Australia – Measures Affecting the Importation of Apples from New Zealand

(WT/DS367)

Second Written Submission of New Zealand

21 April 2009

CONTENTS

LIST OF EXHIBITS

Letter from Pipfruit New Zealand to the New Zealand Ministry of Foreign Affairs and Trade, dated 16 April 2009	**Exhibit NZ-112**
Letter from the New Zealand Avocado Industry Council to the New Zealand Ministry of Agriculture and Forestry, dated 31 March 2009	**Exhibit NZ-113**
Letter from Zespri International Ltd to the New Zealand Ministry of Agriculture and Forestry, dated 6 April 2009	**Exhibit NZ-114**
Agricultural Statistics Yearbook, Council of Agriculture, Taiwan, 2007 (Extract only)	**Exhibit NZ-115**
Cotter H van T, Blanchard RO (1978) "Heterothallism in Nectria cocciniea var. Faginata", *Mycologia* 50, 697-700	**Exhibit NZ-116**
Wessel H (1980), "Study of the Influence of Climatic Factors on the Development of Apple Canker (*N. galligena)*", Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent., 45(2):183-190 (German and English)	**Exhibit NZ-117**
Cross JV and Hall DR (2008) "Exploitation of the sex pheromone of apple leaf midge *Dasineura mali* Kieffer (Diptera: Cecidomyiidae) for pest monitoring: Part 1. Development of lure and trap" Crop Protection 28, 1 – 6; and Cross JV, Hall DR, Shaw P and Anfora G (2008) "Exploitation of the sex pheromone of apple leaf midge *Dasineura mali* Kieffer (Diptera: Cecidomyiidae): Part 2. Use of sex pheromone traps for pests monitoring" Crop Protection 28, 1 – 6.	**Exhibit NZ-118**
Sandanayaka M and Rogers D (2009) "Effect of cold storage on emergence and mortality of apple leafcurling midge" *New Zealand Institute For Plant and Food Research Ltd* p 1 – 8	**Exhibit NZ-119**
Plant Health Australia and Apple and Pear Australia Ltd "Orchard Biosecurity Manual for the Apple and Pear Industry" (2008), p 1 – 28	**Exhibit NZ-120**
Rodoni B, Kinsella M, Gardner R and Merriman P (1999) "Detection of *Erwinia amylovora*, The Causal Agent of Fire Blight", in the Royal Botanic Gardens, Melbourne, Australia", Proceedings of the 8th International Workshop on Fire Blight", Acta Horticulturae 489, 169-170	**Exhibit NZ-121**
Horticulture facts and figures 2000, HortResearch, Private Bag 11030 Palmerston North pp 16 – 17 (Extract only); *Fresh facts New Zealand Horticulture 2007*, HortResearch, Private Bag 92169, Auckland, p 20 - 21 (Extract only)	**Exhibit NZ-122**
Amos ND, Cleland DJ, Cleland AC and Banks NH (1993), "*The effect of coolstore design and operation on air relative humidity*", Massey University, Palmerston North, New Zealand, 1 - 10	**Exhibit NZ-123**

International Standards for Phytosanitary Measures No. 11 (2004) "Pest Risk Analysis for Quarantine Pests including Analysis of Environmental Risk and Living Modified Organisms" para 2.2.1.4 (Extract only)	**Exhibit NZ-124**
Australian Quarantine Inspection Service "Requirements for Offshore Pre-clearance Inspection of Fresh Fruit and Vegetables (2000) p 4 (Extract only)	**Exhibit NZ-125**
Mizuno A, Sato S, Kawai A, Takahashi K, Nishiyama K, Azegami K, Ieki H, Komamura K (2003) "Review of alleged occurrence of fire blight in Japan" *Research Bulletin of the Plant Protection Service*, Japan. Yokohama Plant Protection Station, Ministry of Agriculture, Forestry and Fisheries, Yokohama, Japan 39, 109-116	**Exhibit NZ-126**
Australian Bureau of Statistics, Agricultural Survey, Apples and Pears, 2007-2008, 1-2	**Exhibit NZ-127**
Draft Import Risk Analysis Report for Fresh Apples Fruit from the People's Republic of China, January 2009, pp 126 – 133 and 160 - 161 (Extract Only)	**Exhibit NZ-128**
Xu X-M and Robinson JD (2000) "Epidemiology of brown rot (*Monilinia fructigena*) in apple: infection of fruits by conidia", *Plant Pathology* 49: 201-206	**Exhibit NZ-129**
Commonwealth Agricultural Bureau Compendium (CABI), *Crop Protection Compendium: Monilinia fructicola*, 2007 edition, 1-2	**Exhibit NZ-130**
Commonwealth Agricultural Bureau Compendium (CABI), *Crop Protection Compendium: Monilinia laxa*, 2007 edition, 1-2	**Exhibit NZ-131**
Department of Primary Industries Victoria, *Agriculture Notes, Brown Rot of Stone Fruits*, Jan 2006	**Exhibit NZ-132**
Department of Primary Industries New South Wales Management Guide, *Orchard Plant Protection Guide for deciduous fruits in NSW 2008-2009* (18^{th} ed.) pp. 9, 32, 36, 40, 46 and 47 (Extract Only)	**Exhibit NZ-133**
Schimanski LJ, Jennings D and Brown G (2005) "Overcoming Fumigation Damage of 'Fuji' Apples destined for Japan" *Acta Horticulture. International Society for Horticultural Science, Leuven* 682(2), 1185-1191	**Exhibit NZ-134**

CASES CITED

Short Title	**Full Case Title and Citation**
Australia – Salmon	Panel Report, *Australia – Measures Affecting Importation of Salmon*, WT/DS18/R and Corr.1, adopted 6 November 1998, modified by Appellate Body Report, WT/DS18/AB/R, DSR 1998:VIII, 3407
Australia – Salmon	Appellate Body Report, *Australia – Measures Affecting Importation of Salmon*, WT/DS18/AB/R, adopted 6 November 1998, DSR 1998:VIII, 3327
Australia – Salmon (Article 21.5 – Canada)	Panel Report, *Australia – Measures Affecting Importation of Salmon – Recourse to Article 21.5 of the DSU by Canada*, WT/DS18/RW, adopted 20 March 2000, DSR 2000:IV, 2031
Canada – Continued Suspension.	Appellate Body Report, *Canada - Continued Suspension of Obligations in the EC – Hormones Dispute,* WT/DS321/AB/R, adopted 14 November 2008.
EC – Asbestos	Appellate Body Report, *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products,* WT/DS135/AB/R, adopted 5 April 2001, DSR 2001: VII, 3243.
EC – Asbestos	Panel Report, *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products,* WT/DS135/R and Add.1, adopted 5 April 2001, as modified by Appellate Body Report, WT/DS135/AB/R, DSR 2001: VIII, 3305.
EC – Biotech Products	Panel Report, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS291/R, WT/DS292/R, WT/DS293/R, Corr.1 and Add. 1, 2, 3, 4, 5, 6, 7, 8, and 9, adopted 21 November 2006.
EC – Hormones (US)	Panel Report, *EC Measures Concerning Meat and Meat Products (Hormones)*, WT/DS26/R/USA, adopted 13 February 1998, modified by Appellate Body Report, WT/DS26/AB/R, WT/DS48/AB/R, DSR 1998:III, 699
EC – Hormones	Appellate Body Report, *EC Measures Concerning Meat and Meat Products (Hormones)*, WT/DS26/AB/R, WT/DS48/AB/R, adopted 13 February 1998, DSR 1998:I, 135
EC – Salmon	Panel Report, *European Communities - Anti-dumping Measure on Farmed Salmon from Norway,* WT/DS337/R.
Japan - Alcoholic Beverages II	Appellate Body Report, *Japan – Taxes on Alcoholic Beverages,* WT/DS10/AB/R, WT/DS11/AB/R, WT/DS8/AB/R, adopted 1 November 2006.
Japan – Agricultural Products II	Appellate Body Report, *Japan – Measures Affecting Agricultural Products*, WT/DS76/AB/R, adopted 19 March 1999, DSR 1999:I, 277

ABBREVIATIONS

ABARE	Australian Bureau of Agricultural and Resource Economics
ACER	Australia's comments on experts' responses
ACNZCER	Australia's comments on New Zealand's comments on experts' responses
AFWS	Australia's first written submission
ALCM	Apple leafcurling midge
ALOP	Appropriate level of sanitary or phytosanitary protection
AQIS	Australian Quarantine Inspection Service
ARPQ	Australia's responses to Panel questions
BRS	Bureau of Rural Sciences
CABI	Commonwealth Agricultural Bureau Compendium
CSIRO	Australia's Commonwealth Scientific and Industrial Research Organisation
CVD	Countervailing Duty
DAFWA	Department of Agriculture and Food Western Australia
DPI	Department of Primary Industries
DSB	Dispute Settlement Body
DSU	*Understanding on Rules and Procedures Governing the Settlement of Disputes*
EA (Ea)	*Erwinia amylovora*
ECRPQ	European Communities Responses to Panel Questions
EPPO	European and Mediterranean Plant Protection Organization
IFP	Integrated fruit production
IPPC	International Plant Protection Convention

IRA	Import risk analysis
ISPM	International Standards for Phytosanitary Measures
JRPQ	Japan's responses to Panel questions
MAF	New Zealand Ministry of Agriculture and Forestry
MAFBNZ	MAF Biosecurity New Zealand
NIWA	National Institute of Water and Atmospheric Research
NZCACER	New Zealand's comments on Australia's comments on experts' replies
NZCER	New Zealand's comments on experts responses
NZFWS	New Zealand's first written submission
NZPPC	New Zealand Plant Protection Centre
NZRPQ	New Zealand's responses to Panel questions
OIE	World Organisation for Animal Health
PEES	probability of entry, establishment and spread
PPEES	probability of entry, establishment and spread
PRA	Pest Risk Assessment
RPC	Returnable plastic crate
RPQ	Responses to Panel questions
SAA	Statement of Administrative Action
SOP	Standard operating procedure
SPS Agreement	*Agreement on the Application of Sanitary and Phytosanitary Measures*
TCE	Tray cartons equivalents
TPKM	The Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu

TPS	Third party submission
USRPQ	United States responses to Panel questions
VBNC	Viable but non-culturable

I. INTRODUCTION

1.1 In its first written submission, New Zealand established that Australia's measures for the importation of apples from New Zealand are not in conformity with Australia's obligations under the *SPS Agreement*.

1.2 Australia's measures are not maintained with sufficient scientific evidence as required by Article 2.2 of the *SPS Agreement*. There is no scientific evidence that apple fruit imported from New Zealand would serve as a vector for the entry, establishment and spread of fire blight. Equally there is no scientific evidence that apple fruit imported from New Zealand would serve as a vector for the entry, establishment and spread of European canker in Australia. And there is no scientific evidence to support the Australian theory that there is some likelihood of New Zealand apples serving as a pathway for the establishment and spread of ALCM in Australia. In respect of each of these three pests, Australia's position is based on supposition and conjecture, not scientific evidence.

1.3 Australia has also failed to base its measures on a risk assessment as required by Article 5.1 of the *SPS Agreement*. There has been no evaluation of the likelihood of entry, establishment or spread of the pests at issue. Such an evaluation involves considering scientific evidence from respected and qualified sources and, on the basis of such evidence, reasoning that is objective and coherent and conclusions that are sufficiently supported by the scientific evidence. None of this can be found in the IRA. Instead, under the guise of applying a semi-quantitative method of analysis, the IRA assigns "probability values" to events that have never occurred nor have the remotest possibility of occurring, and which bear no relationship to the scientific evidence. Through a combination of the weight applied to those values and their multiplication by overestimated volumes of trade, the IRA reaches conclusions about probability of occurrence that are vastly in excess of what could happen in the real world. The result is clearly not an objectively justifiable assessment of risk.

1.4 The responses of the experts to the Panel's questions have confirmed the flaws in the IRA and the insufficiency of the scientific evidence to support the assumptions upon which Australia's measures are based.

1.5 Australia's reaction, in its first written submission, in the oral hearing and in its responses to questions, has been to seek to divert the panel from the real issues at stake in this case. New Zealand, it claims, is challenging Australia's right to set its own ALOP; New Zealand has failed to meet its burden of proof; New Zealand is denying Australia's right to rely on minority or divergent opinion; and New Zealand is trying to turn *Japan – Apples* into some form of higher law or *jus cogens*. And, when Australia does start to turn its attention to the real issues in the case, it seeks to change the ground rules. According to the Australian view, Article 5.1 prevails over Article 2.2, reversing the plain wording of the *SPS Agreement*, and the jurisprudence of panels and the Appellate Body. The Panel, Australia asserts, must give "considerable deference" to the IRA, again seeking to undermine established jurisprudence. The Panel, Australia asserts, cannot rule on measures that Australia self-designates as "ancillary" measures. And, according to Australia, the IRA is no longer just a risk assessment; it is a product of "expert judgement", and is itself a source of scientific evidence and therefore insulated from review.

1.6 Moreover, in its comments on the experts' responses Australia now seeks to insulate its risk assessment even further by invoking "scientific uncertainty". But Australia misapplies the notion of scientific uncertainty, suggesting that it exists wherever the scientific evidence does not sufficiently support the IRA's conclusions. Australia appears to believe that the less scientific evidence it has to support its conclusions, the lower the legal threshold should be for establishing the "sufficiency" of that evidence.

1.7 All of this is simply an effort to divert the Panel from the real issues in this case, and to shield the IRA from the review that the Panel must conduct in accordance with its mandate under the DSU and reflected in the jurisprudence down to the most recent decision in *Canada – Continued Suspension*.

1.8 As New Zealand pointed out in its closing statement at the first oral hearing, the fundamental issue in this case is whether the measures imposed by Australia are based on science. The Panel must ask itself, in accordance with the terms of Article 2.2 whether there is a "rational or objective relationship" between the measures and scientific evidence. The Panel must, in terms of Article 5.1, consider whether there has been a proper assessment of the "likelihood of entry, establishment and spread" of the three pests at issue. These are the key matters, which, by focusing on considerable deference, minority or divergent opinion, "scientific uncertainty", and the sanctity of the IRA's conclusions, Australia seeks to avoid.

1.9 Australia's attempt to divert attention from the substantive issues in this case carries over into its treatment of the other provisions of the *SPS Agreement*, Articles 5.2, 5.5, 5.6 and Article 8 and Annex C with which, as New Zealand has pointed out, Australia is not in compliance. Australia denies that it has any obligation to give "genuine consideration" to factors that it is required to take into account under Article 5.2. It minimises the effects of its different treatment of similar risks which, contrary to Article 5.5, result in discrimination and a disguised restriction on international trade. Equally, Australia's only explanation for its failure to adopt alternative, less trade restrictive measures is to fall back on the seriously flawed assessment of risk contained in the IRA.

1.10 Finally, Australia seeks to pre-empt the Panel from considering New Zealand's arguments in relation to Article 8 and Annex C, arguments dealing with undue delay and the possible reasons for that delay. It is understandable why Australia does not wish to have this matter addressed by the Panel, for it underscores the intense political opposition generated by Australia's domestic apple-growing industry against the importation of New Zealand apples. The eight-year delay in finalising an import risk analysis, and the parallel domestic political process, expose the IRA for what it truly is – a document with a veneer of scientific plausibility but, in fact, produced to deal with a difficult political issue in Australia.

1.11 In this second written submission, New Zealand will show that the position it set out in its first written submission, reiterated at the oral hearing and in its responses to questions, remains unchallenged. Australia's arguments that would shelter the IRA from proper review are wrong as a matter of law; Australia's attempts to support what was said in the IRA do not withstand analysis; and Australia's attempt to shore up the IRA with new evidence or arguments, including arguments that the IRA itself rejected, simply have no credibility. The fundamental point in this case is the lack of sufficient scientific evidence to support Australia's actions and this has been underlined by the responses of the experts to the Panel's questions. Accordingly, there can be no doubt that Australia's measures designed as a barrier to the importation of New Zealand apples breach the provisions of the *SPS Agreement*.

1.12 This second written submission contains a detailed rebuttal of Australia's arguments, and is organised in the following way:

- Sections A. to E. (paras. 2.1 to 2.98) present New Zealand's rebuttal in relation to preliminary technical and legal matters, namely the measures and product at issue, mode of trade, standard of review and burden of proof, and order of analysis.

- Section F. (paragraphs. 2.99 to 2.292) contains New Zealand's rebuttal in respect of Article 2.2, beginning with a general section on Article 2.2 legal issues, followed by rebuttal in relation to each of the three pests at issue, and concluding with a section on the general measures.

- Section G. (paragraphs. 2.293 to 2.803) contains New Zealand's rebuttal in respect of Article 5.1, which includes a section on the applicable legal standard, followed by a section relating to the methodological flaws in Australia's risk assessment, rebuttal in relation to each of the three pests at issue, and finally rebuttal in relation to Australia's failure in the IRA to evaluate likelihood according the measures that might be applied.

- Sections H, I, J. and K. respectively (paragraphs. 2.804 to 2.943) deal with New Zealand's rebuttal in relation to Articles 5.2, 5.5, 5.6 and Article 8 and Annex C.

1.13 In addition, New Zealand reaffirms all of its claims and arguments made in previous submissions to the Panel.

II. DETAILED REBUTTAL OF AUSTRALIA'S ARGUMENTS

A. MEASURES AT ISSUE

1. The measures identified by New Zealand are SPS measures

2.1 In its first written submission, New Zealand established that all of the measures identified in New Zealand's Panel request are SPS measures within the meaning of Annex A(1) of the *SPS Agreement*.

2.2 Australia has claimed that not all of the measures identified by New Zealand are SPS measures, on the basis that not all of them "actively" reduce risks. Australia's interpretation has no basis in the *SPS Agreement* or the relevant case law, and should be rejected.

2.3 Australia argues that the definition of SPS measures contained in Annex A(1) of the *SPS Agreement* only includes measures that "actively" reduce SPS risks.[1] Australia calls these "principal" measures. Australia suggests that measures that reduce risk in a less direct way by supporting or implementing "principal measures" (which Australia calls "ancillary measures"), are not SPS measures in their own right.[2] Although Australia acknowledges that this is not made explicit in the definition of an SPS measure under the *SPS Agreement* itself, Australia claims that when read alongside the panel report in *US – Export Restraints*, such a distinction is "implicit".[3]

2.4 There are many problems with Australia's argument. First, Australia's interpretative approach is flawed. When properly interpreted it is clear that the definition of SPS measures in the *SPS Agreement* includes any measures applied to protect against SPS risks. Second, there is no basis for suggesting that the reasoning in *US – Export Restraints* changes the clear definition of SPS measures in the *SPS Agreement*. Moreover, there is no similarity between the interpretive instruments considered in that *US – Export Restraints* and Australia's SPS requirements in this

---

[1] Australia's responses to Panel Questions (ARPQ), Q 24, p. 23. See also Australia's first written submission (AFWS), para. 859.

[2] AFWS, para. 141, ARPQ, Q 12, p. 9, Q 14, p. 10.

[3] ARPQ, Q 23, p. 22.

case. Third, measures that are "supportive' in risk reduction are still applied to protect against SPS risks and are therefore SPS measures. Fourth, the distinction proposed is confusing and unworkable. There is no consensus on how to distinguish between "principal" and "ancillary" measures. Finally, even if some measures are treated as elements of a broader SPS measure, this does not shelter them from review under the *SPS Agreement*.

(a) The definition of SPS measures is not limited to measures that "actively" reduce risk

2.5 Under Article 31(1) of the Vienna Convention on the Law of Treaties the terms of a treaty are to be interpreted in accordance with their ordinary meaning in their context and in light of the object and purpose of the treaty. The *SPS Agreement* expressly defines an SPS measure as "[a]ny measure applied" to protect against certain SPS risks. There is nothing in the words used in this definition to suggest that it applies only to measures that "actively reduce risks" (putting to one side what "actively reduce risks" actually means), as opposed to "ancillary" measures that are "supportive" in risk reduction. Indeed, the definition clearly provides that SPS measures are "any" measures applied to protect against SPS risks.

2.6 This reading is confirmed by considering the remainder of paragraph 1 of Annex A which sets out some examples of SPS measures. This list expressly includes "testing, inspection, certification and approval procedures." These are the very kind of 'ancillary measures' that Australia is seeking to exclude from the definition. The panel in *Japan – Apples* confirmed that certain certification, inspection, and verification requirements "fall within the definition of phytosanitary measures contained in Annex A, paragraph 1, of the *SPS Agreement*, which includes "inspection, certification and approval procedures"."[4]

2.7 Moreover, Australia's narrow reading of "SPS measures" is not consistent with the object and purpose of the *SPS Agreement*. Australia suggests that the science-based obligations in the *SPS Agreement* only apply to "principal measures" that "actively" reduce risks. According to this argument, provided that the "principal"

[4] Panel Report, *Japan – Apples*, para. 8.24.

measures are WTO-compliant, an importing member has free licence to impose any number of onerous and restrictive 'ancillary' measures, none of which are required to be science-based or shown to assist in the reduction of risk. Clearly such an interpretation would circumvent key provisions in the *SPS Agreement*.

(b) US – Export Restraints does not change the definition of SPS measures in the SPS Agreement

2.8 Australia has acknowledged that "the terms "principal" and "ancillary" measures do not appear in the *SPS Agreement*."[5] However, Australia argues that "when the definition of "SPS measure" in Annex A(1) of the *SPS Agreement* is read together with the panel's reasoning from the *US – Export Restraints* case, such a distinction is implicit."[6] There is no basis for this interpretative approach. The *US – Export Restraints* case (which concerned subsidies under the Agreement on Subsidies and Countervailing Measures) cannot be used to override the clear definition of SPS measures in the *SPS Agreement*.

2.9 Moreover, there is simply no similarity between the preambular and interpretative instruments considered in *US – Export Restraints* and the substantive requirements that Australia claims are "ancillary" measures in this case. The panel in *US – Export Restraints* considered that the Statement of Administrative Action and Preamble to US countervailing duty regulations could not give rise to violations of WTO obligations because they did not "[operate] in some concrete way in [their] own right".[7] They did not "*do* anything";[8] they were merely interpretive.[9] This stands in stark contrast to Australia's "ancillary" measures. None of these so-called ancillary

[5] ARPQ, Q 23, p. 22.

[6] Ibid.

[7] Panel Report, *US – Export Restraints*, para. 8.85.

[8] Panel Report, *US – Export Restraints*, para. 8.114.

[9] At paras. 8.99 and 8.114: "The unique legal status granted to the SAA is, however, in respect of its interpretive authority in respect of the statute….We find no evidence… that the SAA has an operational life or status independent of the statute such that it could, on its own, give rise to a violation of WTO rules. Independent of the statute, the SAA does not *do* anything." At para. 8.113: the Preamble to the US Countervailing Duty Regulations "could by its very nature only inform the reader of the rationale generally for the regulations, and for the interpretations and methodologies contained therein…we are not persuaded that the fact that a general statement of basis and purpose is described as being 'incorporate[d] in the rules' automatically confers on that statement the same operational status and effect as the rules themselves…. it does not *do anything*".

measures merely interpret other measures. All of them "[operate] in some concrete way in [their] own right". To take just two examples, the requirement to disinfect packing equipment does not "interpret" the requirement to disinfect fruit; and the requirement to intensively examine all new planting stock does not "interpret" the requirement that apples are sourced from orchards free from European canker. These are separate requirements, enforced separately in time, entailing additional burdens, and with which compliance is mandatory in order to export apples to Australia.[10] There is no comparison between these ancillary requirements and the Statement of Administrative Action and Preamble in *US – Export Restraints.*

2.10 Finally, a key consideration in the *US – Export Restraints* case for determining whether each measure operated in its own right was the status of each of the measures under US law. The panel found that only the Statute had an operational life of its own: "the [Department of Commerce] is legally bound to ensure that the criteria set out in the Statute are satisfied. Given this, it is clear that the Statute has an operational life in its own right".[11] In the present case the status of the measures is not in doubt. The measures as set out in the IRA are, pursuant to the decision of Director of Animal and Plant Quarantine of March 2007, the legal requirements for the importation of New Zealand apples. Therefore, it would be entirely consistent with the *US – Export Restraints* case to treat the "ancillary" measures in this case as measures that individually give rise to violations of the WTO Agreements.

(c) Measures that are "supportive" in risk reduction are still aimed at reducing SPS risks

2.11 New Zealand accepts that some of the measures at issue are closely related to other measures at issue. Some may even be characterised as "supporting",

[10] New Zealand's responses to Panel questions (NZRPQ) noted that an important criterion for determining whether a measure operates in its own right is whether a breach of that measure alone would result in the suspension of apple imports. In its responses to Panel questions, Australia has argued that non-compliance with the ancillary measure would generally indicate non-compliance with its related principal measure and that any suspension of any imports would take place on that basis. However, a failure to properly examine new planting stock does not imply a breach of the orchard freedom or inspection requirements. Likewise, a failure to disinfect grading and packing equipment does not indicate non-compliance with the "principal" requirement to disinfect apples. These are entirely separate requirements, and non-compliance with one is neither a necessary nor a sufficient condition to imply non-compliance with the other.

[11] Para. 8.91.

"verifying" or "operationalising" other measures.[12] However, the key point is that all of the measures are aimed in some way at protecting against alleged SPS risks. If they were not, then it is difficult to understand why the IRA would have deemed them necessary in the first place.

2.12 A measure that is "supportive" in SPS risk reduction is, by definition, applied to protect against SPS risks. Measures that "verify" other measures are applied to protect against the risk that those other measures will not be correctly performed or performed without error. Thus, they, too, are applied to protect against the risk of entry, establishment and spread as a result of such errors. Likewise, there is nothing inherent in the notion of "operationalising" another measure that suggests that the operationalising measure does not act to reduce risks. The very notion of "operationalising" is an active one that stands in contrast to, for example, merely "interpreting" a measure. For example, the orchard inspection and orchard suspension requirements may well be considered as "operationalising" the requirements to source apples from orchards free of fire blight symptoms or European canker.[13] But even Australia does not suggest that these requirements are "ancillary" or that they do not "[operate] in a concrete way in [their] own right".[14] Therefore, the fact that certain requirements may "support, verify, or operationalise" other SPS measures does not disqualify them from being SPS measures in their own right. Indeed, such measures are themselves applied to protect against SPS risks.

2.13 Dr Deckers supported this view. He stated that "all the measures described in Australia's IRA can be considered as measures that reduce the risk for infections actively directly or indirectly. Some of the measures describe the implementation of the measures, but in fact the result for all these measures is always with the intention to reduce the infection risks."[15]

[12] AFWS, para. 140.

[13] When asked "from a technical perspective" to distinguish between principal and ancillary measures, or between measures active in risk reduction and measures designed to implement or support active measures, some of the experts categorised the orchard inspection and suspension requirements as being supportive or 'ancillary. See for example Latorre RPQ, Q 93.

[14] Panel Report, *US – Export Restraints,* para. 8.85.

[15] Deckers RPQ, Q 48, p. 18. See also his responses to Q 93 and Q 123.

(d) The distinction between measures that "actively" reduce risk and measures that are "supportive" in risk reduction is confusing and unworkable

2.14 There are no clear and consistent criteria for distinguishing between "principal" and "ancillary" measures. As noted above, according to Australia, "principal measures" are those that "actively" reduce risks. But it is not always clear how this definition relates to the way Australia has categorised the measures in this case. Indeed, a number of the measures identified by Australia as "ancillary" appear to be concerned with "active" risk reduction. For example:

- the requirement that packing houses registered for export of apples process only fruit sourced from registered orchards is presumably intended to prevent cross-contamination of clean apples, and is therefore aimed at reducing the risk that such apples, infested with *E. amylovora*, will be imported into Australia;

- the requirement to disinfect all grading and packing equipment is presumably intended to reduce the risk that clean apples from registered orchards will be contaminated by grading and packing equipment that may have earlier been contaminated by fruit from non-registered orchards and is therefore aimed at reducing the risk that such apples, infested with *E amylovora*, will be imported into Australia;

- the requirement that all new planting stock be intensively examined and treated for European canker is presumably intended to prevent the entry, establishment and spread of European canker by reducing the likelihood that apples will be sourced from export orchards with European canker.[16]

2.15 The inconsistency in Australia's application of its own definitions underlines the difficulties inherent in applying the kind of distinction that Australia is suggesting. Indeed, it is clear from the expert responses that while a number of experts consider that it may be possible from a "technical" perspective to distinguish between measures that are active in risk reduction and measures that are supportive, there is no consensus as to which measures fall within which category.[17]

---

[16] AFWS, para. 949 states that "the IRA explicitly noted that 'infected nursery stock presents a pathway for the establishment and spread of European canker in places of production" (IRA, p. 154).

[17] See experts' responses to Panel questions, Qs 48, 93, 139.

2.16 Of course, whether or not it is technically possible to make such a distinction, the issue of whether measures are SPS measures under the *SPS Agreement* is a legal question (a point which Australia itself concedes[18]) to be determined by the Panel in accordance with the ordinary meaning of the definition in Annex A(1), and, in this regard, the existence of any technical meaning may not be relevant. Moreover, the differences in the experts' responses further highlight the difficulties that would arise if Australia's distinction were to be applied.

(e) Even if some measures are treated as elements of a broader SPS measure they are still subject to the obligations in the SPS Agreement

2.17 Australia itself admits that "[w]hen 'taken as a whole' with related principal risk reduction measures … the ancillary measures may fall within the definition of 'SPS measure'".[19] Whether the measures are treated individually or as a whole, principal or ancillary, the Panel can still make individual findings on each measure. In *Japan – Apples*, the panel decided to treat a number of requirements relating to the export of apples from the United States to Japan as elements of a single SPS measure. That did not prevent the panel from making "specific findings on each of the elements of the compliance measure without having to treat each element as a separate measure."[20] Accordingly, following the approach of the panel in *Japan – Apples (Article 21.5 - US)*, even if the Panel in the present case were to treat some of the requirements identified in New Zealand's panel request as elements of a broader SPS measure, this would not prevent the Panel from making separate findings on each of the requirements. In New Zealand's view, making separate findings on the WTO-consistency of each of the requirements is necessary in order to secure a prompt and positive solution to this dispute.

[18] Australia's comments on the experts' responses (ACER), para. 295.

[19] ARPQ, Q 14, p. 10.

[20] Panel Report, *Japan – Apples (Article 21.5 – US)*, para. 8.29.

2. The measures at issue in this dispute are those identified in New Zealand's panel request

2.18 In New Zealand's submission, with the exception of measure 12 (below), measures identified in the New Zealand panel request and in the terms therein described remain at issue in this dispute.

(a) The parties have reached agreement as to non-pruning requirement (measure 12)

2.19 Following the first substantive meeting of the parties, the parties entered discussions and have reached a common agreement that the matter related to measure 12 ('non-pruning' requirement) has been clarified in a mutually satisfactory manner and that, accordingly, New Zealand will not further pursue its claims in respect of this measure in the context of the current dispute.

2.20 As set out in the letter from the parties to the Panel of 19 December 2009, the parties have thus proposed that the following text be included in the Panel report to record the agreement reached between the parties:

> The Panel noted Australia's submission that it does not impose "[t]he requirement that an orchard/block be suspended for the season on the basis that any evidence of pruning or other activities carried out before the inspection could constitute an attempt to remove or hide symptoms of European canker" referred to in the twelfth bullet point of New Zealand's panel request. The Panel also noted New Zealand's advice that, based on Australia's confirmation that it does not impose such a requirement, it will not pursue its claim in relation to the twelfth bullet point of its panel request. In view of this, the Panel concluded that there was no need for it to rule on this aspect of New Zealand's claim.

(b) AQIS involvement remains a "measure at issue" (measure 15)

2.21 Australia argues that the measure related to AQIS involvement (measure 15) is not at issue. Australia suggests that New Zealand has mischaracterised the extent of AQIS involvement. According to Australia, AQIS involvement is indistinguishable from the "systems audit" identified by New Zealand as an alternative measure under

Article 5.6 and, accordingly, there is "no live dispute with respect to this measure" between the parties.[21]

2.22 As set out in New Zealand responses to Panel questions, Australia's definition of a systems audit does not conform to New Zealand's understanding of the term.[22] New Zealand and Australia continue to differ as to the intensity, scope and WTO-consistency of any potential AQIS involvement requirement. Accordingly, measure 15 remains a live issue between the Parties.

2.23 First, despite Australia's attempt to equate "AQIS involvement" with a systems audit, it is important to note that there was no reference to a "systems audit" in the IRA. As Australia itself conceded in its first written submission "the level and precise nature of "AQIS involvement" was not well defined in the Final IRA Report."[23] Accordingly, whereas Australia's first written submission now refers to an audit of "100% of survey teams in the field,"[24] the IRA referred to "[AQIS involvement] in orchard inspections for European canker and fire blight."[25] Rather than an audit of "all relevant packing houses,"[26] the IRA referred to "[AQIS involvement] in direct verification of packing house procedures, and in fruit inspection"[27] and "supervision" by AQIS officers of procedures in the packing house, including fumigation treatments.[28] Further, although Australia's first written submission now suggests that with respect to audits of survey teams the level of scrutiny may decline from 100% over time "based on performance"[29], the IRA was entirely silent on this point. New Zealand also notes that there is no explicit

---

[21] AFWS, para. 155.

[22] NZRPQ, Q 46.

[23] AFWS, para 151. See also ARPQ, Q 47, p. 36 which stated that "elements [of the measure] required clarification".

[24] AFWS, para. 151.

[25] IRA, p. 314.

[26] AFWS, para. 151.

[27] IRA, p. 314.

[28] In respect of ALCM, under "Option 1: Inspection with Treatment", the IRA stipulates at p. 320 that "Under pre-clearance arrangements AQIS would be involved in the *supervision of these procedures*" (emphasis added). "These procedures" includes the requirement that, "where any live quarantinable arthropod is found the lot must be subjected to *an appropriate treatment* (for example, fumigation) or rejected for export." (Emphasis added.)

[29] AFWS, para. 151.

clarification in Australia's first written submission in relation to performance-based audits of New Zealand packing houses.[30]

2.24 The lack of clarity in the IRA with respect to this requirement is also reflected in the varied views of the experts as to what exactly 'AQIS involvement' might entail.[31]

2.25 Second, notwithstanding Australia's efforts at clarification, New Zealand and Australia continue to differ as to the intensity and scope of any potential AQIS audit.

2.26 While Australia has characterised its AQIS involvement measure as involving the "audit of 100% of survey teams and packing houses", in New Zealand's view an audit to ensure an appropriate level of confidence in the New Zealand phytosanitary certification system would involve observing only a sample of all necessary aspects of the export programme.[32]

2.27 As Dr Deckers confirms: "A systems audit should not mean an audit for 100% survey of the teams in the field in the first year and for 100% of all the packing houses involved."[33] Thus, this matter remains in dispute between the parties.[34]

2.28 New Zealand and Australia also disagree as to the scope of any AQIS audit. Australia's position is that AQIS auditing should extend to all survey teams completing inspections for fire blight and European canker and to all packing houses to ensure compliance with measures in the packing house[35] (which include inspection for ALCM and treatments for ALCM and fire blight).

2.29 However, New Zealand's position is that an AQIS audit should relate only to those requirements imposed by Australia that are WTO-consistent, in particular those

[30] AFWS, para. 151.

[31] Experts' RPQ, Qs 4, 5.

[32] NZRPQ, Q 52.

[33] Deckers RPQ, Q 5, p. 2.

[34] Moreover, as Dr Schrader points out (Schrader RPQ, Q 5, p. 3), "the members of the survey team being audited is not quantified…Australia could conclude that the team has to be audited in total…." Furthermore, in its comments on experts' replies, Australia does not deny the possibility that the auditor "may observe and question an entire survey team to satisfy themselves that there was an appropriate level of competence: ACER, para. 283.

[35] AFWS, para. 151.

measures which are supported by sufficient scientific evidence in accordance with Article 2.2 and based on a risk assessment under Article 5.1. In New Zealand's view, because none of the measures at issue in this case are consistent with these obligations, AQIS audit of those measures similarly cannot be supported. Thus, for example, an audit of survey teams cannot be WTO-consistent when inspection of orchards to confirm freedom from symptoms of fire blight or European canker is not supported by sufficient scientific evidence.

2.30 Thus, the issue that remains in dispute between the parties is whether the AQIS involvement requirement is WTO consistent.

(c) No clarification of the remaining measures is required

2.31 Australia argues that New Zealand has mischaracterised three of the remaining 15 measures: the requirement that apples be sourced from areas free from fire blight disease symptoms (measure 1); the requirement that the orchard/block be suspended for the season on the basis that any evidence of pruning or other activities carried out before the inspection could constitute an attempt to remove or hide symptoms of fire blight (measure 4); and the requirement that all new planting stock be intensively examined and treated for European canker (measure 11).[36]

2.32 New Zealand has responded to these arguments fully in its responses to Panel questions.[37] New Zealand will not repeat the same points here, but simply reaffirms its view. In addition, New Zealand notes that none of the revisions proposed by Australia make any material difference in terms of New Zealand's claims that the measures are inconsistent with the *SPS Agreement*. Although New Zealand believes that the measures should be characterised in the terms set out in New Zealand's panel request, the measures are equally WTO-inconsistent if characterised in the terms suggested by Australia.

[36] AFWS, paras. 148-166.

[37] NZRPQ, Qs 33, 37, 38, 40.

B. PRODUCT AT ISSUE

2.33 Whatever disagreement remains as to the precise "product at issue" in this case, the parties appear to agree that the focus of this dispute should be on the type of apple that would actually be traded. New Zealand articulates the product that would actually be traded as "mature, symptomless apples".[38] Australia articulates it slightly differently as "mature apple fruit free of trash, either packed or sorted and graded bulk fruit from New Zealand".[39]

2.34 As explained in New Zealand's responses to Panel questions, New Zealand sees no practical difference between its use of the phrase mature, symptomless apples and the product assessed in the IRA.[40] Indeed, the expert responses confirm that the various articulations of the product actually traded are, in practice, essentially the same.[41]

2.35 First, both New Zealand and Australia refer only to mature apples. And both exclude ungraded fruit. Australia does this explicitly, articulating the scope as "either packed or sorted and graded bulk fruit".[42] A "mature, symptomless" requirement effectively excludes exports of ungraded apples and apples direct from the orchard.[43] "Symptomlessness" is a concept that has been factored into the IRA for fire blight and European canker (it is not relevant to ALCM).[44] For the avoidance of doubt, contrary to Australia's assertions, New Zealand is not arguing that a symptomless apple is necessarily pest-free.[45] Rather, New Zealand's understanding of the meaning of

[38] NZFWS, para. 3.44.

[39] AFWS, para. 123 and ARPQ, Q 1, p. 1.

[40] NZRPQ, Q 1, pp. 1-2.

[41] Experts' RPQ, Q 3. For example, Dr Swinburne notes that "[i]t is difficult to discern any meaningful difference between the various terms applied to the quality of fruit that would be exported from New Zealand" (Swinburne RPQ, Q 3, p. 3).

[42] This is confirmed in ARPQ, Q 8, pp. 6-7.

[43] NZFWS, para. 3.45. Apples that meet the Pipfuit NZ Inc Best Practice Guidelines (**Exhibit NZ-93**) would not be ungraded or exported direct from the orchard because the Guidelines specify various minimum grade standards for all export apples.

[44] The "risk scenario" identified by the IRA for fire blight is focussed on "symptomless mature apple fruit": IRA, pp. 52-53. In respect of European canker, the IRA states that "the risk pathway of greatest concern to export with regard to European canker is symptomless infection and infestation of fruit that cannot be detected by inspection": IRA, pp. 150-151.

[45] ARPQ, Q 3, pp. 4-5.

"symptomless" is consistent with the IRA's definition of a "symptomless" apple (which New Zealand has not contested), as being "[w]ithout any visible indication of disease by reaction of the host e.g. canker, leaf spot, wilt."[46] Finally, the scope of the IRA is explicitly limited to apples that are free from trash, which is not challenged by New Zealand.[47]

C. MODE OF TRADE

2.36 As explained in New Zealand's first written submission, the likely mode of trade for New Zealand apple exports to Australia is retail ready packaging.[48] In the 2008 season, New Zealand exported approximately 97% of its total apple export crop in retail ready packaging to markets around the world.[49] New Zealand exports of avocados and kiwifruit to Australia are also in retail ready packaging.[50]

2.37 In its first written submission, Australia claimed that New Zealand exporters would be unlikely to export retail ready fruit to Australia.[51] The basis for Australia's claim was that Coles Myer, one of its largest supermarket retailers, has a system of supplying returnable plastic crates (RPCs) to apple suppliers, which New Zealand would not be able to participate in. The only basis for this claim was Australia's assertion that: "It is unlikely that empty crates would be sent from Australia to New Zealand in order for New Zealand exporters to pack their apples for Australia."[52]

2.38 However, as explained in New Zealand's responses to the Panel's questions, New Zealand exporters regularly export product in RPC type packaging.[53] New Zealand apple exporters already supply fruit in this type of recycled crate to Walmart in the United States and Waitrose in the United Kingdom. After initial use, the crates

[46] IRA, Glossary, p. 346.

[47] The IRA requires that all New Zealand apples must be free of trash: IRA, p. 318.

[48] NZFWS, para. 4.129.

[49] **Exhibit NZ-112:** Letter from Pipfruit New Zealand to MFAT dated 19 April 2009.

[50] **Exhibit NZ-113:** Letter from the Avocado Industry Council to MAF dated 31 March 2009 and **Exhibit NZ-114**, letter from Zespri International Ltd to MAF dated 6 April 2009. Zespri is New Zealand's largest kiwifruit exporter.

[51] AFWS, para. 610.

[52] AFWS, para. 610.

[53] NZRPQ, Q 10, para. 19.

are sterilised and returned to New Zealand, inspected on arrival and then repacked with fruit and reshipped to the retailer.[54] If New Zealand exporters can do this for a market as distant as the United Kingdom, they would also be able to do so for Australia. Additionally, New Zealand notes that New Zealand avocados are already exported to Australia using the Coles RPC system.[55] Indeed, in the 2008/9 season, 24% of New Zealand avocado exports to Australia were in a RPC format (and the remainder were in an alternative retail ready format).[56]

2.39 Australia also claims that New Zealand exporters would be unlikely to export retail ready product because bulk bins are the "best commercially available option".[57] However, as explained in New Zealand's responses to the Panel's questions, the export of fruit in bulk bins is not a cheaper option.[58] Contrary to Australia's assertions, assessed according to volume of fruit, the cost of a bin is the same as that of a carton.[59] Further, exporting in bulk bins would involve the additional cost of the double handling required of packing houses in order to transfer fruit to retail ready packaging.[60]

2.40 Thus, Australia's claims that New Zealand exporters would be unlikely to export fruit in retail ready packaging are baseless. To the contrary, the current practice of New Zealand exporters with respect to apples exported to other markets, as well as exports of other agricultural goods to Australia clearly indicate that the likely mode of trade for apple exports to Australia would be retail ready packaged fruit. As confirmed by the expert responses, this is highly significant.[61] New Zealand's first written submission explains that, if New Zealand fruit is retail ready, it would not

[54] NZRPQ, Q 10, para. 19.

[55] **Exhibit NZ-113:** Letter from the Avocado Industry Council to MAF dated 31 March 2009.

[56] **Exhibit NZ-113:** Letter from the Avocado Industry Council to MAF dated 31 March 2009.

[57] AFWS, para. 610.

[58] NZRPQ, paras. 18 and 19.

[59] NZRPQ, paras. 18-19.

[60] NZRPQ, paras. 18-19.

[61] See, e.g., Cross RPQ, Q 98, pp. 8- 9, Q 108, p. 15 and Q 120, p. 21.

require repacking in Australia at orchard wholesalers.[62] Instead, it would be sent directly to urban centres in Australia for retail distribution.[63]

2.41 Australia seeks to downplay the significance of this factor by claiming that New Zealand would not rule out the possibility of exporting apples to Australia in bulk bins.[64] Australia claims that "New Zealand's assertion that the "majority of apple fruit exported to Australia from New Zealand would be 'retail-ready' and 'just-in-time'" is indicative of its continued unwillingness to limit its exports to "retail ready fruit.""[65]

2.42 However, while New Zealand recognises that in practice most trade will be retail ready, the imposition of such a restriction on its trade is valid only if there is scientific evidence to justify it. As explained in New Zealand's responses to the Panel's questions, New Zealand has clearly indicated to Australia that it is prepared to accept such a requirement in the event that Biosecurity Australia determine through a science-based assessment of risk that it is necessary to meet Australia's ALOP. [66]

D. STANDARD OF REVIEW AND BURDEN OF PROOF

2.43 In New Zealand's view, the appropriate standard of review in this case is set out in Article 11 of the DSU. Article 11 provides:

> The function of panels is to assist the DSB in discharging its responsibilities under this Understanding and the covered agreements. Accordingly, a panel should make <u>an objective assessment of the matter</u> before it, including <u>an objective assessment of the</u>

[62] NZFWS, para. 4.129.

[63] As is clear from Coles Myer's *Corporate Social Responsibility Report 2005* exhibited by Australia as **AUS-62** (p. 16), the RPC system is designed to ensure that no re-packaging of product occurs in the country of import. It states that "The returnable plastic crates allow for 'one touch' handling from supplier to shelf; suppliers pack their product directly into the crates which are delivered to stores and then placed directly onto fixtures."

[64] See for example ACER, para. 229 where Australia claims the IRA did not need to take into account the issue of mode of trade because "New Zealand refused to rule out the use of other modes of trade and undertake to only export 'retail ready' apples".

[65] ARPQ 9, p. 7. See also AFWS, paras. 124 and 780; and IRA, p. 9.

[66] NZRPQ, Q 7, paras. 14-15. See also New Zealand's comments on the revised draft IRA 2005 **(Exhibit NZ-56)** in which New Zealand explicitly requested that Australia assess the two basic forms of product which might be traded, namely retail ready and bulk, and consistent with the *SPS Agreement*, propose phytosanitary measures should this be justified by the science.

> facts of the case and the applicability of and conformity with the relevant covered agreements, and make such other findings as will assist the DSB in making the recommendations or in giving the rulings provided in the covered agreements. (Emphasis added.)

2.44 The *EC – Hormones* case provided the Appellate Body with its first opportunity to address the appropriate standard of review under the *SPS Agreement*. The Appellate Body found that Article 11 "articulates with great succinctness but with sufficient clarity the appropriate standard of review".[67] This standard of review has been applied in every SPS case since. In New Zealand's view the law in this regard is clear.

2.45 Yet Australia has put forward a radical, albeit not completely novel, alternative, namely that SPS risk assessments be accorded "considerable deference" under the *SPS Agreement*. It is radical in the sense that it has no basis in the *SPS Agreement*, and it lacks novelty in the sense that it has been rejected twice before by the Appellate Body. Australia's efforts to rely on a highly deferential standard of review in order to defend the apples IRA, reflects the shortcomings of its substantive case. In any event, Australia's arguments are misguided and should be rejected.

2.46 Australia's starting point is to claim that Article 11 of the DSU is "couched in broad terms and provides limited guidance on the precise nature and intensity of the review required of a panel in its fact-finding role."[68] In a similar vein, Australia states that "merely acknowledging that a panel must conduct an 'objective assessment of the facts', pursuant to Article 11 of the DSU, tells a panel little more than that its evaluation must be unbiased and impartial."[69] This is not correct. In fact, panels and the Appellate Body have provided extensive guidance as to what an "objective assessment" entails in the context of the *SPS Agreement*. It is clear from this guidance that an "objective assessment" does not simply relate to the state of mind of the panel members. Rather, it relates to the type of examination that the panel must undertake.

[67] Appellate Body Report, *EC – Hormones*, para. 116.

[68] AFWS, para. 175.

[69] ARPQ, Q 55, first para, p. 43.

2.47 For example, in *EC – Hormones* the Appellate Body stated that:

> So far as fact-finding by panels is concerned, their activities are always constrained by the mandate of Article 11 of the DSU: the applicable standard is neither *de novo* review as such, nor "total deference", but rather the "objective assessment of the facts". Many panels have in the past refused to undertake *de novo* review, wisely, since under current practice and systems, they are in any case poorly suited to engage in such a review. On the other hand, "total deference to the findings of the national authorities", it has been well said, "could not ensure an 'objective assessment' as foreseen by Article 11 of the DSU.[70]

2.48 The Appellate Body elaborated on this, noting that:

> The duty to make an objective assessment of the facts is, among other things, an obligation to consider the evidence presented to a panel and to make factual findings on the basis of that evidence. The deliberate disregard of, or refusal to consider, the evidence submitted to a panel is incompatible with a panel's duty to make an objective assessment of the facts. The wilful distortion or misrepresentation of the evidence put before a panel is similarly inconsistent with an objective assessment of the facts. "Disregard" and "distortion" and "misrepresentation" of the evidence, in their ordinary signification in judicial and quasi-judicial processes, imply not simply an error of judgment in the appreciation of evidence but rather an egregious error that calls into question the good faith of a panel.[71]

2.49 More recently, in *Canada – Continued Suspension*, the Appellate Body has provided some additional guidance in the context of a panel's review of a risk assessment under Article 5.1. The Appellate Body has emphasised that the focus in that context must be on the conclusions contained in a risk assessment, and that a panel must review those conclusions to ensure that they find sufficient support in the scientific evidence. The Appellate Body stated that:

> It is the WTO Member's task to perform the risk assessment. The panel's task is to review that risk assessment. Where a panel goes beyond this limited mandate and acts as a risk assessor, it would be substituting its own scientific judgement for that of the risk assessor and making a *de novo* review and, consequently, would exceed its

[70] Appellate Body Report, *EC – Hormones,* para. 117.

[71] Appellate Body Report, *EC – Hormones*, para. 133.

> functions under Article 11 of the DSU. Therefore, the review power of a panel is not to determine whether the risk assessment undertaken by a WTO Member is correct, but rather to determine whether that risk assessment is supported by coherent reasoning and respectable scientific evidence and is, in this sense, objectively justifiable.[72]

2.50 The Appellate Body went on to provide guidance as to how this standard should be applied in practice under Article 5.1:

> The Appellate Body has observed that a WTO Member may properly base an SPS measure on divergent or minority views, as long as these views are from qualified and respected sources. This must be taken into account in defining a panel's standard of review. Accordingly, a panel reviewing the consistency of an SPS measure with Article 5.1 of the *SPS Agreement* must, first, identify the scientific basis upon which the SPS measure was adopted. This scientific basis need not reflect the majority view within the scientific community but may reflect divergent or minority views. Having identified the scientific basis underlying the SPS measure, the panel must then verify that the scientific basis comes from a respected and qualified source. Although the scientific basis need not represent the majority view within the scientific community, it must nevertheless have the necessary scientific and methodological rigour to be considered reputable science. In other words, while the correctness of the views need not have been accepted by the broader scientific community, the views must be considered to be legitimate science according to the standards of the relevant scientific community. A panel should also assess whether the reasoning articulated on the basis of the scientific evidence is objective and coherent. In other words, a panel should review whether the particular conclusions drawn by the Member assessing the risk find sufficient support in the scientific evidence relied upon. Finally, the panel must determine whether the results of the risk assessment "sufficiently warrant" the SPS measure at issue. Here, again, the scientific basis cited as warranting the SPS measure need not reflect the majority view of the scientific community provided that it comes from a qualified and respected source.[73]

2.51 Further, the Appellate Body has noted that “it is generally within the discretion of the Panel to decide which evidence it chooses to utilize in making

---

[72] Appellate Body Report, *Canada –Continued Suspension,* para. 590.

[73] Appellate Body Report, *Canada – Continued Suspension,* para. 591 (footnotes omitted).

findings."[74] In *Japan – Apples* the Appellate Body noted that a panel, as trier of facts, enjoys "a margin of discretion in assessing the value of the evidence, and the weight to be ascribed to that evidence."[75] The Appellate Body also made it clear that panels are entitled to take into account the views of experts, and that requiring them to give precedence to the importing Member's evaluation of scientific evidence and risk is not compatible with the panel's discretion as a trier of facts.

2.52 In New Zealand's view this guidance is clear. The degree of deference that a panel must give to a risk assessment is precisely that articulated by the Appellate Body, and nowhere in that guidance is there any suggestion that the standard is one of "considerable deference".

2.53 In arguing in favour of a considerable deference standard, Australia asserts that "the standard of review should be informed by the particular covered agreement(s) and obligation(s) at issue in a given dispute."[76] Australia further submits that "the particular provision and covered agreement at issue inform a panel of what is required in order to conduct an "objective assessment of the facts"."[77] It draws support for this notion from Appellate Body statements in *US – Softwood Lumber VI (Article 21.5 – Canada), US – Countervailing Duty Investigation on DRAMS*, and *US – Lamb*.[78] In New Zealand's view it is common sense, not to mention a requirement of the customary rules of treaty interpretation, that the nature of a panel's investigation will be informed by the particular provision at issue.[79] Indeed, the particular provision at issue, together with the measures at issue, will determine what is to be examined. But nothing in this concept, nor in the Appellate Body statements quoted by Australia, justify adopting a standard of "considerable deference" with regard to SPS risk assessments. Moreover, New Zealand considers that Australia's notion that different degrees of deference should be applied to different substantive provisions would be complex and unworkable.

---

[74] Appellate Body Report, *EC – Hormones*, para. 135.

[75] Appellate Body Report, *Japan – Apples,* para. 166.

[76] AFWS, para. 175.

[77] ARPQ, Q 55, first para., p. 43.

[78] AFWS, paras. 176-178.

[79] *Vienna Convention on the Law of Treaties,* Article 31.

2.54 Australia relies heavily on the notion of the "balance of jurisdictional competencies" in the *SPS Agreement* to justify its deferential standard of review. In particular Australia focuses on the following statement by the Appellate Body in the *EC – Hormones* case:

> The standard of review appropriately applicable in proceedings under the *SPS Agreement*, of course, must reflect the balance established in that Agreement between the jurisdictional competences conceded by the Members to the WTO and the jurisdictional competences retained by the Members for themselves. To adopt a standard of review not clearly rooted in the text of the *SPS Agreement* itself, may well amount to changing that finely drawn balance; and neither a panel nor the Appellate Body is authorized to do that.[80]

2.55 But Australia has taken this statement out of context. The Appellate Body was not invoking the concept of jurisdictional balance to justify a concept of considerable deference. To the contrary, it was seeking to affirm the competence that a panel has.

2.56 In the paragraph that follows the Appellate Body went on to say:

> We do not mean, however, to suggest that there is at present no standard of review applicable to the determination and assessment of the facts in proceedings under the *SPS Agreement* or under other covered agreements. In our view, Article 11 of the DSU bears directly on this matter and, in effect, articulates with great succinctness but with sufficient clarity the appropriate standard of review for panels in respect of both the ascertainment of facts and the legal characterization of such facts under the relevant agreements.[81]

2.57 From this it is clear that the Appellate Body does not use the notion of "jurisdictional competencies" as some kind of caveat or exception to applying Article 11, as Australia implies. Rather, the Appellate Body comes to the view that Article 11 provides the appropriate standard of review, in light of the need to maintain the balance of jurisdictional competencies. This is only reinforced by the fact that a few paragraphs later the Appellate Body explicitly rejected a suggestion that a

[80] Appellate Body Report, *EC – Hormones*, para. 115.

[81] Appellate Body Report, *EC – Hormones*, para. 116.

"deferential reasonableness standard" be applied under the *SPS Agreement*.[82] Australia's attempts to interpret the Appellate Body's guidance in *EC – Hormones* as somehow supporting a "considerable deference" standard must therefore be rejected.

2.58 Likewise, in the paragraph preceding that relied on by Australia, the Appellate Body expressly rejects any idea of "an intent on the part of the Members to adopt or incorporate into [the SPS] Agreement the standard set out in Article 17.6(i) of the Anti-Dumping Agreement."[83] It is in this context that the Appellate Body states, in the paragraph relied on by Australia, that "[t]o adopt a standard of review not clearly rooted in the text of the *SPS Agreement* itself, may well amount to changing that finely drawn balance; and neither a panel nor the Appellate Body is authorized to do that."[84] In other words, far from justifying a standard of considerable deference, the Appellate Body was warning against adopting the standard set out in the Anti-Dumping Agreement because such a standard was not rooted in the text of the *SPS Agreement*. Australia's considerable deference standard is, similarly, not rooted in the text of the *SPS Agreement*. Adopting this standard would amount to changing the finely drawn balance of jurisdictional competencies in the *SPS Agreement*.

2.59 This point is further illustrated by considering Australia's misguided reliance, as support for "considerable deference", on the right of Members to establish their appropriate level of protection.[85] As the Appellate Body has pointed out, the right to establish ALOP is explicitly provided for in the text of the *SPS Agreement* itself. Paragraph 5 of Annex A states that the ALOP is "the level of protection deemed appropriate by the Member establishing a …phytosanitary measure". Preambular paragraph 6 of the *SPS Agreement* provides that efforts towards harmonization of SPS standards will be taken "without requiring Members to change their appropriate level of protection of human, animal or plant life or health." For these reasons, the Appellate Body has stated that that "[t]he determination of the appropriate level of protection…is a prerogative of the Member concerned and not of

[82] Appellate Body Report, *EC – Hormones*, para. 119.

[83] Appellate Body Report, *EC – Hormones*, para. 114.

[84] Appellate Body Report, *EC – Hormones*, para. 115.

[85] See, for example, ARPQ, Q 57, para. 3.

a panel or of the Appellate Body."[86] In contrast, however, there is no textual basis for the suggestion that considerable deference be accorded to risk assessments under Article 5.1.

2.60 Moreover, the Appellate Body has noted that the "right of a Member to define its appropriate level of protection is not … an absolute or unqualified right."[87] Rather, "compliance with Article 5.1 was intended as a countervailing factor in respect of the right of Members to set their appropriate level of protection."[88] The Appellate Body stated that,

> The requirements of a risk assessment under Article 5.1, as well as of "sufficient scientific evidence" under Article 2.2, are essential for the maintenance of the delicate and carefully negotiated balance in the *SPS Agreement* between the shared, but sometimes competing, interests of promoting international trade and of protecting the life and health of human beings.[89]

2.61 So, the right of Members to set their own appropriate level of protection, rather than supporting the notion of considerable deference as Australia claims, merely reinforces the importance of objectively assessing Australia's compliance with Articles 2.2 and 5.1 of the *SPS Agreement*. The balance of jurisdictional competencies would be undermined, not promoted, by the adoption of a considerable deference standard.

2.62 At the heart of Australia's claim that considerable deference be accorded to SPS risk assessments, is the idea that some deference must be accorded to the "investigative and fact-finding process [that] compulsorily precedes any assessment by a WTO panel of the relevant scientific and other evidence".[90] Australia states that "there is a positive obligation on all Members to obtain and rely upon a risk assessment"[91] and that this "establishes that the (non-WTO) competent bodies that

[86] Appellate Body Report, *Australia – Salmon*, para. 199.

[87] Appellate Body Report, *EC – Hormones*, para. 173.

[88] Appellate Body Report, *EC – Hormones*, para. 177.

[89] Appellate Body Report, *EC – Hormones*, para. 177.

[90] AFWS, para. 191.

[91] AFWS, para. 192.

perform these risk assessments are given a pre-eminent position in the decision-making process as to whether there is a legitimate basis for particular SPS measures."[92]

2.63 The idea that special deference must be accorded to an assessment of risk simply because that assessment was made by a WTO Member has been considered and rejected by the Appellate Body in previous cases. As noted above, in *EC – Hormones* the Appellate Body rejected a "deferential reasonableness standard".[93] In *Japan – Apples*, Japan argued before the Appellate Body that the panel should have accorded a "certain degree of discretion" to the importing Member with regard to the manner in which it chooses, weighs, and evaluates scientific evidence.[94] The Appellate Body disagreed, noting that:

> …on several occasions, including disputes involving the evaluation of scientific evidence, the Appellate Body has stated that panels enjoy discretion as the trier of facts; they enjoy "a margin of discretion in assessing the value of the evidence, and the weight to be ascribed to that evidence." Requiring panels, in their assessment of the evidence before them, to give precedence to the importing Member's evaluation of scientific evidence and risk is not compatible with this well-established principle.[95]

2.64 It is clear that a panel must not conduct its own risk assessment. But an obligation not to conduct a risk assessment does not carry with it an obligation to show considerable deference to the conclusions in a Member's risk assessment. Australia has provided no arguments to suggest that a standard of considerable deference is appropriate under the *SPS Agreement*, much less arguments to support overriding the explicit guidance of the Appellate Body, and to justify embarking on an approach that diverges from that taken in every SPS case to date. There is no justification for an approach that contains an inherent bias towards the conclusions in a risk assessment.

---

[92] AFWS, para. 205.

[93] Appellate Body Report, *EC – Hormones*, para. 119.

[94] Appellate Body Report, *Japan – Apples,* para. 161.

[95] Appellate Body Report, *Japan – Apples*, para. 166 (footnotes omitted).

1. Australia's contention that New Zealand is simply presenting an alternative view of the science or conducting its own risk assessment is without foundation

2.65 Central to Australia's effort to rebut New Zealand's first written submission, is Australia's argument that New Zealand is simply presenting "an alternative picture of the science."[96] Australia's contention is that science can sustain multiple "objective and credible" interpretations, and that the IRA is based on "one of the range of credible scientific accounts".[97] Australia has elaborated this point in the following way,

> [I]t is not enough for New Zealand to merely set out its own view of the scientific evidence, or point to differences between its interpretation and the views expressed in the Final IRA Report. There may be nothing "incorrect" with New Zealand's alternative interpretation of the science. However, Australia submits that this is irrelevant, because there may be more than one objective and credible interpretation of the available evidence.[98]

2.66 The problem with this argument is that it is simply unrelated to what New Zealand has asserted in this case. New Zealand has not set out its view of the scientific evidence, or presented an alternative view of the science. New Zealand has established that Australia's measures, and the conclusions in its risk assessment, do not find sufficient support in the science. This is not about presenting an alternative view of the science. Rather, it is the discharging of New Zealand's burden of proof.

2.67 It is difficult to disentangle Australia's arguments on this point from its views on "considerable deference". Australia wants to use its standard of considerable deference to diminish what has to be shown in order to demonstrate a "credible scientific account", instead of allowing the Panel to objectively assess the matter in light of the information and evidence before it. New Zealand is simply asking the Panel to do the latter. And this involves asking no more than that the *SPS*

---

[96] See, for example, AFWS, para. 17; ARPQ, Q 40 and Q 58; and ACER, para. 2.

[97] AFWS, para. 24.

[98] ARPQ, Q 58, p. 50.

Agreement be applied to the facts of this case according to the appropriate standard of review.

2.68 In New Zealand's view such an analysis will lead the Panel to conclude that Australia's SPS measures, and the conclusions in the IRA, are not sufficiently supported by scientific evidence. New Zealand has not simply presented an alternative view of the science. It has established that Australia's measures are inconsistent with the *SPS Agreement*. Australia's attempts to respond by shrouding the IRA in a veil of "considerable deference" must be rejected.

2. Australia misapplies the notion of "divergent scientific opinion"

2.69 Another important element of Australia's attempted rebuttal is the idea that it is entitled to rely on divergent scientific opinion. New Zealand does not take issue with the right of WTO Members to base measures on divergent or minority scientific opinion, provided certain criteria are met. However Australia misapplies the notion of "divergent scientific opinion."

2.70 Merely asserting the existence of divergent scientific opinion does not resolve the issue of compliance with the *SPS Agreement*. It is necessary: first, that the evidence qualifies as divergent scientific evidence; and second, that it sufficiently supports the point for which it is being relied upon. In addition, divergent scientific opinion relating to one aspect of a pathway does not constitute divergent scientific opinion relating the completion of the entire pathway.

2.71 The Appellate Body has clarified that in order to qualify as "divergent scientific evidence" the evidence must come from a qualified and respected source, and have "the necessary scientific and methodological rigour to be considered reputable science."[99] If the evidence meets this standard, the question then becomes the adequacy of the relationship between this divergent scientific evidence on the one hand, and the conclusions drawn from that evidence on the other. The conclusions must find "sufficient support in the scientific evidence relied upon."[100] Clearly, this requires not just that the divergent scientific opinion is relevant to the conclusions

[99] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

[100] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

derived from it, but that it provides a sufficient scientific basis to render such conclusions objectively justifiable.[101]

2.72 The Appellate Body has emphasised the crucial importance of the relationship between the divergent scientific opinion and the conclusions drawn from it, in the following way:

> In most cases, responsible and representative governments tend to base their legislative and administrative measures on "mainstream" scientific opinion. In other cases, equally responsible and representative governments may act in good faith on the basis of what, at a given time, may be a divergent opinion coming from qualified and respected sources. *By itself*, this *does not necessarily* signal the *absence of a reasonable relationship* between the SPS measure and the risk assessment, especially where the risk involved is life-threatening in character and is perceived to constitute a clear and imminent threat to public health and safety. *Determination of the presence or absence of that relationship can only be done on a case-to-case basis*, after account is taken of all considerations rationally bearing upon the issue of potential adverse health effects.[102]

2.73 More recently, in *Canada – Continued Suspension*, the Appellate Body made a similar point. While noting that a WTO Member may base a measure on divergent scientific views, the Appellate Body made it clear that establishing the existence of divergent scientific evidence was not enough. It is necessary to conduct a further investigation as to whether:

> the reasoning articulated on the basis of the scientific evidence is objective and coherent. In other words, a panel should review whether the particular conclusions drawn by the Member assessing the risk find sufficient support in the scientific evidence relied upon.[103]

2.74 It is clear that the question is not simply whether divergent scientific evidence exists, but whether that scientific evidence rationally or sufficiently supports

[101] Appellate Body Report, *Canada – Continued Suspension*, para. 590.

[102] Appellate Body Report, *EC – Hormones*, para. 194. (Emphasis added.)

[103] Appellate Body Report, *Canada – Continued Suspension*, para. 591. (Footnotes omitted.)

the evaluation of risk and the measures imposed. This assessment must be made on a case by case basis, taking into account all relevant considerations.

2.75 Later in this submission, New Zealand will address in detail the particular studies or information claimed by Australia to constitute "divergent scientific opinion" and relied upon to support various conclusions and measures in this case. As New Zealand will demonstrate, these studies either do not constitute "divergent scientific evidence" or do not provide "sufficient scientific support" for the conclusions drawn. Moreover, even if there were some divergent scientific evidence relating to some aspects of some pathways, this would not constitute sufficient scientific evidence for the pathway as a whole.

2.76 Finally, at times Australia appears to imply that the IRA itself is a source of "divergent scientific opinion". This notion appears to be based on the idea that because the IRA Team was made up of "qualified and respected" persons, it therefore constitutes divergent scientific evidence upon which Australia is entitled to rely.[104] This argument is flawed. It amounts to suggesting that a risk assessment undertaken by a WTO Member can justify itself. If taken seriously, such an argument would prevent any kind of meaningful review, and defeat the object and purpose of having WTO disciplines relating to SPS measures. The IRA in this case is not an independent source of divergent scientific evidence, and cannot be used to create such divergent scientific evidence where none existed previously. In reality, this argument is another variation on the theme of "considerable deference." It boils down to the notion that the Panel should give precedence to the importing Member's evaluation of scientific evidence. Yet this is precisely what the Appellate Body rejected in *Japan – Apples*, on the basis that it is not compatible with the proper standard of review.[105] It is also inconsistent with the legal requirement, as laid down by the Appellate Body in

[104] See, for example, AFWS paras. 238-239, ARPQ, Q 123; ACER, para. 10.

[105] In *Japan – Apples* the Appellate Body stated at para. 166: "on several occasions, including disputes involving the evaluation of scientific evidence, the Appellate Body has stated that panels enjoy discretion as the trier of facts; they enjoy "a margin of discretion in assessing the value of the evidence, and the weight to be ascribed to that evidence." Requiring panels, in their assessment of the evidence before them, to give precedence to the importing Member's evaluation of scientific evidence and risk is not compatible with this well-established principle." (Footnotes omitted.)

Canada – Continued Suspension, that a panel must review the conclusions in a risk assessment to ensure that they find sufficient support in the scientific evidence.[106]

2.77 To conclude, although Australia makes much of its right to rely on divergent scientific opinion, it does not in fact help Australia's defence in this case. Much of what Australia claims is "divergent scientific evidence" is not; and where Australia does refer to legitimate scientific studies, they do not sufficiently support the point for which they are relied upon. Moreover no scientific evidence, divergent or otherwise, is provided to support the completion of the overall pathways contemplated in the IRA. New Zealand will elaborate on this in detail below.

3. Australia mischaracterises the relationship between Articles 2.2 and 5.1

2.78 In New Zealand's view, the proper relationship between Articles 2.2 and 5.1 has been clearly set out by the Appellate Body in previous cases. In *EC – Hormones* the Appellate Body stated that:

> Articles 2.2 and 5.1 should constantly be read together. Article 2.2 informs Article 5.1: the elements that define the basic obligation set out in Article 2.2 impart meaning to Article 5.1.[107]

2.79 Likewise, in *Japan – Agricultural Products II*, the Appellate Body considered that Article 5.1 provided relevant context in interpreting the phrase "maintained without sufficient scientific evidence" in Article 2.2.[108]

2.80 In New Zealand's view it is clear from this, and from the practice of previous panels and the Appellate Body in specific cases, that Articles 2.2 and 5.1 are closely related, that the interpretation of one must inform the interpretation of the other, but that they establish separate legal obligations, with which compliance can be separately assessed. New Zealand's first written submission reflects this understanding of these provisions, by setting out claims and arguments with respect to both Article 2.2 and Article 5.1.

[106] Appellate Body Report, *Canada – Continued Suspension*, para. 590.

[107] Appellate Body Report, *EC – Hormones,* para. 180.

[108] Appellate Body Report, *Japan – Agricultural Products II,* para. 74.

2.81 Australia claims that, in doing so, New Zealand has treated Article 2.2 and Article 5.1 in "virtual isolation".[109] But New Zealand has done nothing more than apply the kind of analysis undertaken by panels and the Appellate Body in previous cases involving these two Articles. It is Australia that is proposing a novel approach. Australia's view of the relationship between Article 2.2 and 5.1 is incorrect and without precedent.

2.82 Australia states that "the question of whether Australia has maintained measures 'without sufficient scientific evidence' under Article 2.2 can only be answered by considering whether Australia's measures are based on a valid risk assessment under Article 5.1."[110] In other words, Australia sees no role whatsoever for the third requirement of Article 2.2 in this case. Australia claims that "Article 2.2 is a basic obligation whose content is to be derived from other more specific and detailed provisions in the *SPS Agreement* and the specific facts of each case."[111] Australia's basis for this claim is that, because "sufficiency" in Article 2.2 is a "relational" concept, this "necessarily implies that the scope and content of "sufficiency" is to be derived from other more specific and detailed provisions", namely, Article 5.1.[112] In other words, Australia is seeking to conflate two distinct provisions into a single obligation with a single test.

2.83 This is a fundamental misinterpretation of Article 2.2 of the *SPS Agreement*. To suggest, as Australia in effect does, that Article 2.2 has no meaning independent of Article 5.1 is to ignore the clear and consistent jurisprudence of panels and the Appellate Body. The Appellate Body has stated that "the obligation in Article 2.2 that an SPS measure not be maintained without sufficient scientific evidence requires that there be a rational or objective relationship between the SPS measure and the scientific evidence."[113] The relevant "relationship" in question is, therefore, that between the scientific evidence and the SPS measures. There is nothing in this that requires looking at other "more specific and detailed provisions". Indeed, in previous

[109] AFWS, para. 217.

[110] AFWS, para. 219. (Emphasis added.)

[111] ARPQ, Q 125, para. 3.

[112] AFWS, para. 222.

[113] Appellate Body Report, *Japan – Agricultural Products,* para. 84.

cases involving claims under both Articles 2.2 and 5.1, panels and the Appellate Body have applied the "rational or objective" relationship standard in Article 2.2 separately from their consideration of claims under Article 5.1.[114] To suggest that compliance with Article 2.2 can only be determined by considering compliance with Article 5.1 is to suggest that the approach of panels and the Appellate Body in previous cases has been wrong.

2.84 Australia tries to temper its argument by suggesting that its interpretation only applies to the facts of this case. It claims that "the interpretation of Article 2.2 and Article 5.1 put forward by Australia is specific to the circumstances in which a Member chooses to rely on a risk assessment."[115] New Zealand finds this statement puzzling in light of Australia's earlier remarks that "there is a positive obligation on all Members to obtain and rely upon a risk assessment."[116] It would appear to follow from this "positive obligation" that Australia's view of the relationship between Article 2.2 and Article 5.1 would apply in every case under the *SPS Agreement*.[117]

2.85 In truth, Australia's misconstrued view of the relationship between Articles 2.2 and 5.1 is part of a concerted effort to shelter the IRA from one of the core obligations in the *SPS Agreement*. In arguing that Article 2.2 is wholly subservient to Article 5.1, Australia effectively carries its concept of considerable deference through to the heart of the science based obligations in the *SPS Agreement*. Not only are panels prevented from considering Article 2.2; they must also show "considerable deference" in conducting a review under Article 5.1. The result is that panels would be denied a mandate to objectively assess whether SPS measures are maintained with sufficient scientific evidence.

2.86 Australia seeks to justify effectively reading the third requirement of Article 2.2 out of the *SPS Agreement*, by emphasising the complexity of risk assessment and the inadequacy of Article 2.2 to deal with such complexity. It states:

[114] See *Japan – Agricultural Products; Japan – Apples; Japan – Apples (Article 21.5 – US).*

[115] ARPQ, Q 124, p. 100.

[116] Although Australia claims that it is not being "prescriptive about an order of analysis", the fact that its interpretation of the relationship between Article 2.2 and Article 5.1 would, in effect, apply in all cases where a WTO Member relies on a risk assessment, suggests that Australia is indeed being prescriptive about the order of analysis. See AFWS, para. 192.

[117] ARPQ, Q 124, para. 1.

> The ascertainment of risk is a multifaceted exercise. Risk is not determined exclusively by science. As appropriate to the circumstances it involves the weighing and balancing of a number of scientific, economic and technical factors, marshalling evidence according to a particular methodology, and finally, the application of expert judgement at every stage of the process. None of these elements can be meaningfully separated; they inform and impart meaning to each other.[118]

2.87 In New Zealand's view, while assessments of risk may involve a "weighing and balancing" of various factors, this weighing and balancing exercise must take place within the parameters imposed by the obligations in the *SPS Agreement*. Core among these is the obligation that measures are not maintained without sufficient scientific evidence. This "weighing and balancing exercise" does not operate to limit the obligations in the *SPS Agreement* as Australia suggests. To the contrary, the purpose of the obligations in the *SPS Agreement* is to place constraints on such "weighing and balancing".

2.88 In addition, it is not clear to New Zealand that the "particular methodology" chosen by a WTO Member to "marshal the evidence" should have a meaningful impact on whether measures are maintained with sufficient scientific evidence in accordance with Article 2.2, or prevent a panel from undertaking an assessment of whether such sufficient scientific evidence exists. Consistency with the core obligations in the *SPS Agreement* should not turn on which methodology a WTO Member decides to employ to assess risk.

2.89 New Zealand does not deny that applying a certain amount of judgement may be a necessary part of performing a risk assessment. It does not follow, however, that such judgement should be accorded "considerable deference", or be allowed to override the obligations contained in Article 2.2. Article 2.2 sets down the basic parameters within which such expert judgement must operate, including the requirement that measures are sufficiently supported by the scientific evidence.

2.90 In reality, much of Australia's argument in this context is aimed at diverting attention away from scientific evidence. Australia does this by suggesting that the central concept in the *SPS Agreement* is that of "risk", and "risk" is not "wholly

[118] AFWS, para. 218.

focused on scientific evidence".[119] Australia reasons that assessing compliance with Article 2.2 is therefore too narrow given the focus of that provision is "scientific evidence".

2.91 New Zealand queries the interpretative approach used by Australia in making this argument. It appears that Australia is suggesting that the framers of the *SPS Agreement* drew the provisions of the "basic obligations" contained in Article 2.2 too narrowly by focusing solely on "scientific evidence." Australia effectively argues that the express provisions of Article 2.2 should be ignored (not to mention the interpretative approach taken in every SPS case to date), in favour of the obligations in Article 5.1. In New Zealand's view the drafters of the *SPS Agreement* were fully aware of the potential complexity involved in risk assessments, and of the different factors that may come into play when they drafted Article 2.2, specifically intending the test in Article 2.2 to apply alongside the requirements of Article 5.1. Such factors cannot be used as a reason to bypass the express obligations contained in Article 2.2. Indeed, in accordance with the principle of effectiveness, the provisions of Article 2.2 should be given full effect.[120]

2.92 Finally in this context, while Australia asserts that New Zealand has focused on a "narrow category of scientific literature"[121] in its submissions, Australia does not go on to specify precisely which broader factors New Zealand's submissions have supposedly overlooked.

2.93 New Zealand does not contest the fact that the obligations in Article 2.2 and 5.1 are closely related. It does however challenge the idea that the complexity of risk analysis, the weighing of various factors, the use of judgement by risk assessors, and the application of particular methodologies, should be used as reasons to read down the core obligation that SPS measures are not to be maintained without sufficient

[119] AFWS, para. 228.

[120] See Appellate Body Report, *US – Gasoline*, p. 23: "One of the corollaries of the "general rule of interpretation" in the *Vienna Convention* is that interpretation must give meaning and effect to all the terms of a treaty. An interpreter is not free to adopt a reading that would result in reducing whole clauses or paragraphs of a treaty to redundancy or inutility."

[121] AFWS, para. 230.

scientific evidence. Australia's efforts to sideline Article 2.2, and in the process, the core role of scientific evidence, should be rejected.

2.94 Australia makes similar points in its alternative arguments made under Article 2.2. Australia suggests that if the Panel were to consider Article 2.2, it would be limited to an examination which, to all intents and purposes, is identical to an examination under Article 5.1. For Australia, the IRA itself "constitutes 'scientific evidence' within the meaning of Article 2.2",[122] and "Australia does not consider that the scientific validity of its measures can or should be judged on any other basis except the Final IRA Report".[123] According to Australia, the burden is on New Zealand to show that "the scientific evidence relied upon by Australia, as evaluated by the IRA Team in the risk assessment" is insufficient.[124] Australia concludes that under Article 2.2 "New Zealand must actually show that the IRA Team's evaluation of the scientific evidence was not objective and credible."[125]

2.95 In other words, according to Australia, under Article 2.2 New Zealand must demonstrate exactly the same thing as it must demonstrate under Australia's interpretation of Article 5.1. It is clear that, for Australia, Article 2.2 is viewed through the lens of Article 5.1, which in turn is viewed through the lens of "considerable deference".

2.96 In *Japan – Agricultural Products II* the Appellate Body noted that the fact that Article 5.1 may be viewed as a specific application of Article 2.2 in no way justifies limiting the scope of Article 2.2 "in favour" of Article 5.1.[126] Yet Australia's view on the relationship between Article 2.2 and 5.1 effectively subsumes the third requirement of Article 2.2 within Article 5.1, and then through its standard of review drains it of meaningful content. The consequence of Australia's approach would be to remove the Panel's mandate to assess whether a rational or objective relationship

[122] ARPQ, Q 123, p. 99, 3rd para.

[123] ARPQ, Q 123, p. 99, 4th para.

[124] AFWS, para. 925.

[125] AFWS, para. 925. (Emphasis added.)

[126] Appellate Body Report, *Japan – Agricultural Products,* para. 82.

exists between the science and the SPS measures. Nothing could more clearly limit Article 2.2 "in favour" of Article 5.1, than this.

E. ORDER OF ANALYSIS

2.97 Australia's views on the order of analysis are determined by its view that consistency with Article 2.2 can only be determined by reference to Article 5.1.[127] There is nothing, however, in the text of the *SPS Agreement* that suggests an analysis of Article 5.1 should logically precede an analysis of Article 2.2, much less that it must do so in every instance where a Member has "obtained" a risk assessment. As noted above, a number of panels have begun their analysis with Article 2.2, irrespective of the fact that the measures were purportedly based on a risk assessment. In *Japan – Agricultural Products II*, the Appellate Body expressly rejected Japan's suggestion that the panel erred by beginning its analysis in that case with Article 2.2 rather than Article 5.1.[128]

2.98 In New Zealand's view, it would be appropriate in the circumstances of this case for the Panel to start its examination with Article 2.2. The Appellate Body in *EC – Hormones* considered that an approach that started with the "Basic Rights and Obligations" in Article 2 was "logically attractive".[129] New Zealand agrees and hence started its first written submission with its Article 2.2 claim. Previous panels have found the order in which a complainant orders its arguments to be relevant in determining their own order of analysis.[130] In *Japan – Apples*, the panel chose to consider Article 2.2 first, considering that this approach would be "consistent with the opinions of the Appellate Body in *EC – Hormones* and in *Australia – Salmon*."[131] For the same reasons, New Zealand considers that a similar approach would be appropriate in the present case.

---

[127] AFWS, para. 344.

[128] Appellate Body Report, *Japan – Agricultural Products*, para. 82.

[129] Appellate Body Report, *EC – Hormones*, para. 250.

[130] Panel Report, *Australia – Salmon*, para. 8.48. In that case the panel found it relevant to consider the fact that Canada as the complainant first presented its claims under Article 5. In that case, the respondent, Australia first presented its arguments under Article 2. See also, Panel Report, *Japan – Apples*, para. 8.4.

[131] Panel Report, *Japan – Apples*, para. 8.4.

F. ARTICLE 2.2

1. Article 2.2 legal issues

2.99 New Zealand set out the appropriate approach to an analysis under Article 2.2 in its first written submission.[132] As noted there, in *Japan – Agricultural Products II* the Appellate Body stated that for there to be "sufficient scientific evidence", there had to be a "rational or objective relationship" between the SPS measures and the scientific evidence, and that this was to be determined in the light of factors such as the characteristics of the measure and the quantity and quality of the scientific evidence.[133] This approach was followed by the Appellate Body in *Japan – Apples*.[134] In its first written submission New Zealand established that there is no rational or objective relationship between the measures imposed by Australia and the scientific evidence.

2.100 New Zealand has already addressed Australia's argument that consistency with Article 2.2 can only be addressed by reference to Article 5.1, and Australia's alternative claim that the test for determining consistency with Article 2.2 is identical to the test for determining consistency with Article 5.1. In New Zealand's view, these arguments are an effort to limit the scope of Article 2.2 "in favour" of Article 5.1.

2.101 Australia makes a related argument with respect to the legal obligation and burden of proof under Article 2.2. Australia argues that:

> …the third requirement is couched in negative terms. Namely Members must ensure that their measures are "*not* maintained *without* sufficient scientific evidence." The provision does not say that Members must ensure that their measures are "maintained with sufficient scientific evidence.[135]

2.102 While it is true that the provision is couched in the negative, in New Zealand's view this in no way alters the obligation under Article 2.2 that, where

[132] NZFWS, paras. 4.3 to 4.6.

[133] Appellate Body Report, *Japan – Agricultural Products II,* para. 84.

[134] Appellate Body Report, *Japan – Apples,* para. 162

[135] Closing statement of Australia from first substantive meeting with the parties, 3 September 2008, para. 25.

Members choose to impose SPS measures, those measures must be maintained with sufficient scientific evidence. To the extent that Australia is suggesting otherwise in the quotation above, New Zealand strongly disagrees. Of course, under the normal rules of burden of proof, it is for New Zealand to establish a prima facie case that Australia's measures are not maintained with sufficient scientific evidence. But this does not change the nature of the obligation on Australia. New Zealand has met its burden by establishing that there is no rational or objective relationship between the measures imposed by Australia and the scientific evidence.

2.103 New Zealand also rejects Australia's contention that the negative formulation of the obligation in Article 2.2 creates a "heavy evidentiary burden" on New Zealand. Australia provides no support for this proposition, and none exists. In New Zealand's view, the negative formulation of the obligation in Article 2.2 is nothing more than a convenient way to take account of the fact that "[w]hilst WTO Members have the right to take SPS measures, they are not required to do so".[136] However, where WTO Members do choose to adopt SPS measures, they must ensure that such measures are not maintained without sufficient scientific evidence.

2. Fire blight

(a) Australia has been unable to provide any evidence to support the existence of the pathway as a whole and has thus failed to rebut New Zealand's case

2.104 As New Zealand stated in its first written submission,[137] Australia's contention that mature, symptomless apples provide a pathway for introducing fire blight is not supported by scientific evidence. Such a pathway has not been shown to exist. Australia has not provided any evidence to support the existence of such a pathway in its first written submission or in its responses to the Panel's questions.[138] The responses of the experts support New Zealand's case that there is no scientific evidence that mature, symptomless apples would provide a pathway for the introduction of fire blight.[139] The experts' responses also support New Zealand's case

[136] Appellate Body Report, *Canada – Continued Suspension*, para. 531.

[137] NZFWS, para. 4.7.

[138] See ARPQ, Q 126.

[139] See NZCER, paras. 23-68.

that Australia's measures for fire blight are maintained without sufficient scientific evidence.[140] Accordingly, New Zealand maintains its submission that Australia's fire blight measures lack sufficient scientific support and are, accordingly, inconsistent with Article 2.2.[141]

2.105 Australia's measures for fire blight are directed at the risk that mature symptomless apples are involved in the spread of the disease, and therefore that New Zealand apples imported into Australia could cause the introduction of the disease to that country.

2.106 The primary issue, therefore, in relation to fire blight, is whether there is a rational or objective relationship between:

a. Australia's measures; and

b. scientific evidence on the question of whether a pathway exists for the introduction of fire blight via mature apples.

2.107 While New Zealand accepts that Australia would be entitled to rely on divergent scientific opinion, subject to certain criteria being met,[142] neither the IRA nor Australia's first written submission refers to any divergent opinion supporting the existence of a pathway for the introduction of fire blight via mature, symptomless apples.

2.108 The lack of any scientific evidence (divergent or otherwise) advanced by Australia to support the existence of a pathway is unsurprising. New Zealand is unaware of any scientific evidence that would support Australia's arguments. A pathway for introduction of fire blight via mature symptomless apples has never been observed or demonstrated to exist. Much research has been conducted on the issue, all of which points to the lack of a pathway for the introduction of fire blight via mature apples. There is, accordingly, insufficient scientific evidence to support Australia's measures for fire blight.

[140] See NZCACER, paras. 22-31.

[141] NZFWS, paras. 4.31-4.51.

[142] See above, paras. 2.69 to 2.77.

(i) Scientific evidence must address the overall pathway not merely individual steps

2.109 The IRA deconstructs the hypothetical pathway into discrete individual steps and then purports to assess the scientific evidence in relation to each of those steps.[143] In its first written submission, New Zealand has pointed out that the lack of scientific support for several of the individual steps into which the IRA divides the overall hypothetical "pathway".[144] The experts' responses to the questions posed by the Panel also cast doubt on the conclusions drawn by Australia in respect of each of the importation steps, the IRA's overall conclusion in relation to the likelihood of importation of *E. amylovora*, and the probability of "exposure"[145] of a susceptible host to *E. amylovora*.[146]

2.110 Australia is inaccurate in its assertion that New Zealand objects to "the pathway being examined".[147] The point New Zealand made in its first written submission is that none of the scientific examinations of "the pathway" that have been undertaken has concluded that a pathway exists. Australia's IRA reaches a different conclusion, but lacks any scientific foundation for having done so.

2.111 In evaluating the evidence for each of the steps in Australia's hypothetical pathway, it is important not to lose sight of the fact that there is no scientific evidence of the existence of the pathway as a whole. In other words, New Zealand does not consider it to be sufficient for Australia to advance some scientific evidence in relation to some of the discrete steps, where there is no evidence supporting the linking together of the steps as a complete pathway.

[143] IRA, pp. 53-97. The IRA purports to calculate the probability of entry, establishment and spread by breaking down the overall hypothetical pathway into the following steps: (1) Importation of apples with *E. amylovora* on them – an "importation scenario" that is itself broken into 8 importation steps; (2) Proximity – the likelihood of utility points being near hosts plants susceptible to the pest in each exposure group; (3) Exposure – the probability of exposure of a susceptible host plant in the exposure group to the pest by an infested/infected apple discarded near to it; (4) Establishment; and (5) Spread.

[144] NZFWS, paras. 4.10-4.26; 4.209-4.252.

[145] "Exposure" is defined in the IRA, p. 85, as the likelihood of the transfer of the pathogen from infested or infected apples (waste) to a susceptible host plant.

[146] See NZCER, paras. 23-68.

[147] AFWS, para. 440.

2.112 For example, in its first written submission, Australia places great emphasis on evidence relating to the quantity of fire blight bacteria that are necessary to initiate an infection. This is a component of the step described in the IRA as "exposure", or "the likelihood of the transfer of the pathogen from infested or infected apples (waste) to a susceptible host plant."[148] Australia argues that there is no consensus on the minimum number of bacteria needed to initiate an infection – and that "Australia strongly disagrees… that there is a minimum threshold number."[149]

2.113 New Zealand maintains its submission that the population levels of *E. amylovora* occasionally found on infested apples at harvest are, under natural conditions, insufficient to be transferred to a susceptible host and result in the spread of disease.[150] New Zealand has provided evidence that, for transmission and infection to occur in an orchard environment, large populations of *E. amylovora* are required in the early stages of flowering.[151] As New Zealand pointed out in its responses to the Panel's question 63, the scientific evidence to which Australia refers, suggesting that only small populations may be required to initiate infections, does not support the conclusions in the IRA. The studies on which Australia relies[152] were confined to artificial conditions and, as the IRA itself notes, cannot be taken to be indicative of what occurs in a natural environment.[153] The one orchard-based study which Australia relies upon for this point, van der Zwet *et al.* 1994, does not reach any conclusions on the topic, as the question of the number of bacteria required for infection was not the primary topic of the research. Furthermore, infections resulting from the inoculation of negative controls indicate a level of contamination present in the study which will have affected interpretation of its results.

2.114 In their responses to the Panel's questions, the experts pointed to the absence of scientific support for Australia's hypothesis about the minimum number of bacteria needed to start an infection. Dr Sgrillo noted that the probability of a fruit with one

[148] IRA, p. 85.

[149] AFWS, paras. 362,

[150] NZFWS, para. 4.14, citing **Exhibit NZ-23**, Taylor *et al.* 2003b: 332.

[151] NZRPQ, paras. 101-107; NZFWS, para. 4.244.

[152] ARPQ, Q 63.

[153] This was acknowledged in the IRA at p. 92.

bacterium starting an infection, is different from the probability associated with a fruit infested with 10,000 bacteria starting an infection, because the probability of establishment is a function of the initial population size.[154] In the same response, Dr Sgrillo also noted that the pathogen cycle could be broken if the quantity of bacteria decreased below a certain level.

2.115 Dr Paulin noted that the values cited by Australia in relation to its hypothesis concerning the minimum number of bacteria, are "strictly linked to the conditions in which they are obtained (no nutrient limitation, no water limitation, optimal and constant temperature)".[155] Dr Paulin pointed out that "the most likely limiting factor for *E. amylovora* in orchard conditions is the site where it could multiply. Except in laboratory conditions, no multiplication of *E. amylovora* outside an infection of the host plant (the first step being on the hypanthium) has ever been described."[156]

2.116 Thus, Australia's theories that *E. amylovora* can rapidly multiply on or in fruit[157] lack any support in the scientific evidence. Dr Paulin stated: "the only scientific basis for oozing on mature fruit (?)[158] is from van der Zwet 1990, which has already been discussed, and which can be considered as irrelevant for the case."[159] Dr Deckers also dismissed Australia's contention in relation to the production of ooze by mature fruit, in the following terms: "Internally infected mature fruits will not be able to produce bacterial ooze. These fruits will immediately be invaded by fungal infections. Ooze production occurs only on immature fruits where the starch of the immature fruits is used by the EA bacteria during the multiplication phase."[160]

2.117 Accordingly, the scientific evidence does not support Australia's contention that, under orchard conditions, a single bacterium, or very small number of bacteria, would be sufficient to initiate an infection in a susceptible host.

[154] Sgrillo RPQ, Q 28, citing Liebhold *et al* 1995.

[155] Paulin, Q 40, p. 20.

[156] Paulin RPQ, Q 40, p. 20.

[157] AFWS, paras. 463-471.

[158] The question mark appears to be indicating that Dr Paulin is questioning whether the fruit in the study were in fact mature, as does New Zealand.

[159] Paulin, RPQ, Q 33, p. 18.

[160] Deckers RPQ, Q 33, p. 13.

2.118 Rather, the experts' responses confirm that although it is possible that *E. amylovora* could survive on apple fruit, they will only survive in small numbers (if at all) and it is highly unlikely that any such bacteria will be able to multiply.[161]

2.119 But in any event, absent any evidence that the entire pathway would be completed, the number of bacteria required to initiate infection is immaterial. Even if there were scientific support (which there is not) for the view that only a very small number of bacteria are required to initiate an infection in an orchard, that contention could not establish that a pathway exists for the introduction of fire blight via mature, symptomless apples. Australia's hypothetical pathway has several steps and the quantity of bacteria required for infection only relates to one of them.[162] Crucially, for example, a transfer mechanism must also exist for the bacteria to be transmitted from a discarded apple to a susceptible host and for an infection to ensue. Australia has adduced no evidence to support its contention that such a transfer mechanism has been observed under real orchard conditions. In fact, Australia concedes that the transfer mechanisms it proposes, as part of its hypothetical pathway, are hypothetical, and transmission of *E. amylovora* from a mature, symptomless apple to a susceptible host causing infection has never actually been demonstrated.[163] The experts' responses confirm the absence of scientific evidence for Australia's contended transfer mechanisms.[164]

2.120 Australia's argument therefore misses a key point: that there is a complete lack of scientific evidence demonstrating that the hypothetical "pathway" has ever been or could ever be completed. The scientific research that has been done suggests

---

[161] Paulin, RPQ, Q 6(a), p. 4; Q 14, p. 9; Q 19, p. 12; Q 26, p. 15; Q 27, p. 16; Q 40, p. 20; Deckers RPQ, Q 7, pp. 3-4; Q 19, p. 8; Q 40, p. 15.

[162] See also Paulin RPQ, Q 3, p. 20: "The probability of bacteria from the calyx of mature apple to infect a plant supposes many steps. One only (infectivity of one or very few cells) is based on scientific evidence, but in conditions very different from natural conditions."

[163] AFWS, para. 473, where Australia states: "Since the pathway being examined is hypothetical, the IRA Team was not obliged to disregard a potential vector simply because it has never been shown to "demonstrate" transmission of *E. amylovora*." New Zealand reads this statement as an acknowledgment by Australia that mature apple fruit have never been shown to demonstrate transmission of *E. amylovora*.

[164] Paulin RPQ, Q 19, pp. 12-13; Q 20, p. 13; Q 37, p. 19; Deckers RPQ, Q 6, p. 3; Q 7, pp. 3-4; Q 18, p. 8; Q 19, p. 8; Q 20, pp. 8-9; Q 35, p. 14; Q 37, p. 14.

that no pathway exists. In addition, a huge amount of trade has occurred with no reports of the introduction of fire blight via mature, symptomless apple fruit.

2.121 Australia's fire blight measures would be justified only if there were scientific evidence to support the overall pathway. Australia has adduced no scientific evidence to support the existence of a pathway for transfer of the disease via mature fruit. By focusing only on a confined part of its hypothetical pathway, Australia has failed to rebut New Zealand's argument that there is no scientific evidence supporting the existence of a pathway as a whole. It follows that there is no rational or objective relationship between any of Australia's fire blight measures and the scientific evidence.

2.122 Even if there were scientific evidence to support the existence of a pathway for the introduction of fire blight via mature, symptomless apples (which New Zealand denies), there would be no rational or objective relationship between all of Australia's measures *in combination* and such (hypothetical) scientific evidence. For example, if apples were sourced from areas free from fire blight disease symptoms there would be no scientific justification for insisting on disinfection of apples in the packing house *as well*. Likewise, there would be no scientific evidence to justify the disinfection of packing and grading equipment *as well* as an area freedom requirement.

<u>(ii) Australia attempts to reverse the obligations in the *SPS Agreement*</u>

2.123 Australia asserts that "[n]o mode of fire blight transmission has ever been established",[165] which it then attempts to support with the statement that "there is no direct evidence which establishes that apples do not spread fire blight."[166] To the extent that science can "prove a negative", there is scientific evidence that mature, symptomless apples are not a vector.[167] But putting this evidence to one side,

---

[165] AFWS, section 3 (a) ii. heading to paras. 353ff.

[166] AFWS, para. 354. (Emphasis in original.)

[167] For example, the two Roberts papers (**Exhibits NZ-22** and **NZ-29**); Hale *et al.* 1996 (**Exhibit NZ-27)**; and Taylor *et al.* 2003a (**Exhibit NZ-28**). Note also the comment of the Panel in *Japan – Apples* (para. 8.219 and Annex 3, paras. 342 and 343) that "[w]ith regard to fire blight, not only a large quantity but a high quality of scientific evidence has been produced over the years that describes the risk of transmission of fire blight through apple fruit as negligible." As stated by Roberts *et al.* 1998: 23 (**Exhibit NZ-22**) "There are no specific pathways recorded that document movement of

Australia seems to be suggesting that New Zealand is required to produce "direct evidence" to "prove" that mature apples do not spread fire blight. The implication of Australia's argument is to reverse the obligations in the *SPS Agreement*. Australia thus appears to hold the mistaken belief that it is permitted to maintain a measure so long as there is no direct scientific evidence proving it to be unnecessary. That cannot be correct.

2.124 The correct interpretation of the *SPS Agreement* is the opposite of that implied by Australia's submission. Under Article 2.2, Australia may not maintain a measure without sufficient scientific evidence. Australia has failed to rebut New Zealand's case that Australia's fire blight measures are maintained without sufficient scientific evidence.

(iii) The fire blight "outbreak" at the Royal Botanic Gardens at Melbourne is not evidence that mature, symptomless apples provide a pathway for the introduction of fire blight

2.125 Likewise, it does not assist Australia to refer to the "fire blight outbreak" in the Royal Botanic Gardens at Melbourne.[168] This "outbreak" does not qualify as evidence that there is a pathway for the introduction of fire blight via mature symptomless apples. Rather, the most likely scenario for the Melbourne find is that it was caused by infected nursery stock.[169] Although Australia makes an unsubstantiated assertion that "there was no introduction of planting material that could have introduced the disease", Rodoni *et al.* 1999 identifies that *E. amylovora* was isolated from a Cotoneaster and a Sorbus plant in the Botanic Gardens.[170]

EA from fruit, either imported or domestic in origin, to susceptible host tissues in an orchard or nursery." Roberts and Sawyer 2008 (**Exhibit NZ-29**) notes, however, the "impossibility of proving that something does not exist or never occurs." (p. 366) Australia nevertheless argues that New Zealand is required to prove a negative – see, for example AFWS, para. 475, where Australia argues that the sample size of 1830 apples, in the studies by Hale *et al.* 1996 (**Exhibit NZ-27**) and Taylor *et al.* 2003a (**Exhibit NZ-28**), was too small, and implies that millions of apples would need to be tested before Australia's hypothetical "pathway" could be "disproved".

[168] AFWS, para. 356.

[169] Internationally it has been accepted that the spread of fire blight over long distances is most likely to be attributed to the movement of contaminated nursery stock: Thomson 2000 (**Exhibit NZ-5**); Jock *et al.* 2002 (**Exhibit NZ-30**); EPPO Data Sheet 2006 (**Exhibit NZ-6**).

[170] **Exhibit NZ-121:** Rodoni B, Kinsella M, Gardner R and Merriman P (1999) "Detection of Erwinia amylovora, The Causal Agent of Fire Blight", in the Royal Botanic Gardens, Australia",

Australia does not provide any explanation as to how Cotoneaster and Sorbus plants were introduced into the Botanic Gardens in the first place. Neither plant is a native to Australia. Those plants must, therefore, have been introduced into Australia at some time.

2.126 Accordingly, New Zealand's assertion that mature, symptomless apples do not serve as a pathway for the introduction of fire blight has not been rebutted by Australia through its references to the find at the Royal Botanic Gardens at Melbourne. Absent any scientific evidence of the existence of a pathway, the inescapable conclusion is that Australia's measures for fire blight are maintained without sufficient scientific evidence.

(iv) Australia has not rebutted evidence from international trade that mature, symptomless apples do not provide a pathway for introduction of fire blight

2.127 The reality of international trade in apples reinforces New Zealand's argument that mature, symptomless apples do not provide a pathway for the introduction of fire blight.

2.128 In its first written submission, New Zealand identified that in the long history of trade there has been no instance of the introduction, establishment and spread of the disease via mature, symptomless apple fruit. New Zealand's submission is supported by the responses to the Panel's question 2 addressed to third parties, in which the United States, Japan, and the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu all stated that they had not experienced the entry, establishment, or spread of fire blight due to trade in fresh apple fruit. Introduction of fire blight has never been associated with the import of mature, symptomless apple fruit.[171] For that reason, there is an absence of specific measures in Europe in relation to trade in apple fruit, despite the fact that some European countries remain free of the disease.[172] In the 50 plus years since fire blight was first recorded in Europe, no evidence has emerged that mature, symptomless apple fruit provide a pathway for spread of the

Proceedings of the 8th International Workshop on Fire Blight", *Acta Horticulturae* 489, 169-170. The IRA does not mention the isolation of *E. amylovora* from Sorbus, see IRA part C, p. 107.

[171] Paulin RPQ, Q 16, pp. 10-11.

[172] Deckers RPQ, Q 6, p. 3 and Q 16, p. 7.

disease, despite the uncontrolled movement of huge volumes of apple fruit from infected to non-infected regions. Australia has failed to rebut New Zealand's arguments based on the reality of international trade that Australia's measures are maintained without sufficient scientific evidence.

3. European canker

(a) Australia has been unable to provide any evidence to support the existence of a pathway as a whole and has thus failed to rebut New Zealand's case

2.129 The European canker measures imposed by Australia are based on the contention that mature apples from New Zealand provide a pathway for the establishment of European canker in Australia. However, as pointed out in New Zealand's first written submission, there is no scientific evidence that mature apples have ever provided a pathway for European canker even in optimal circumstances, let alone that they could do so in the context of New Zealand apples exported to Australia. As established in New Zealand's first written submission, in New Zealand fruits rots caused by *N. galligena* are rare and virtually absent from major apple-producing regions in New Zealand, and latent fruit rots caused by *N. galligena* in mature apple fruit, upon which the Australian pathway ostensibly relies, are virtually unknown. Moreover, even if the disease entered Australia, climate conditions in Australia are not conducive to European canker establishment and spread.

2.130 In an effort to rebut these points Australia is forced to treat hypothetical speculation as to the existence of a pathway as "divergent scientific opinion"; to rely on a flawed alternative climate analysis that simply confirms that the incidence of European canker must be overstated in order for the Australian position to find any support; and to invent novel explanations to downplay the significance of the European canker outbreak in Tasmania. As New Zealand will elaborate below, Australia's arguments cannot be sustained.

(b) No evidence of a pathway via mature, symptomless apples

2.131 As New Zealand demonstrated in its first written submission, Australia's contention that trade in apple fruit provides a pathway for the transmission of European canker is not supported by scientific evidence. In fact, the pathway proposed in the IRA has never been reported in any of the scientific literature or observed anywhere in the world.

2.132 Indeed, the absence of scientific support for such a pathway is acknowledged in the IRA which states that: "no studies exist in the literature to demonstrate long-distance spread from fruit infections".[173] The IRA also concedes that "there is no evidence in the literature that indicates that long-distance spread of the disease is due to movement of fruit".[174]

2.133 That mature apple fruit have never been implicated in the long-distance spread of the disease is confirmed in the experts' responses to Panel questions. Dr Latorre states that "[t]here is no scientific evidence demonstrating that long-distance spread of European canker is due to the movement of fruits….Therefore, long-distance spread along with mature apple fruits should be regarded as a hypothesis rather than a true fact."[175]

2.134 In particular, the experts confirm that there is no evidence of a pathway via latently infected mature apple fruits. Dr Swinburne confirms that "[t]here are no reports which imply that rotted apples are in any way involved in the transfer of infection with *N. galligena* to 'clean' orchards."[176]

2.135 The experts also confirm that there is no scientific evidence to support a pathway via infested/surface-contaminated mature New Zealand apple fruit. Dr Latorre comments that "[t]he likelihood of a pathway via surface-contaminated mature New Zealand apple fruit is unknown. Based on the scientific information acquired thus far, surface contamination (ascospores and conidia epiphytically contaminating fruit surfaces) appears to be non-existent. This possibility should be disregarded from the risk analysis."[177]

[173] IRA, p. 135.

[174] IRA, p. 142.

[175] Latorre RPQ, Q 64, pp. 16-17.

[176] Swinburne RPQ, Q 54/55, p. 6.

[177] Latorre RPQ, Q 57, p. 13.

2.136 Dr Swinburne states that "it is extremely unlikely that in the event that spores deposited on the open surface of fruit at or before harvest would play any part in an entry pathway".[178]

2.137 While Australia, in its comments on experts' replies, claims that neither of the experts "rule out" the view expressed in the IRA that mature apple fruit may be a pathway for the long distance spread of European canker,[179] this is not the test under the *SPS Agreement*. Australia must provide sufficient scientific evidence to maintain its measures which Australia has patently failed to do in the IRA. Australia has not provided any new evidence in its first written submission, its responses to Panel questions, or its comments on experts' replies, to support the existence of such a pathway. Accordingly, New Zealand maintains its submission that Australia's European canker measures are not maintained with sufficient scientific evidence, and are inconsistent with Article 2.2.

(c) Neither the Ivess letter nor the Braithwaite report constitutes sufficient scientific evidence of a pathway via latently infected apple fruit

2.138 In its first written submission and responses to Panel questions, Australia relies on the Braithwaite report[180] and a covering letter from a New Zealand official[181] as divergent scientific evidence of the existence of a pathway.[182] These neither constitute minority scientific opinion nor "sufficient scientific evidence" capable of supporting the Australian measures.

2.139 With regard to the covering letter, Australia's contention that the New Zealand official "endorsed"[183] or "accepted"[184] the existence of a pathway is simply not correct. The letter merely noted the conclusion of the Braithwaite report: "the report concludes that apple fruit are a potential pathway for the introduction of

[178] Swinburne RPQ, Q 57, p.7.

[179] ACER, para. 132.

[180] **Exhibit NZ-34**.

[181] **Exhibit AUS-54**.

[182] ARPQ, Qs 70, 126. See also AFWS, para. 942.

[183] AFWS, para. 546 (see also para. 942); ARPQ, Q 70.

[184] ARPQ, Q 71.

European canker as the fruit can develop latent or storage rots".[185] This falls well short of "endorsement" or "acceptance". Accordingly, New Zealand rejects Australia's attempt to use the covering letter as evidence that the transmission of European canker through imports of New Zealand apples is not a contentious issue.[186] Clearly the letter is not scientific evidence, let alone sufficient scientific evidence, that European canker can be transmitted through trade in apple fruit.

2.140 The same is true of the Braithwaite report. While the Braithwaite report was referred to in the IRA, the IRA went on to conclude that there was "no evidence"[187] in the literature to indicate that the long-distance spread of the disease is due to the movement of fruit. Accordingly, the IRA itself does not support Australia's new-found contention that the Braithwaite report itself constitutes scientific evidence, let alone sufficient scientific evidence, that European canker can be transmitted through trade in apple fruit.

2.141 In its responses to Panel questions, Australia argues that New Zealand's criticisms of the Braithwaite report "lack credibility".[188] Australia points to the fact that the report was provided by New Zealand to Australia, that it contains numerous references to scientific literature and was carried out by scientists currently or previously in the employment of the New Zealand Government.[189]

2.142 However, Australia's arguments miss the point. New Zealand neither takes issue with the report as a whole nor with the scientists involved in the its preparation. The key point made in New Zealand's first written submission is that Braithwaite's specific conclusion as to the possibility of a pathway[190] was not based on any scientific data, studies or research which actually reported the spread of European canker via latently infected apple fruit or demonstrated that it could occur. This in itself is not surprising as no such evidence exists. Thus, although the report contains

---

185 **Exhibit AUS-54**, p. 2.

186 ARPQ, Q 70.

187 IRA, p. 142.

188 ARPQ, Q 70, p. 58

189 ARPQ, Q 71, p. 59. See also ACER, paras. 149-150.

190 "It would be possible for European canker to be transmitted by the distribution of infected fruit. Infections can be latent and may not become apparent until after storage", **Exhibit NZ-34**, p. 1.

"a lengthy reference list",[191] the references appear primarily in the 'Background' and 'Biology and epidemiology' sections of the report and relate almost exclusively to disease development in the northern hemisphere.[192] The section dealing with a pathway ("risk of disease spread through infected fruit") comprises a mere two sentences (three lines of text) and contains no scientific references whatsoever.[193] Moreover, Braithwaite did not refer to any evidence that showed New Zealand apples are a potential pathway for the introduction of European canker. Therefore, the most that can be said is that the Braithwaite report, like the IRA, speculates on a hypothetical possibility of trade in apples providing a pathway for European canker.

2.143 The fact remains that such a pathway has never been demonstrated to have occurred anywhere, ever. Even in regions where fruit rots are common, latent infections are known to occur, and the conditions for European canker establishment are optimal, there is no evidence implicating apple fruit in the long-distance transmittal of European canker. In New Zealand, by contrast, fruit rots are rare and latent rots are virtually unknown. Moreover, Australia's climate is not suitable for European canker establishment. The Braithwaite Report does not engage with these issues.

2.144 The experts' responses confirm that Braithwaite is neither relevant nor reliable evidence of a pathway for the introduction of European canker into Australia via New Zealand apple fruit.

2.145 Dr Latorre states that "Braithwaite (1996) published a brief review on the currently available knowledge regarding European canker, based on studies of the disease's development in the United Kingdom and Northern Europe, without examining conditions in New Zealand. No new objective data is reported in this paper."[194]

2.146 As Dr Swinburne makes clear in his criticisms of the Braithwaite report: "Braithwaite (1996) contains an *unconfirmed* report that fruit rotting with this

[191] ARPQ, Q 71, p. 59.

[192] **Exhibit NZ-34**, pp. 2-3.

[193] **Exhibit NZ-34**, p. 4.

[194] Latorre RPQ, Q 54, p. 11.

pathogen has been detected in NZ…Braithwaite then goes on to speculate that rotted fruit can transmit infection, basing his argument on European observations on the formation of ascospores on mummified fruit. This is a very rare occurrence and most unlikely to be found in the climates of NZ or Australia….For these reasons this aspect of the paper can be disregarded."(Emphasis added.)[195]

2.147 Thus, the Braithwaite report does not provide any scientific evidence that European canker can be transmitted through latently infected apples, let alone via New Zealand apples exported to Australia. Australia cannot use Braithwaite's speculation regarding a hypothetical pathway as a substitute for sufficient scientific evidence.

(d) Australia has failed to show that latent fruit infections caused by N. galligena occur in New Zealand

2.148 Australia's response to Panel question 70 asserts that "…the IRA Team was mostly concerned with latent infection; infestation was of only minor concern".[196] This is also reflected in the description of the risk scenario in the IRA.[197]

2.149 As explained in New Zealand's first written submission, a fundamental flaw in the Australian contention regarding a pathway via latently infected New Zealand apples is that latent infections are virtually unknown in New Zealand. The most likely timing for latent infection is when fruit is infected late in the growing season, just prior to harvest. However, this is the period in New Zealand during which weather conditions are least suitable for infection, particularly in the major apple-producing areas of Hawke's Bay and Nelson.

2.150 While Australia in its comments on experts' replies bemoans "the data constraints under which the IRA Team had to conduct its risk assessment of European canker in relation to the incidence of fruit infection in New Zealand",[198] this lack of

[195] Swinburne RPQ, Q 54/55, p. 6.

[196] ARPQ, Q 70, pp. 57-58. See also ACER, para. 141; ACNZCER, para. 30.

[197] IRA, p. 118: "The risk scenario in respect to *N. galligena*, when importing apple fruit, is primarily any latent infection in fruit that would not have been detected at harvesting or during processing in the packing house".

[198] ACER, para. 153.

data is simply evidence that latent infections are virtually non-existent in New Zealand because of unfavourable summer climatic conditions rather than due to any lack of quality in the data itself.

2.151 This is a point expressly acknowledged by the experts. Dr Swinburne states that "[t]he weather data presented in Annex 2 of the NZ FWS would accord with a low incidence of fruit infection".[199] He observes that "[b]oth parties seem to agree that the frequency of fruit rotting is low, given the paucity of positive identifications…this must be attributable to unfavourable weather conditions, especially the absence of rain, during the summer months."[200] He also notes that "[t]he scarcity of reports of fruit infection in New Zealand, even from districts with canker…must reflect the predominant weather conditions in summer…."[201]

2.152 The only "evidence" of *latent fruit infections in New Zealand* which Australia's first written submission points to is, once again, the Braithwaite Report. Braithwaite noted that "the fungus has been associated with storage rots of apples (Mike Dance. Pers Comm) which *suggests* that latent infections also occur in New Zealand fruit" (emphasis added).[202]

2.153 However, a 'personal communication' referenced in a report does not amount to scientific evidence showing "the necessary scientific and methodological rigour to be considered reputable science"[203] capable of supporting an entire theory about the existence of a pathway via latently infected New Zealand apple fruit. The statement in the Braithwaite report does not make clear the quantity of storage rots discovered (or the frequency of discovery), the apple cultivar; the quality of the fruit;[204] the conditions of storage; the timing and location of the discovery; or the

---

[199] Swinburne RPQ, Q 57, p. 7.

[200] Swinburne RPQ, Q 75, p. 12.

[201] Swinburne RPQ, Q 72, p. 12.

[202] **Exhibit AUS-54**, p. 5.

[203] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

[204] Dr Swinburne notes that "[u]nlike some other species responsible for apple rots….conidia of *N. galligena* are not able to initiate infection through the intact cuticle of fruit, consequently conidia adhering to the unbroken surface are unlikely to…contribute to fruit rots": RPQ, Q 49, p. 4. Accordingly, if the fruit were not export quality (i.e. not mature, symptomless and wound free) this would be a relevant factor in considering the relevance of the find referred to in Braithwaite to any future incidence of fruit infections in New Zealand export grade apples.

prevailing weather conditions. In short, it is impossible to draw any conclusions about the incidence of latent infections in New Zealand on the basis of a suggestion in a report which itself is founded on an unverified, unsighted personal communication.

2.154 The experts' responses confirm that Braithwaite is neither relevant nor reliable scientific evidence of latent infections in mature, symptomless New Zealand apple fruit. Dr Latorre states that "…I agree that it is not a reliable and relevant reference to support the hypothesis that latent infections may also occur in mature apple in New Zealand".[205]

2.155 Dr Swinburne also notes that "it is by no means clear if these reports [of fruit rots in New Zealand] refer to pre- or postharvest".[206] While Australia states that it is clear "that the fruit rot originated from latent infections (post-harvest)",[207] in reality there is insufficient information in the cursory reference in the Braithwaite report to a personal communication from which to draw any conclusions at all.

2.156 In summary, the Braithwaite report is not a sufficient scientific basis for Australia's SPS measures.

(e) Australia has failed to rebut the evidence from international trade that apples do not provide a pathway for the transmission of European canker

2.157 As demonstrated in New Zealand's first written submission, the fact that mature apple fruit are not a pathway is reinforced by the reality of international trade in apples. This is confirmed by the responses to Panel question 2 addressed to third parties, in which the United States, Japan and the Separate Customs Territory of TPKM all stated that they had not experienced the entry, establishment or spread of European canker due to trade in fresh apple fruit.[208]

---

[205] Latorre RPQ, Q 54, p.11.

[206] Ibid.

[207] ACER, para. 147.

[208] TPKM RPQ, p. 5: So far, no fire blight or European canker symptom has been found in the imported apple fruits. US RPQ: The United States has significant experience with trade in fresh apple fruit. At the same time, the United States has not experienced the entry, establishment, or spread of fire blight or European canker due to trade in fresh apple fruit. The four criteria listed above do not alter this. The United States has not intercepted fire blight or European canker either in apples that are

2.158 Moreover, despite the billions of apples traded from New Zealand over the last 15 years, none of the apples exported from New Zealand have been associated with the entry, establishment or spread of European canker.[209]

2.159 Australia attempts to downplay the significance of this evidence, on the basis that the vast majority of New Zealand's exports have been to countries that already have the disease.[210]

2.160 However, contrary to Australia's assertion, not all of New Zealand's export markets have European canker. For example, European canker has not been found in Chinese Taipei, a territory which lists European canker as a quarantine pest, despite 177 thousand metric tonnes[211] of apples being imported from New Zealand from January 1989 to June 2008.[212] New Zealand notes that Chinese Taipei has a domestic apple industry[213] as well as individual apple trees and many of the 'alternative hosts' identified by the IRA planted in gardens and occurring in the wild.[214] Moreover, climatic conditions in the mountainous central regions where hosts are found means that Chinese Taipei is relatively high risk for European canker establishment and spread, and comparatively more favourable to the development of European canker than mainland Australia.

imported into the United States or in apples that it exports. J RPQ: European canker was found in Japan in the past, however, Japan is unsure about the entry, establishment or spread of it.

[209] NZFWS, para. 4.95.

[210] AFWS, para. 671.

[211] 177 metric tonnes = 885,000,000 apples at 90 apples per TCE (more likely given demand for larger sized fruit in Asian markets) or 973,500,000 apples at 100 apples per TCE (usual figure used for determining volume of trade), see NZRPQ, Q 10.

[212] In its response to Panel question 6, the Customs Territory of TPKM confirms that "The amount of apples imported from New Zealand to our territory from January 1989 to June 2008 was about 177 thousand metric tonnes". No incidence of European canker was recorded in that period: TPKM RPQ, Q 6, p. 6. See also TPS TPKM, p. 11: "In the last thirty-two years, European canker has never been found in the territory of TPKM".

[213] In 2007 Chinese Taipei had 568 hectares planted in commercial apples (453 hectares were in Taichung, 115 hectares in Nantou, both in the central hilly part of Chinese Taipei), producing over 5,900 tonnes annually in 2006 and 2007: *Agricultural Statistics Yearbook*, Council of Agriculture, Taiwan 2007. **Exhibit NZ-115**.

[214] Global Biodiversity Information Facility Data Portal. http://data.gbif.org/species/ (Accessed 8 Jan 2009).

2.161 In addition, New Zealand exports apples to a number of other Asian countries such as Thailand, Bangladesh, Viet Nam, Papua New Guinea, Malaysia and the Philippines where European canker has never been recorded. While these countries do not have apple industries, they do have some of the more than fifty alternative species which Australia has identified as potential hosts of the disease in Australia[215] (for example, oriental pears and several species of beech, elm, birch and rose are recorded in the higher elevations of South East Asia).[216]

(f) Australia has failed to rebut evidence that the Australian climate is not conducive to European canker establishment and spread

2.162 As set out in New Zealand's first written submission, underlying Australia's measures for European canker is an assumption that Australian apple-producing regions have suitable climatic conditions for European canker establishment and spread.[217] However, as pointed out in New Zealand's first written submission, there is no rational or objective relationship between this assumption and the scientific evidence relied on. Specifically, Australia's measures are based on the flawed assumption that more than 1000mm rainfall per year and temperatures between 2 and 30 degrees Celsius (with an optimum temperature for disease development of between 20 and 25 degrees) are the relevant climatic parameters.[218]

2.163 Beresford and Kim's climate analysis, annexed to New Zealand's first written submission, determined that the climatic conditions conducive to European canker are the simultaneous occurrence in the same month of rainfall on more than 30% of days and temperatures between 11 and 16 degrees for more than 8 hours per day. Contrary to what is suggested in the IRA, (and Annex 2 of Australia's first written submission), Beresford and Kim showed that in the main apple-growing regions of Australia the climate is less suitable than those parts of the world where European canker is known to occur as a disease problem.[219] Accordingly, even if *N.*

[215] IRA, part C, p. 99. Data sheets - European canker.

[216] Global Biodiversity Information Facility Data Portal. http://data.gbif.org/species/ (Accessed 8 Jan 2009).

[217] IRA, pp. 137, 140, 143.

[218] IRA, p. 137.

[219] On Beresford and Kim's analysis, the only Australian apple-growing areas that possibly have a similar climate to regions where European canker exists are parts of Western Australia (out of

galligena were to enter Australia, the effect is likely to be similar to areas in the world where the pathogen is considered likely to be present but does not cause a disease problem, for example in central Washington State, as discussed in the third party submission of the United States.[220]

2.164 As will be elaborated at paragraphs 2.640 to 2.642 below, the experts' responses confirmed that the total rainfall criterion used in the IRA was not an adequate predictor of European canker risk and that it is necessary to include duration of rainfall, temperature and seasonal distribution of rainfall during the year.

2.165 The unsuitability of Australia's climate is also confirmed by the experts' responses. Dr Swinburne found it "…difficult to escape the conclusion that the climate of fruit growing regions of mainland Australia are not conducive to the development of an epidemic of this disease."[221] Dr Latorre considered that "[o]verall, the climate in Australian apple production areas is relatively less conducive to the establishment and spread of European canker than other producing areas of the world".[222]

2.166 In its first written submission, Australia criticises New Zealand for its 'undue' focus on environmental criteria.[223] New Zealand recognises that European canker establishment would require the simultaneous occurrence of *N. galligena* inoculum, a susceptible host and a suitable environment, and all three of these factors were dealt with in New Zealand's first written submission,[224] and in detail below at paras. 2.580 to 2.634. However, the limited occurrence or non-occurrence of only one of these three factors would be sufficient for the disease not to establish.

2.167 Australia, in its first written submission, makes two main arguments in respect of New Zealand's climate analysis: first, that the climatic parameters used by Beresford and Kim are too narrow; and second that New Zealand's climate analysis

---

the scope of the dispute) and Northern Tasmania (and then only for some months), see NZFWS para. 4.91.

[220] TPS US, para. 40.

[221] Swinburne RPQ, Q 58, p. 8.

[222] Latorre RPQ, Q 72, p. 21.

[223] AFWS, para. 532.

[224] NZFWS, paras.4.303-4.317.

under-predicts the likely incidence of European canker.[225] However, both of these arguments are unfounded.

(i) Australia has failed to show that the Beresford and Kim climatic parameters are too narrow

2.168 Australia argues that the climatic requirements identified by Beresford and Kim (rainfall on more than 30% of days per month and temperature between 11-16 degrees for more than eight hours per day), are "too restrictive" and "not fully supported by "other literature and high infections can occur at other values [outside] of these parameters".[226]

2.169 The "other literature"[227] appears to be a reference to Dubin and English 1974,[228] Grove 1990[229] and Latorre *et al.* 2002.[230] However Australia fails to show any lack of fit between those studies and the climate parameters developed by Beresford and Kim.

2.170 Australia cites Grove's finding that the best range for infections in the field is between 10-16 degrees Celsius.[231] However, this proposition is entirely consistent with the Beresford and Kim analysis. Dubin and English 1975 also found that "field experiments showed that the optimum temperature for infection was ca. 10-15 degrees Celsius."[232] Latorre *et al.* 2002 confirmed that the optimum temperature for disease development was 15 degrees Celsius.[233] Each of these references reinforce rather than contradict Beresford and Kim's analysis.

[225] AFWS, paras. 531-534, 627-628, 657-659, 681, and 698.

[226] AFWS, para. 533.

[227] These references appear in AFWS, footnote 624 and are expanded upon at AFWS, para. 627.

[228] **Exhibit AUS-67**.

[229] **Exhibit NZ-7**.

[230] **Exhibit AUS-50**.

[231] **Exhibit NZ-7**, Grove, p. 6, cited in AFWS, para. 627.

[232] **Exhibit NZ-12**, p. 84.

[233] **Exhibit AUS-50**, p. 288.

2.171 Australia also points to Dubin and English 1974[234] to show that 6 hours wetness is sufficient to cause infections (in contradistinction to the rain day thresholds used by Beresford and Kim).[235] However, Dubin and English go on to state:

> …field infection occurs only where rainfall is abundant for long periods of time [Crowdy (1952), Dubin (1972) and Wilson (1966)]…
>
> Field data on infection obtained in California indicated a "definite need of *several days free moisture* to obtain high levels of infection [Dubin (1972)]. *These results are supported by the present data*" (emphasis added).[236]

2.172 In his responses to Panel questions, Dr Swinburne confirms a continuing period of leaf wetness is required for spore production and infection and that "[t]he number of days of rain will give a much more accurate indicator of the likelihood of infection, especially when examined in terms of the seasonal frequency of rain days."[237]

2.173 Accordingly, the Beresford and Kim analysis is consistent with the results reported in Dubin and English 1974 and the experts' responses.

2.174 Australia criticises the climatic parameters adopted by Beresford and Kim on the basis that they are not borne out by the climatic data relied on. Australia argues that the Chilean data from Lolas and Latorre 1996[238] shows that the differences observed in European canker incidence were driven by differences in rainfall.239 However, the rainfall and temperature values in the Chilean data are, in fact, completely consistent with both the temperature and rain day thresholds used by Beresford and Kim.

---

[234] Australia also cites Grove 1990 in support of its statement. Grove 1990 is a literature review of the disease and its control in the Compendium on Apple and Pear Diseases published by the American Phytopathological Society. Grove did not actually study European canker. As Grove gives no reference, it is presumed that Grove was relying on the Dubin and English 1974 study.

[235] AFWS, para. 627.

[236] **Exhibit AUS-67**, p. 1202.

[237] Swinburne RPQ, Q 56, pp. 6-7.

[238] **Exhibit AUS-81**.

[239] AFWS, para. 533.

2.175 Australia also points to the known incidence of fruit infection in the Waikato as evidence of the unreliability of the predictions based on the Beresford and Kim analysis.[240] However, the fact that only seven *N. galligena* rots were discovered in a sample of 3300 pre-harvest rotted fruit collected at harvest between 1999 and 2005 is consistent with the finding in Beresford and Kim that summer conditions in New Zealand are generally unsuitable for European canker fruit infection. As set out in Beresford and Kim's climate analysis, Waikato (which has a similar climate to Auckland) has suitable conditions for European canker development over a larger proportion of the year than other New Zealand regions.

2.176 The experts' responses do not support Australia's contention that the parameters identified by Beresford and Kim are 'too restrictive'. Dr Latorre comments that "[t]he weather analysis performed by New Zealand (Beresford and Kim) objectively explains the algorithm used, and provides information regarding the model's validation, using historical weather data obtained in five countries where European canker affects apples, with different prevalence and severity. Therefore, it is an acceptable criterion to assess weather conditions for European canker establishment in Australia, relative to other apple-producing areas in the world where *N. galligena* is a real problem."[241]

2.177 Dr Swinburne states that "the approach adopted by Beresford and Kim (Annex3 NZFWS) is both rational and reasonable, drawing as it does on the climatic factors identified in California and Chile…Most importantly it makes allowances for the water requirements for spore formation as well as their dispersal and the infection process itself. In the absence of leaf wetness data, an analysis of the days of rain during critical parts of the season seems to provide a reasonable assessment of infection risk. That this model also enables regions within NZ to be distinguished on the basis of known disease incidence is reassuring."[242]

2.178 Accordingly, Australia has failed to show that the Beresford and Kim climatic parameters are too narrow.

---

[240] AFWS, para. 534.

[241] Latorre RPQ, Q 72, pp. 20-21 .

[242] Swinburne RPQ, Q 72, p. 11.

(ii) Australia's claim that New Zealand's climate analysis under-predicts the likely incidence of European canker has no support

2.179 In its first written submission, Australia attempts to provide an alternate climate analysis to show a much larger area of potential canker establishment than that put forward by Beresford and Kim, including Australia's major pome-fruit regions (Bureau of Rural Sciences climate paper (BRS report), Australia's first written submission, Annex 2).

2.180 The BRS report relies on climate matching with areas with a known occurrence of European canker, using the software CLIMEX and CLIMATE. However, the analysis provides insufficient methodological information to allow an appraisal of their climate matching procedure. In particular, the paper does not explain which records of European canker were taken into account so that their interpretation of the worldwide distribution of *N. galligena* cannot be analysed; it omits details of the weather station locations and climate databases used in the analyses so that the quality and appropriateness of chosen sites cannot be verified; and it does not make clear what climatic parameters and parameter values were used in determining areas with European canker risk.

2.181 As Dr Swinburne states: "In the absence of a detailed explanation of the CSIRO climate model, or why the results it produced (Annex 2 Australia's FWS) differed from the application of the Beresford & Kim model (Annex 3 NZ FWS) it is difficult to provide critical comment on the potential areas of risk claimed (Fig1 Aus FWS Annex 2)."[243]

2.182 The differences between the results generated in the BRS report and the results in Edwards *et al.* 2007 (Appendix 1 to the BRS Report) as to the potential distribution of European canker in Australia further call into question Australia's climate-matching methodology. While the BRS report claims similarity between the BRS map of European canker risk from CLIMEX (Figure 1) and that in Edwards *et al.* 2007,[244] in fact there are substantial differences. Whereas the results of Edwards *et*

[243] Swinburne RPQ, Q 72, p. 11.

[244] AFWS, Annex 2, p. 2.

al. 2007 predict that European canker risk is restricted to a coastal fringe in southeastern and southwestern Australia, but that it extends along the entire coastal fringe of tropical north Queensland, the BRS report shows a wider area of risk throughout southeastern and southwestern Australia and no risk in north Queensland. There are similar sorts of discrepencies between Edwards *et al.* 2007 and the BRS report in the analyses using CLIMATE.

2.183 Further, as pointed out in New Zealand's oral statement for the first substantive meeting with the parties and New Zealand's response to Panel question 73, the flaws in the BRS report's analysis are demonstrated in the risk maps of New Zealand (Figures 1 and 2 of the BRS report), which show high European canker risk in areas known to be either free from or low risk for European canker. For example, Figure 1 shows an area of high risk along the east coast of the South Island (Marlborough, Canterbury and coastal North Otago) and in Central Otago. This bears no relation to reality, as European canker is virtually unknown from these eastern and inland South Island regions. Accordingly, applying the real world test, the CLIMATE and CLIMEX modelling grossly over-predict the incidence of European canker establishment risk.

2.184 The fact that the Australia's comments on expert replies now suggest that a second BRS climate paper is being prepared only serves to underscore the weaknesses of Australia's argument about Australia's climatic suitability for European canker development.

2.185 Accordingly, Australia fails to show that the Beresford and Kim analysis under-predicts the risk of European canker. Instead, what Australia does show is that it needs to try and shore up its position by over-estimating the incidence of European canker.

(g) Australia fails to rebut evidence that failure to spread during the Tasmanian outbreak was due to climatic unsuitability

2.186 As set out in New Zealand's first written submission, the failure of European canker to spread throughout Tasmania (a region which, on Beresford and Kim's analysis, is considered to be one of only two regions in Australia that would be marginally favourable to European canker)[245] from the four affected orchards or to the mainland is testament to the unsuitability of the Australian climate as a whole for the establishment or spread of European canker.

2.187 Dr Swinburne confirms that "[t]he Tasmanian outbreak of European canker does have some relevance to the suitability of the climate in mainland Australia to support an epidemic. The fruit growing areas in the west of [Tasmania] 'enjoys' more days of rain than Auckland (NZ) and yet the reports suggest that the impact of the disease in terms of severity or spread over a period of years was less in the Spreyton district than now seen in Auckland the Beresford and Kim model suggests that this difference is attributable to unfavourable temperatures in Tasmania, and thus providing further support to its use in assessing the disease potential of differing climatic zones."[246]

2.188 In its first written submission and responses to Panel questions, Australia attempts to downplay the significance of climate relative to other factors and seeks to attribute the failure of European canker to spread during the Tasmanian outbreak to a "range of reasons"[247] none of which are supported by the evidence.

<u>(i) European canker in Tasmania remained untreated for years</u>

2.189 Australia relies on the eradication programme as the principal reason for the limited spread of the disease during the Tasmanian outbreak.[248] However, while New Zealand does not, as Australia's first written submission suggests, consider the eradication programme "irrelevant",[249] the point which Australia continues to overlook is that European canker had been present for a considerable period of time prior to the start of the eradication programme and did not spread beyond a handful of affected orchards. As Dr Swinburne states "[t]he removal of all infected trees would

[245] NZFWS, p. 224.
[246] Swinburne RPQ, Q 74, p. 12.
[247] AFWS, paras. 660-670, 890. See also ARPQ Q 76, pp. 62-63.
[248] AFWS, paras. 661, 693, 890.
[249] AFWS, para. 663

reduce and finally eliminate the opportunity to spread *but does not explain the failure to do so in the earlier years*."(Emphasis added.)[250]

2.190 While Australia's first written submission attempts to downplay the period preceding the commencement of the eradication programme,[251] Ransom 1997, the only published information on the Tasmanian outbreak, states that "[t]he disease had been known for some time by local orchardists but had never been formally identified…"[252] Ransom also states that "Ca. 1947 A canker disease was known in apple trees in the Spreyton district, but thought to be Frog Eye spot caused by Botryosphaeria obtusa (Schw.) Shoemaker. It was not widespread, *although it may have been present for almost 20 years.*" (Emphasis added.) [253]

2.191 Further, Australia's reliance on the eradication programme implies that the disease risk was eliminated as soon as the eradication programme commenced in 1954-55. However, Ransom reports increased incidence in 1964.[254] The eradication programme was only finalised in 1991. It is also relevant therefore that for the duration of the eradication programme, some 37 years, the disease did not spread out of the four contiguous orchards in the Spreyton area.

(ii) No evidence to support the presence of a heterothallic strain of *N. galligena* during the Tasmanian outbreak

2.192 In its first written submission, Australia acknowledges the absence of air-borne ascospores contributed to the failure of the disease to spread during the Tasmanian outbreak.[255] As set out in New Zealand's first written submission, the absence of ascospores is consistent with New Zealand's view that the climatic conditions in Tasmania were not suitable for the completion of perithecial development.[256] However, Australia now attempts to draw attention away from the

[250] Swinburne RPQ, Q 90, p. 15.

[251] AFWS, para. 665.

[252] Ransom 1997 (**Exhibit NZ-13**), p. 121.

[253] Ibid., p. 121.

[254] Ibid., p. 123.

[255] AFWS, paras. 664, 691, 890. ARPQ, Q 76.

[256] NZFWS, 4.308, Annex 3, p. 224. See also Munson 1939, **Exhibit NZ-37**, p. 446, which confirms that perithecia only appear after the temp drops and the subsequent production of ascospores

unsuitability of the Australian climate by inventing a novel reason, not considered in the IRA, why ascospores of *N. galligena* were not discovered during the Tasmanian outbreak. Australia posits that this was because the disease in Tasmania was caused by a "unique" heterothallic strain of *N. galligena*, one that required another mating type for sexual reproduction (i.e. producing ascospores), and that the required mating type was not present.[257]

2.193 The suggestion that a unique heterothallic strain produced the perithecia that were observed in Tasmania but that these were unfertilised and therefore incapable of producing ascospores has no basis either in the facts surrounding the Tasmanian outbreak, or in the existing literature about mating systems in *N. galligena*.

2.194 Despite the large volume of scientific literature cited in Australia's first written submission, many of the papers either do not relate to *N. galligena* at all[258] or simply confirm the homothallic nature of the fungus. Booth 1959,[259] Lortie 1964[260] and Lacoste and Dehorter 1973[261] all produced perithecia in culture from single ascospore isolates, demonstrating the homothallic nature of *N. galligena*. El-Gholl *et al.* 1986[262] also clearly demonstrated that *N. galligena* is homothallic. The study by Plante *et al.* 2002[263] was cited in Australia's first written submission to show that "some strains of *N. galligena* in North America are also cross-fertile".[264] However, the study was not of heterothallism, but of the genetic variability of *N. galligena* in North American hardwoods. The study did not address cross-fertilisation and the way in which the paper is applied in Australia's first written submission in support of a heterothallic strain in Tasmania is misleading.

---

required: "A continuous humid atmosphere from the beginning of October onwards". Butler 1949, **Exhibit AUS-60**, indicated that dry weather retards the appearance of perithecia, p. 726.

[257] AFWS, paras. 631-632. See also AFWS, paras. 664, 691, 890. ARPQ, Q 76.

[258] **Exhibit AUS-68** (Brayford *et al.*) is about taxonomy based on morphological and DNA characteristics and does not any mention of mating systems in *N. galligena*, or any other *Neonectria* species. **Exhibit AUS-69** (Hirooka) is about mating systems in *N. castaneicola* and *N. rugulosa*, with no reference, either direct or indirect to *N. galligena*.

[259] **Exhibit AUS-70**.

[260] **Exhibit AUS-71**.

[261] **Exhibit AUS-72**.

[262] **Exhibit AUS-73**.

[263] **Exhibit AUS-75**.

[264] AFWS, para. 631.

2.195 In fact, Australia's arguments depend entirely upon the exceptional example discovered in Germany described by Kruger 1974.[265] As stated in Cotter *et al.* 1978:[266]

> Nectria galligena Bres. is homothallic with the exception of strains isolated by Kruger (1974), which were heterothallic.

2.196 There is simply no basis for extrapolating from this isolated finding in Germany to construct an extremely unlikely explanation for the failure of ascospores to develop (one which the IRA itself did not even contemplate). Ransom 1997, the only existing published information about the Tasmanian outbreak, does not refer to heterothallism.

2.197 Dr Swinburne confirms the lack of scientific evidence to support the Australian theory about a unique heterothallic strain: "There is no evidence in the literature that there are distinct strains of the pathogen responsible for European canker in the apple, including the data of Flack & Swinburne (1975)…. There are conflicting reports in the literature concerning sexual reproduction in Nectria (El-Gholl, Barnard & Schroeder 1986; Kruger, 1974), but the former (homothallic) seems the most convincing. To assume that failure to form mature perithecia was due to the presence of only one mating type also requires the assumption that the entire epidemic originated, somewhere, with one spore, which is most unlikely."[267]

2.198 Australia also claims in its first written submission that 'protoperithecia' were discovered but no mature ascospores, which it uses to suggest the existence of a heterothallic strain and the absence of a compatible mating type.[268] Protoperithecium refers to the structure that develops into a perithecium following mating, which for heterothallic strains would require a compatible mating type to be present. However, the basis for the Australian claim is unclear. Ransom 1997, the only published literature on the Tasmanian outbreak, does not mention protoperithecia. Rather, Ransom states that "*perithecia* were found on several occasions but they never

[265] **Exhibit AUS-74**.

[266] **Exhibit NZ-116**, Cotter H van T, Blanchard RO (1978) "Heterothallism in Nectria cocciniea var. Faginata", *Mycologia* 50, 697-700.

[267] Swinburne RPQ, Q 90, p. 15.

[268] AFWS, para. 632.

contained asci" (emphasis added).[269] The fact that perithecia were found suggests that the Australian strain was homothallic. Even if it were heterothallic, the discovery of perithecia suggests that a compatible mating type was present and that mating had occurred. Accordingly, the facts surrounding the Tasmanian outbreak contradict Australia's claim that the Tasmanian outbreak was due to a heterothallic strain with no compatible mating type present.

(iii) Failure of ascospores to develop due to climatic unsuitability

2.199 Rather than attempting to superimpose new facts on the Tasmanian situation, as Australia does, New Zealand's position that the absence of ascospores was due to climatic unsuitability is well supported in the literature.

2.200 Wessel 1980 confirmed that the failure of perithecia to mature and of ascospores to develop is a consequence of drier, warmer conditions.[270] Two year old grafted apple trees were inoculated with a single strain of *N. galligena* and then distributed to different locations in Germany (chosen primarily on the basis of differences in rainfall and temperature) and monitored. Perithecia developed only in the colder, wetter locations (Oderbrück and Jork). Perithecia did not appear in Hanover (relatively warmer and drier than the other two locations), and in Geisenheim (the driest, warmest site) the infection healed over and was barely distinguishable from the other tissue.

2.201 Wilson 1966 reported on the "striking differences" between the behaviour of the fungus in Sonoma County (California) and its behaviour in England in terms of the production of ascospores.[271] In California, in the years 1958-1965, mature perithecia (containing ascospores) developed only twice (1963-1964).[272] Sonoma

[269] Ransom, **Exhibit NZ-13**, p. 122. Although Ransom also mentions perithecial initials (p. 124), this term is clearly used as an alternative name for the undifferentiated perithecia observed in the field. Non-fertilised protoperithecia in ascomycete fungi are likely to remain microscopic and would likely not be detected during field inspection.

[270] **Exhibit, NZ-117**, Wessel H (1980), "Study of the Influence of Climatic Factors on the Development of Apple Canker (*N. galligena)*", Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent., 45(2):183-190 (German and English)

[271] **Exhibit NZ-64**, p. 183.

[272] **Exhibit NZ-64**, p. 183. In 1955, perithecia were found but no ascospores. In 1956 one perithecium was found with ascospores but only "after an extensive search". Nichols, Carl W and E.E

County is warmer and drier (and therefore less conducive to perithecial development) than most apple-growing districts in the United Kingdom.[273] Latorre 2002 reported that in Chile and California conidial infection is more important than infection through ascospores and that ascospores are seldom seen in certain (hotter, drier) apple producing areas of Chile.[274]

2.202 Dr Swinburne confirms that "[i]n California ascospores fail to develop in most seasons…[and t]hat this is due simply to climate and not to problems involving heterothallism or unusual strains of the pathogen is revealed by observing that in some years they do not develop in California."[275]

2.203 Accordingly, the conclusion drawn by Australia that the failure of ascospores to develop was likely to have been caused by a unique strain of *N. galligena* that required another (absent) mating type for reproduction is pure speculation. It is not supported by the scientific evidence relied on. The scientific evidence supports the New Zealand position that the failure of ascospores to develop can be attributed to unfavourable climatic conditions.

(iv) Australia's ambivalence with respect to the relevance of climatic factors to the Tasmanian outbreak

2.204 At certain points in Australia's first written submission[276] and the IRA,[277] Australia concedes that climatic conditions may not have been suitable for European canker spread during the Tasmanian outbreak. There is, however, no scientific basis for the attempted qualification in Australia's first written submission that the climate may have been unfavourable only "during the relevant time period"[278] (which spanned more than 50 years) or, for the reasons set out above, "to that particular

Wilson (1956) An outbreak of European canker in California. Plant Disease Reporter 40: 952-953 (cited in **Exhibit NZ-64**).

[273] NZFWS, Annex 3.

[274] **Exhibit AUS-50**, pp. 285-286. Latorre reports that ascospores are common between 36 – 42 degrees south, the colder, wetter areas of Chile.

[275] Swinburne RPQ, Q 90, pp. 15-16.

[276] AFWS, para. 890.

[277] IRA, pp. 141, 144 and 147.

[278] AFWS, para. 890.

strain".[279] This is mere speculation – Australia does not attempt to provide any evidence to support its assertion.

(h) Australia has failed to rebut evidence of the unrestricted movement of apple fruit during the Tasmanian outbreak

2.205 Further, as set out in New Zealand's first written submission, and uncontested by Australia's first written submission, throughout the period of the Tasmanian outbreak (both prior to identification and during the eradication programme), there were no restrictions on the movement of apple fruit from the outbreak area to elsewhere in Tasmania or to mainland Australia. Despite the absence of any controls, at no time did the disease spread from the four affected orchards. This is further compelling evidence that mature apple fruit do not provide a pathway for the entry, establishment and spread of *N. galligena* in Australia.

2.206 In its first written submission, Australia argues that the volumes of apples shipped to the mainland were insignificant.[280] However, Australia failed to look at total domestic sales, including sales within the state of Tasmania. From 1970-76 the Spreyton area sold more than 1,000 tonnes of apples to the rest of Tasmania each year, in addition to the 151 tonnes exported each year to the mainland. Moreover, when those volumes are converted to numbers of apples, the unit which the IRA uses to assess risk, this amounts to more than 5.5 million and 838,956 apples respectively per annum.[281] Yet the uncontrolled movement of thousands of tonnes of apple fruit from the affected farms and region failed to vector the disease either within Tasmania (which the evidence suggests is the only part of Australia relevant to this dispute even marginally favourable for European Canker) - or to the mainland.

2.207 Australia's argument that several million apples represent "insignificant" risk is particularly surprising given that the IRA considers a single discarded apple from

[279] AFWS, para 890.

[280] AFWS, para 667.

[281] Using an average count of 100 apples per TCE (at 5556 apples per tonne). Using a pack size of 120 apples per TCE (old varieties were smaller than present day vars.) there are 6666 apples per tonne. 151 tonnes = 1,006,566 apples, 1,000 tonnes = 6,666,000 apples. Sales from three of the affected orchards only shows an average 68.16 tonnes to the mainland = 454,354 apples, plus 185 tonnes = 1,233,210 apples to Tasmania (at 120 apples per TCE).

New Zealand to be a potential pathway for the introduction and establishment of European canker into Australia.

2.208 Australia also states in its first written submission that it is "worth noting that fruit infection was not reported during the Tasmanian outbreak".[282] In New Zealand's view, the absence of information about fruit infections in Tasmania mirrors the New Zealand situation, where records of fruit infection are scarce because of the unfavourable summer climatic conditions. The Beresford and Kim analysis in Annex 3 of New Zealand's first written submission suggests that summer conditions in Tasmania are not dissimilar to summer conditions in New Zealand's apple-producing regions and therefore the likelihood of fruit infections is also low. Accordingly, the absence of evidence that Tasmanian apple fruit vectored *N. galligena* to other parts of Tasmania or mainland Australia may be seen as indicative that the pathway does not exist for imports from New Zealand either.

2.209 In summary, Australia has failed to rebut compelling evidence produced by New Zealand of the absence of a pathway given the failure of the disease to spread despite the movement of apple fruit during a known outbreak of European canker.

(i) No rational or objective relationship between the measures and the scientific evidence

2.210 As pointed out in New Zealand's first written submission, there is no rational or objective relationship between any of the measures imposed in respect of European canker, and the scientific evidence, as they are all based on the flawed contention that mature, symptomless New Zealand apples are a pathway for transmitting European canker. Australia has failed to provide any scientific support for this contention either in the IRA or in its submissions to the Panel. Accordingly, Australia's European canker measures are not supported by sufficient scientific evidence, and are inconsistent with Article 2.2.

2.211 The experts' responses strongly support this conclusion. In particular the experts highlight the extremely low likelihood of latent infections in New Zealand, and the unsuitability of the Australian climate for establishment and spread.

282 AFWS, para. 668; Swinburne RPQ, Q 59, p. 8

2.212 In addition, even assuming (contrary to the scientific evidence) that mature apple fruit do provide a potential pathway, none of the measures imposed by Australia have a rational or objective relationship with the scientific evidence

2.213 For example, Australia has failed to provide any scientific justification for the rigorous inspection requirements imposed in respect of European canker (measure 10).[283] There is no analysis at all or scientific evidence provided in either Australia's first written submission or the IRA as to why 100% of trees in an orchard would have to be inspected, including 100% of trees on "orchards in areas where the disease has either never been recorded or the disease occurs only sporadically in very wet seasons" – which, as the IRA acknowledges, account for 95% of apple export production.[284]

2.214 Australia argues that "the proposed winter inspection approach ha[d] proven to be highly effective during the eradication efforts in Spreyton, Tasmania".[285] However, the Tasmanian experience involved a known outbreak of the disease, while the proposed measure is to be imposed on all export orchards, including (as noted above), orchards in areas with no known incidence of European canker. Moreover, as the quote above makes clear, the Tasmanian measures were part of "eradication efforts" not, as in the case of New Zealand measures, as part of efforts to prevent the spread of the disease through the movement of apple fruit. In fact, as explained above at para. 2.205, during the Tasmanian outbreak there were absolutely no measures imposed on the trade in apple fruit from the affected area. As such, there can be no rational or objective relationship between the measure and the scientific evidence cited in support.

2.215 Further, even if European canker were discovered during winter inspection, neither the IRA nor Australia's first written submission provides any scientific basis

[283] Measure 10 is the requirement that in areas less conducive for disease, all trees in export orchards/blocks be inspected for symptoms of European canker, including that orchards/blocks are inspected for symptoms by walking down every row and visually examining all trees on both sides of each row. Areas more conducive to the disease are inspected using the same procedure combined with inspection of the upper limbs of each tree using ladders (if needed). Inspections take place after leaf fall and before winter pruning.

[284] IRA, p. 121.

[285] AFWS, para. 948, citing the IRA, p. 154.

as to why this should result in the suspension for the coming season, and that reinstatement would require eradication of the disease, confirmed by inspection.[286] There is no scientific basis for excluding the grower for a season when the grower could remove the cankers immediately and thereby remove the source of inoculum for fruit infections in the coming season. As Dr Latorre points out, if cankered trees are not prevalent…I would not expect to observe any latent infections, even under high summer rainfalls."[287]

2.216 Likewise, even assuming that mature apples could provide a potential pathway, there is no rational or objective relationship between the scientific evidence and Australia's measure requiring that all new planting stock be intensively examined, and appropriate cultural practices and fungicide sprays used to minimise the likelihood of canker infections (measure 11) and the scientific evidence. Australia contends that "infected nursery stock presents a pathway for the establishment and spread of European canker in places of production".[288] However, control over the movement of planting materials is superfluous to managing the risk, if combined with the orchard freedom and inspection regime required under the IRA, as any symptoms of the disease (i.e. tree cankers) would be picked up during the annual winter inspection. Accordingly, there will be no source of spores for fruit infections at harvest. Dr Latorre concludes with respect to the requirement for controls over the movement of planting materials, that "this measure would prevent further dispersal of European canker; however, it does not directly reduce the risk of fruit contamination. *I suggest eliminating this measure*" (emphasis added).[289]

(j) Conclusion

2.217 As demonstrated in New Zealand's first written submission, the absence of a rational or objective relationship between the measures and the scientific evidence means that Australia's measures are maintained "without sufficient scientific

[286] Measure 13.

[287] Latorre RPQ, Q 49, p. 6.

[288] AFWS, para. 949, citing IRA, p. 154.

[289] Latorre RPQ, Q 93, p.33.

evidence" and are inconsistent with Australia's obligations under Article 2.2. Australia has failed to show otherwise.

4. Apple leafcurling midge

2.218 As New Zealand established in its first written submission, there is no rational or objective relationship between the scientific evidence and the assumption, underlying Australia's measures for ALCM, that there is some likelihood of New Zealand apples providing a pathway for ALCM to become established in Australia.[290] There is no scientific evidence that ALCM has ever been vectored between geographically separated countries by trade in apples.[291] As confirmed by the expert responses,[292] the existing scientific literature links the movement of ALCM to planting material.[293] Australia's measures fail to take into account crucial scientific evidence relating to the low level of viable cocoons on New Zealand apples, ALCM biology and normal trade practices. When these factors are considered, it is clear that there is no rational or objective relationship between the scientific evidence and the measures proposed.

2.219 Australia has provided no evidence to the contrary in its first written submission or in its responses to the Panel's questions. Australia's only basis for claiming that there is any likelihood of ALCM establishment occurring is its attempt to draw a comparison with the establishment of wheat bug in the Netherlands[294] – a comparison not even the IRA attempts to draw. Australia claims that because wheat bug, which is native to New Zealand, has established in the Netherlands, this "supports the view" that New Zealand apples "pose a legitimate risk" in respect of ALCM.[295] However, as explained in New Zealand's written responses to the Panel's questions, the issue of wheat bug establishment in the Netherlands (which has never

[290] NZFWS, paras. 4.106-4.140.

[291] NZFWS, para. 3.79.

[292] Professor Cross states that: "It is considered that normally ALCM spreads to new areas on nursery material": Cross Q 94(vii), p 5. Dr Deckers states that, with regards to the introduction of ALCM, the importation of planting material is "much more important" than the importation of apple fruit Deckers, Q 94, p. 32.

[293] **Exhibit NZ-14**, CABI 2007: 2, **Exhibit NZ-19**, Morrison 1953: 565.

[294] AFWS, para. 818.

[295] AFWS, para. 818.

been linked to trade in apples and relates to an insect of very different biological characteristics from ALCM) is irrelevant to this dispute and does not constitute a scientific basis for the assumptions underlying Australia's measures for ALCM.[296]

2.220 For ALCM emergence, mating and egg laying to occur in Australia (all pre-conditions to ALCM establishment), the scientific evidence indicates and the experts confirm that many thousands of apples would need to be left outside of cold storage uncovered in the same place, at the same time, within 30-50m of newly unfurling apple leaves. However, as explained in New Zealand's first written submission, there is simply no rational basis for concluding that such a sequence of events would occur.[297]

2.221 In its first written submission, Australia claims that New Zealand has failed to "appreciate the range in the scientific data available in respect of the probability of particular events occurring".[298] However, neither the IRA nor Australia's submissions in this case refer to any relevant divergent scientific opinion that would serve to provide a rational basis for its measures. In short, there is no divergent scientific opinion that would support any of Australia's assertions on ALCM, let alone Australia's assertion concerning completion of the pathway.

2.222 In its comments on the expert replies, Australia invokes the concept of "scientific uncertainty" to justify assumptions that are not supported by sufficient scientific evidence.[299] However, the lack of sufficient scientific evidence to support its ALCM measures does not equate to "scientific uncertainty". Rather, it amounts to a breach of Australia's obligation under Article 2.2 to maintain measures with sufficient scientific evidence. The concepts of "scientific uncertainty" and the insufficiency of scientific evidence are not interchangeable.[300] Professor Cross's replies confirm that there is insufficient scientific evidence to support the assumptions underlying Australia's measures for ALCM.

---

[296] NZRPQ, Q 83, para. 200.

[297] NZFWS, paras. 4.131-4.132.

[298] AFWS, para. 722.

[299] See, for example, ACER, paras. 215-216.

[300] Appellate Body Report, *Japan – Apples*, para. 184.

(a) Australia failed to take into account the scientific evidence on cocoon viability

2.223 As explained in New Zealand's first written submission, Australia incorrectly assumed that all ALCM cocoons pose a risk of entry, establishment and spread.[301] In fact, only viable cocoons are a risk factor, and the scientific evidence indicates that the great majority of cocoons on New Zealand apples are not viable, either because the midge inside has already developed into an adult and left the cocoon (and the cocoon is thus empty), or because it has died inside the cocoon (and thus the cocoon is non-viable).[302] However, Australia failed to take this into account and so its measures were based on the assumption that the overall percentage of viable cocoons was 100%.

2.224 In its first written submission and responses to the Panel's questions Australia states that it "agrees that ALCM cocoons themselves are not a risk factor for ALCM".[303] However, it is hard to reconcile this statement with the IRA's manifest disregard for the scientific evidence on viability.

2.225 As explained in New Zealand's first written submission, in the IRA Australia ignored the relevant scientific evidence on viability.[304] This is explicitly confirmed by Professor Cross who notes that "[t]he work of Rogers et al (2006) on cocoon occupancy and viability is cited in Australia's IRA importation step 2 analysis, but then it doesn't appear to have been taken into account when fixing the probability values in the summary analysis of importation step 2."[305]

2.226 Instead, in the IRA Australia assumed the range of infestation on New Zealand apples to be between 0-11.5%.[306] That range is based solely on the outdated data from Tomkins *et al.* 1994 on cocoon infestation.[307] The data in that study on the rate of empty cocoons, and that from Rogers *et al.* 2006, Shaw *et al.* 2005 and Todd

[301] NZFWS, para. 4.111.

[302] NZFWS, paras. 4.107-4.111.

[303] ARPQ, Q 80, p. 65. See also AFWS, para. 72.

[304] NZFWS, paras. 4.336-4.337.

[305] Cross RPQ, Q 109, p. 17.

[306] IRA, p. 160.

[307] Notably, Professor Cross describes Tomkins *et al.* 1994 as "old and inadequate": Cross RPQ, Q 108, p. 16.

1959 on occupancy and viability, were all ignored. Australia admits its failings in that regard. It states that its conclusions in respect of the level of infestation of New Zealand apples were based on an infestation range that was selected to "reflect the Tomkins' figures" only.[308]

2.227 Notwithstanding this clear admission, Australia devotes much effort in its first written submission, responses to Panel questions and comments on the expert responses, to attempting to correct its failures in respect of viability. However, all of its arguments in this regard are *ex post-facto* attempts to rewrite the IRA. For example, Australia now claims that its use of the triangular distribution in the IRA in respect of importation step 2 allowed it to factor in the scientific evidence on viability.[309] However, as explained in full below and as confirmed by the expert responses,[310] this is inaccurate and directly contradicts the IRA, which states that distribution choices were governed solely on the basis of the quantity of scientific information available.[311] Australia also tries to claim that its use of the August 2005 data allowed it to factor in viability.[312] Again, this is not what the IRA says. As explained below, the IRA never relates the August 2005 data to the issue of viability. And nor should it have, because, contrary to Australia's assertions, that data relates to occupied, not viable cocoons, and so could not have, as Australia now claims, allowed the IRA to factor in viability.[313]

2.228 Australia's response to New Zealand's claims that the IRA failed to take into account viability, is to try and contest the numbers, and attack New Zealand's calculations based on the Rogers *et al.* 2006 data.[314] In its first written submission,

---

[308] ARPQ, Q 88, p. 72.

[309] AFWS, para. 729 and ACER, para. 245.

[310] Cross RPQ, Q 109, p. 17.

[311] The IRA states that a triangular distribution was used when "information (for example, literature and expert opinion) on the most likely value was available": IRA, p. 42.

[312] ARPQ, Q 88, p. 71.

[313] As explained in New Zealand's responses to the experts' request for factual clarification (question 2(e)), in response to Australia's argument that the August 2005 data relates to viable cocoons, New Zealand obtained confirmation from the inspectors that carried out the inspections that the data relates to occupied cocoons. Although, as already explained, New Zealand had previously assumed the data related to all cocoons rather than occupied cocoons, this has only very minor implications for New Zealand's calculations and no impact on conclusions drawn in previous submissions to the Panel.

[314] AFWS, paras. 734-736.

Australia disputes the figure of 15% for the overall percentage of viable cocoons identified by New Zealand on the basis of the Rogers *et al.* 2006 study, claiming that the figure should instead be 25%. Then, in its responses to the Panel's questions, Australia asserts that the correct figure is 19%.[315] As explained below, at paras. 2.708 to 2.711, the correct figure is as stated in New Zealand's first written submission: 15%.

2.229 All of this, however, misses a key point. Whatever the overall rate of viable cocoons, the fact remains that the IRA took no account at all of viability. Thus, Australia's contesting of the particular numbers around viability is merely a distracting sideshow. Australia does not contest,[316] and the expert responses confirm,[317] that the scientific evidence indicates only a very small proportion of cocoons of New Zealand apples are viable. Thus, Australia's measures are not supported by the scientific evidence.

2.230 In an apparent attempt to *justify* its failure to take into account viability, many of Australia's responses to the Panel's questions, are devoted to attacking the methodology of Rogers *et al.* 2006.[318] Each of Australia's arguments in this regard is addressed in detail below in respect of Article 5.1.[319] But, again, no amount of critiquing of Rogers *et al.* 2006 can change the fact that Australia ignored the scientific evidence on cocoon viability. And, in any event, Rogers *et al.* 2006 is not alone in indicating the low level of viable cocoons. The data and conclusions in Tomkins *et al.* 1994, Shaw *et al.* 2005 and Todd 1959 also confirm this point.[320]

2.231 This is not, as Australia tries to contend,[321] an issue of divergent scientific evidence. To the contrary, there is no scientific evidence that empty or non-viable cocoons are risk factors – and Australia now admits there is no scientific evidence that

[315] ARPQ, Q 87, p. 69.

[316] AFWS, para. 729, which acknowledges the "relatively low viability rate of cocoons" on New Zealand apples.

[317] Cross RPQ, Q 109, p. 17.

[318] See ARPQ, para. 87, pp. 67-70.

[319] See paras. 2.706 to 2.718 below.

[320] As confirmed by Australia, the overall rate of viable cocoons takes into account mortality caused by parasitism: ACER, para. 238.

[321] AFWS, para. 722.

100% of cocoons will be viable.[322] There is therefore no rational or objective relationship between the scientific evidence relating to cocoon viability and the assumptions underlying Australia's measures in this regard.

2.232 The significance of Australia's failure to factor in viability is explicitly confirmed by Professor Cross, who describes the issue of viability as of "crucial importance…in calculating risks and determining appropriate sample sizes."[323] As explained in New Zealand's first written submission, Australia's failure to take into account viability meant that it failed to have regard to the number of apples that would be required in order for there to be any chance for ALCM mating to occur. New Zealand's first written submission provided an indication, based on the low viability level, of the many thousands of apples required for there to be any chance of ALCM mating occurring.[324] The likelihood of so many apples being left together uncovered outside of cold storage at the same time in conditions allowing for ALCM emergence is negligible.

2.233 Additionally, given the ALCM's extremely short lifespan, which the experts confirm is likely in the field to be only 1-2 days,[325] for there to be any chance of a male and female mating, those many thousands of apples would need to be in the same place at the same time outside of cold storage and uncovered, and emergence of the adults would need to be so timed as to provide for their short lifespans to overlap. Again, nowhere in the IRA are these important connections made, or these issues even mentioned.

2.234 Instead, the IRA explicitly based its analysis on the number of infested fruit arriving at particular utility points per week.[326] Australia focuses heavily on this issue in its first written submission, claiming that more than enough infested apples may arrive at orchard packing houses each week to allow for ALCM emergence and mating.[327] But the number of infested fruit arriving at a particular utility point per

[322] ARPQ, Q 80, p. 63.

[323] Cross, Q 97, p. 8.

[324] NZFWS, paras. 4.126-4.128.

[325] Cross RPQ, Q 94(iv), p. 4.

[326] IRA, pp. 167 and 174.

[327] AFWS, paras. 772-779 and 789.

week is not the key issue, given the extremely short life span of ALCM, and the conditions necessary for the simultaneous emergence of a mating pair.

2.235 In addition, Australia's figures on the number of infested apples predicted to arrive at orchard wholesalers per week are wrong and therefore misleading. This is because Australia claims that the figures relate to the number of apples infested with viable cocoons.[328] But, they do not. Because those figures are based on the August 2005 data, they relate only to the number of apples infested with occupied cocoons.[329] But, as confirmed by the experts, a high proportion of occupied cocoons are not viable. Yet again, Australia has failed to take into account cocoon viability. Factoring viability into Australia's calculations, even using Australia's inflated estimate of the volume of trade, the number of apples with viable ALCM cocoons that would arrive each week at an orchard wholesaler drops from 50[330] to around 13.[331]

(b) There is no scientific basis for key assumptions by Australia about ALCM biology

2.236 In addition to its failure to take into account cocoon viability, Australia's measures for ALCM are premised on two key incorrect assumptions about ALCM biology. The first is that ALCM females have a flying range of up to 200m. The second is that all ALCM adults would emerge from cocoons immediately upon being taken out of cold storage.

(i) There is no scientific evidence for Australia's assumption about ALCM female flight distance

2.237 As explained in New Zealand's first written submission and responses to the Panel's questions, Australia's measures for ALCM are based on the assumption that ALCM female flight could be up to 200m.[332] However, that assumption is not supported by any scientific evidence. The expert responses explicitly confirm this.

---

[328] AFWS, para. 778.

[329] See footnote 313 above.

[330] The IRA's calculation of the number of apples with viable ALCM cocoons that would arrive each week at an orchard wholesaler – see the IRA, table 43.

[331] 25% (the percentage of viable cocoons) x 50 = 12.5.

[332] NZFWS, para. 4.123 and NZRPQ, paras. 186-189.

Professor Cross states that a distance of 200m for female flight is "…not supported by evidence."[333]

2.238 Australia has made clear that it considers the primary pathway for ALCM establishment to involve apples at orchard wholesalers.[334] Its conclusions are based on the assumption that "all" orchard wholesalers would be close enough to apple trees for ALCM establishment to occur (for ALCM egg laying to take place, apple trees must be within female ALCM flight range).[335] However, because the scientific evidence does not support a flight range of 200 metres, Australia's assumption that all orchard wholesalers are close enough to apple trees to be within ALCM female flight range is not valid and a key aspect of the primary pathway is thus seriously undermined.

<u>(ii) No scientific evidence for flight distance of 200m</u>

2.239 In its first written submission, Australia asserted that a figure of 200m is supported by the findings of Suckling *et al.* 2007.[336] However, the expert responses explicitly confirm that Suckling *et al.* 2007, while finding ALCM at 200m, did not attribute that movement to ALCM flight. Professor Cross states that: "The value of 200 m suggested by Australia appears to be based on the background rate of infestation up to 200 m shown in Figure 4 of Suckling *et al.* (2007) but this data does

[333] Cross RPQ, Q 94, p. 3 and Q 103, p. 12.

[334] IRA, pp. 181-182. The IRA confirms that orchard wholesalers are the only utility point likely to be in close proximity to commercial fruit crops. Other utility points are dismissed. Urban wholesalers are dismissed on the basis that "apple trees would not be available around urban wholesalers" (p. 181). Retailers are dismissed on the basis that most are located within urban areas where apple trees are not available (p. 181). The IRA also notes that "[i]n retail outlets apples are displayed at ambient temperatures breaking the cool chain and allowing any mature pupae to emerge as adults. In this situation, most emerged insects would be trapped indoors and would need to escape into the surrounding environment before they could successfully find a mate and locate a susceptible host plant" (pp. 181-182). Food services are dismissed on the basis that "apple trees are generally not available around food services" (p. 182). Consumers are dismissed on the basis of the small numbers of fruit involved, which the IRA concludes would mean "there is little chance of a male and female emerging together and successfully mating" (p. 182).

[335] IRA, p. 168. The IRA states: "All orchard wholesalers would be near commercial fruit crops".

[336] AFWS, para. 804.

not show that these infestations were caused by longer range movement of females from the adjacent block."[337]

(iii) No scientific evidence that wind would boost ALCM flight range

2.240 In its first written submission, Australia also tried to assert that a figure of 200m was justified because wind could boost ALCM's limited flight range.[338] Australia cites in support of this proposition an outdated grower bulletin[339] and a newspaper article about lettuce aphid,[340] which is a different pest altogether, and one which is not comparable to ALCM, because it is asexual and behaviourally adapted to long distance dispersal by wind. However, neither of these references constitutes "scientific evidence". The expert responses explicitly confirm that there is no evidence to support Australia's assumption that gusts of wind would increase the flight range of ALCM. Professor Cross states that "…there appears to be no evidence to support [the proposition that gusts of wind could increase the flight range of females]".[341] In addition, Professor Cross notes that "ALCM avoids flying in windy conditions"[342] and confirms New Zealand's position that, in respect of Australia's attempt to draw comparisons with the flight range of lettuce aphid, "…the example of the lettuce aphid invasion of Tasmania from NZ (2600 km) is not relevant as aphids are known to have long range dispersal mechanisms whereas leaf midges do not."[343] Professor Cross's comments reflect the findings of the recently published Cross and Hall 2008 that: "Midges are weak fliers and would be less prone to being blown from the vicinity of their host plant at ground level."[344] Professor Cross's comments are

[337] Cross RPQ, Q 94 (iii), p. 3. As explained in NZRPQ, Suckling *et al.* 2007 (**Exhibit NZ-15**, p. 748) attributed the infestation at 200m not to ALCM flight but to the movement of nursery stock: NZRPQ, para. 188, p. 63.

[338] AFWS, para. 806. See also IRA, p. 171 which cites Suckling *et al.* 2007 but states that: "Nevertheless, some researchers consider ALCM are able to disperse well with the wind".

[339] **Exhibit AUS-95**. See also AFWS, para. 806. New Zealand notes that a grower bulletin is an advisory tool for growers and is not supported by any scientific research.

[340] **Exhibit AUS-97**. See also AFWS, para. 807.

[341] Cross RPQ, Q 94 (iii), p. 3.

[342] Cross RPQ, Q 94 (iii), p. 3.

[343] Cross RPQ, Q 94 (iii), p. 3.

[344] **Exhibit NZ-118:** Cross JV and Hall DR (2008) "Exploitation of the sex pheromone of apple leaf midge *Dasineura mali* Kieffer (Diptera: Cecidomyiidae) for pest monitoring: Part 1. Development of lure and trap" Crop Protection 28, 1-6, p. 6.

also consistent with Suckling *et al.* 2007, the findings of which included dispersal by wind.

2.241 There is, therefore, no scientific evidence to support Australia's assumption that ALCM "are able to disperse well with the wind."[345] And, in any event, New Zealand notes that even if wind could increase ALCM dispersal, movement by wind would simply result in the random dispersal of ALCM adults, making it even less likely for a mating pair to find either each other or for a mated female to find new apple leaves.

2.242 In an attempt to excuse the fact that its assumptions on ALCM flight range are not supported by any scientific evidence, in its comments on the experts' responses Australia again attempts to invoke its "scientific uncertainty" argument.[346] In doing so, it focuses almost exclusively on Professor Cross's statement that "Australia's IRA with respect to this issue [of female flight] was objective and plausible and relied on what little real evidence there was."[347]

2.243 New Zealand recalls that the key legal determination required under Article 2.2 is whether Australia's SPS measures are maintained with sufficient scientific evidence. Under Article 2.2 Australia is not entitled to "rely on what little evidence there is" if such evidence is insufficient.[348] Moreover, there is no scientific uncertainty regarding Australia's assumption that the flight range for female ALCM is 200m. On this point Professor Cross is clear. He confirms that Australia's conclusions are not supported by evidence.[349] Yet, as explained above, this assumption was crucial to Australia's conclusion that all orchard wholesalers would be close enough to commercial apple crops to be within ALCM flying distance. This is significant given the importance of this pathway to the IRA's overall probability of establishment.

[345] IRA, p. 171.

[346] See, for example, ACER, para. 10.

[347] Cross RPQ, Q 94 (iii), p. 3.

[348] ACER, para. 215.

[349] Cross RPQ, Q 94, p. 3 and Q 103, p. 12.

(iv) Scientific evidence indicates a flight range of 30m

2.244 In addition to confirming that a flight distance of 200m is not based on any scientific evidence, Professor Cross comments that: "The flight range of females relative to males has not been investigated",[350] and suggests that Suckling *et al.* 2007 deals with a situation "which is not directly analogous" and so "does not indicate that females are only able to fly a maximum of 30 m."[351]

2.245 New Zealand notes in this regard, however, that the authors of Suckling *et al.* 2007 were able to infer a female flight distance based on infestation distances observed between old and new plantings of apple trees over three generations in a single season. Indeed, given the significantly greater wing loading of gravid female ALCM reported by Suckling *et al.* 2007, the findings of Cross and Hall 2008 referred to by Professor Cross in his response to Question 94(iii) in respect of male flight distances are consistent with a conclusion that female flight is likely to be less than the 50m confirmed for males. This is particularly the case, given that in Cross and Hall 2008 the male flight researched was in response to sex pheromones of a much greater concentration that that found in the real world.[352] Accordingly, New Zealand's position remains that the scientific evidence indicates that ALCM are weak fliers, with the movement of ALCM females likely to be limited to less than 30-50 metres over three generations.[353]

(c) Australia's assumptions about ALCM emergence have no scientific basis

2.246 Australia's measures are based on the incorrect assumption that all ALCM present on New Zealand apples would simultaneously emerge as soon as the apples were removed from cold storage.[354] In order for this to be true all ALCM present on New Zealand apples would have to be fully developed pupae which, upon being taken

[350] Cross RPQ, Q 94 (iii), p. 3.

[351] Cross RPQ, Q 94 (iii), p. 3.

[352] **Exhibit NZ-118.**

[353] **Exhibit NZ-15**: Suckling *et al.* 2007, p. 750.

[354] IRA, p. 171, which states: "…adults could emerge from the pupal stage after the apples have been taken out of cold storage, or wherever the cold chain is broken, such as at unpacking and repacking facilities or retailers and during the transportation of purchased apples from retailers to households or with fruit that is dumped": This is confirmed by Professor Cross: Cross RPQ, Q 94 (i), p. 2.

out of cold storage, would not require any development time. As confirmed by the experts, this assumption is not supported by the scientific evidence.[355]

2.247 As noted in New Zealand's responses to the expert's request for factual clarification, the scientific evidence indicates that ALCM present on New Zealand apples are most likely to be diapausing pre-pupa, not fully grown pupa.[356] In addition, Professor Cross's view is that, contrary to Australia's assumptions, ALCM in cocoons on apples taken out of cold storage would be "at a wide range of stages of development."[357] Professor Cross goes on to explain that this would result in the emergence of any adult ALCM from viable cocoons, being staggered over a prolonged period.[358] Indeed, Professor Cross explicitly confirms New Zealand's position that in some cases, emergence of viable adults could take a considerable length of time. Professor Cross states that this could possibly be more than one year after removal from cold storage depending on relevant climatic conditions.[359] In terms of the minimum length of time for emergence, Professor Cross's view is that in some cases, it could be possible for viable ALCM to emerge after 1 day. New Zealand's position is that the scientific evidence indicates that viable ALCM would need at least 13 days to emerge after being removed from cold storage.[360] However, whatever the minimum length of time for adult ALCM emergence, the key fact, as identified by Professor Cross, but ignored by Australia, is that emergence of viable individuals would be staggered over a prolonged period of time and not, as Australia assumed, simultaneously after removal from cold storage.

2.248 Australia's incorrect assumptions about the timing of adult emergence have important consequences, particularly when considered together with the 1-2 day lifespan of ALCM in natural conditions. As explained by Professor Cross, prolonged

[355] Cross RPQ, Q 94(i), p. 2.

[356] New Zealand's responses to the expert's request for factual clarification, pp. 5-6.

[357] Cross RPQ, Q 94(i), p. 1.

[358] Cross RPQ, Q 94(i), p. 1.

[359] Cross RPQ, Q 94(i), p. 1.

[360] **Exhibit NZ-119:** Sandanayaka M and Rogers D (2009) "Effect of cold storage on emergence and mortality of apple leafcurling midge" *New Zealand Institute For Plant and Food Research Ltd* pp. 1 – 8 which found that the minimum length of time for ALCM emergence from cocoons attached to apples subject to cold storage was 14 days after removal from cold storage, irrespective of development stage.

emergence of adults "*substantially decreases* the chances of a male and female emerging within the time frame of a few days which is required for successful mating",[361] which in turn "*substantially reduce[s]*" the risk of ALCM establishment.[362] Professor Cross explicitly confirms that this important factor was not taken into account by Australia in its assessment of risk.[363]

2.249 Thus, because of the prolonged emergence of ALCM adults, the likelihood of the sequence of events required for ALCM establishment in Australia occurring becomes even more remote. As explained in New Zealand's first written submission, given their short lifespan, for a male and female ALCM from cocoons on individual apples to have time to find each other and mate there would need to be near simultaneous emergence.[364] Australia failed to take into account the effect of prolonged emergence on the likelihood of this occurring.

2.250 Again, Australia tries to use "scientific uncertainty" to excuse its failings in this regard.[365] However, in doing so Australia fails to appreciate that Professor Cross's overall conclusion is that it is clear that that adult emergence will be staggered over a prolonged period of time, a factor which Professor Cross explicitly confirms was ignored by the IRA.[366] Thus, as with the issue of viability, the key issue is not any scientific uncertainty, but rather the lack of any scientific support for the assumptions underlying Australia's measures.

(d) There is no scientific basis for Australia's assumptions about normal retail supply chain practices

2.251 As explained in New Zealand's first written submission, there is also no basis for Australia's assumptions about the normal retail supply chain practices.[367]

[361] Cross RPQ, Q 102, p. 11. (Emphasis added.)

[362] Cross RPQ, Q 102, p. 11. (Emphasis added.)

[363] Cross RPQ, Q 102, p. 11.

[364] NZFWS, para. 4.124.

[365] ACER, para. 215.

[366] Cross RPQ, Q 102, p. 11.

[367] NZFWS, paras. 4.129-4.130 and 4.357.

2.252 Australia failed to take into account that the great majority of New Zealand apples would be exported in retail ready condition and so would not go to orchard wholesalers for re-packing. In addition, Australia failed to take into account that, even if New Zealand apples did go to orchard wholesalers, Australian agricultural waste practices would preclude any opportunity for ALCM establishment.

(i) <u>Australia failed to take into account that New Zealand apples would be retail ready</u>

2.253 As explained in New Zealand's first written submission and as confirmed above,[368] the vast majority of New Zealand apples exported to Australia would be in a retail ready condition[369] which would result in the primary pathway for ALCM establishment (apples at orchard wholesalers) being virtually eliminated.[370]

2.254 The importance of this issue to the overall likelihood of establishment of ALCM is confirmed by the experts. Indeed, Professor Cross notes that "[w]ith respect to ALCM, the proportion of apples shipped retail ready from NZ to Australia is crucial."[371] However, this issue was not properly taken into account by Australia.[372] Had it been, the primary pathway for establishment of ALCM would have been effectively eliminated. Because New Zealand apples would not require repacking, they would be sent directly to urban centres, which would effectively remove any likelihood of large numbers of apples being near enough to apples trees to be within ALCM female flight range – a key prerequisite to ALCM establishment. This is explicitly confirmed by Professor Cross, who states that "Australia's IRA…did not consider the case of retail ready fruit."[373] Indeed, Professor Cross also confirms New

[368] NZFWS para. 4.129, and paras. 2.36 to 2.42 above.

[369] Meaning that they are ready for retail sale and do not require any re-packaging.

[370] As explained in New Zealand's response to the expert's request for factual clarification, the primary market for retail ready apple fruit from New Zealand would be in the major urban centres, so the proportion requiring repackaging (if any) would be very small and readily handled by urban facilities close to those markets. Apple fruit that arrived in Australia "retail ready" would therefore be highly unlikely to be handled by orchard wholesalers. Instead, as noted by Australia in its first written submission, apples packed in market ready boxes would be sent directly to urban wholesalers for distribution (AFWS, para. 774). This would have the effect of the primary pathway for ALCM establishment (apples at orchard wholesalers) being excluded from the pathway.

[371] Cross RPQ, Q 98, p. 8.

[372] See below, paras. 2.749 to 2.754.

[373] Cross RPQ, Q 122, p. 22.

Zealand's position on this point,[374] concluding that "[i]f all fruit were shipped as retail ready and held in a cool chain conditions until sold to consumers [as is normal retail practice], the risk of importation, establishment and spread would be greatly reduced, perhaps to negligible levels."[375]

2.255 In its first written submission, Australia claims that New Zealand apple exports would, for a variety of reasons, not be in retail ready packaging.[376] However, as explained above, none of these claims have any basis.[377] Indeed, the current practices of New Zealand exporters clearly indicate that the vast majority of apple exports to Australia would be retail ready packaged fruit.[378]

2.256 Australia also tries to justify the IRA's failure to take into account this important issue, on the basis that New Zealand declined to rule out the possibility of exporting apples to Australia in bulk bins.[379] However, as already explained, New Zealand did request that Australia assess risk based on 100% of fruit being in retail ready format.[380] And, in any event, whether or not New Zealand would accept a retail ready restriction on its trade in the absence of scientific evidence on which to base such a measure, is not relevant to the issue of whether New Zealand apple exports to Australia would, as a practical matter and taking into account existing trade practice, likely be in retail ready form, and thus cannot excuse Australia's failing in this regard.

2.257 Australia had no basis for ignoring this very important issue and, accordingly, Australia's measures for ALCM do not have sufficient scientific support.

[374] Professor Cross also states that: "The arguments presented in paras 4.361-4.363 of NZFWS with respect to this appear valid": Cross RPQ, Q 98, p. 8.

[375] Cross RPQ, Q 98, p. 8.

[376] AFWS, para. 610.

[377] See above, paras 2.38 to 2.42.

[378] See above, para. 2.36.

[379] See for example ACER, para. 229 where Australia claims the IRA did not need to take into account the issue of mode of trade because "New Zealand refused to rule out modes of trade other than the export of only 'retail ready'".

[380] See above, para. 2.42.

(ii) Australia failed to take into account that agricultural waste would not be left in a condition conducive to ALCM establishment

2.258 As explained in New Zealand's first written submission, and as accepted by Australia,[381] until apples are disposed of, they would not be in a condition conducive to ALCM emergence.[382] Thus, even if New Zealand apples did go to orchard wholesalers (which, as explained above, is extremely unlikely), in a country such as Australia with a fruit fly problem, apple waste generated by an orchard wholesaler would not be left in a condition that would allow for establishment to take place. As explained in New Zealand's first written submission, Australia ignored this crucial issue.[383]

2.259 In its first written submission and responses to Panel questions, Australia claims that, because its fruit fly management requirements are only mandatory in "designated fruit fly free areas" when there is a fruit fly outbreak, the issue of waste management is not relevant. Australia asserted that "the bulk of relevant apple handling facilities in Australia occur in apple production regions that are not those specifically intended as fruit fly free areas or are areas where fruit flies are not historically an issue for apple production".[384]

2.260 New Zealand accepts that Australia has no mandatory fruit fly management rules other than in designated fruit fly free areas. But Australia has failed to mention that it has implemented nation-wide best practice guidelines for apple growers (the Guidelines) which include procedures for waste disposal.[385] As noted in New Zealand's responses to the expert requests for clarification, the Guidelines, which were produced by Plant Health Australia in connection with the Australian apple

[381] AFWS, paras. 760, 761 and 798.

[382] Because cold storage is essential to maintaining the shelf life of fruit, New Zealand apples, in particular those stored at orchard wholesalers, would be unlikely to be removed from cold storage until disposed of as waste. Even if ALCM emergence could occur inside an orchard packing house, as acknowledged by the IRA, insects that emerge indoors "…would be trapped indoors and would need to escape into the surrounding environment before they could successfully find a mate…": IRA, pp. 181-182.

[383] NZFWS, para. 4.130.

[384] ARPQ, Q 100, p. 81. See also AFWS, para. 785.

[385] **Exhibit NZ-120**: "Orchard Biosecurity Manual for the Apple and Pear Industry" (2008) produced by Plant Health Australia in conjunction with Apple and Pear Australia Ltd.

industry, specifically state that they are designed to protect orchards from the entry and spread of diseases (including fire blight and European canker), and recommend that fruit waste either be disposed of at least 100 metres from the nearest fruit trees or be enclosed in plastic and "hot-composted."[386] Similar measures are also provided for in various State-level guidelines for commercial apple growers and individuals for the prevention of fruit fly outbreaks, including those states containing Australia's major apple growing regions.[387]

2.261 These procedures would preclude entirely any opportunity for ALCM emergence and mating. If apple waste is enclosed and hot composted, any viable ALCM would be destroyed before emergence could take place. If apple waste was disposed of more than 100 metres from apple trees, even if ALCM emergence and mating could occur, establishment would not take place because there would be nowhere within flight range for mated female ALCMs to lay their eggs.

2.262 The expert responses confirm that fruit waste in Australia would be extremely unlikely to be left in a condition conducive to ALCM emergence, mating and/or egg laying. Dr Deckers states that "[a] professional fruit packing station will not leave fruit waste uncovered for a long period."[388] Dr Latorre confirms that packing houses would be "extremely unlikely" to leave fruit waste uncovered and exposed to the elements given that: "(i) Removal of fruit waste is essential to preventing infestation with other pests. (ii) Removal of fruit wastes is needed to comply with good agricultural practices. (iii) Dropping infected fruits or leaving wastes uncovered on the ground runs against the standards of packing houses and against the cultural attitude of Australian people."[389] Thus, Dr Latorre concludes that "[t]his possibility should be disregarded from the risk analysis."[390]

---

[386] **Exhibit NZ-120**, pp. 13 and 23.

[387] For example "Control of Queensland fruit fly in New South Wales" *Prime Facts* (Number 518, February 2007) NSW Department of Primary Industries; "Fruit fly and the home garden" factsheet (June 2008) State of Victoria Department of Primary Industries; "Fruit fly" *PIRSA Plant Health and Quarantine* (last accessed 14 October 2008) Government of South Australia Primary Industries and Resources SA; "Queensland Fruit Fly" Agriculture & Food factsheet (last accessed 11 August 2008) Department of Primary Industries Victoria.

[388] Deckers RPQ, Q 121, p. 40.

[389] Latorre RPQ, Q 89, p. 30.

[390] Latorre RPQ, Q 89, p. 30.

2.263 Accordingly, since the only scenario where large numbers of fruit could conceivably be close enough to apple trees to be within the female ALCM's flight range is apples at orchard wholesalers, the sequence of events required for ALCM establishment – involving many thousands of apples being left outside of cold storage uncovered in one place at the same time within 30-50m of apple trees with newly unfurling apple leaves – becomes even more improbable.

2.264 As confirmed by the experts, Australia failed to factor any of this into its assessment of the likelihood of ALCM establishment. Thus, its conclusions have no scientific basis and accordingly Australia's measures for ALCM are maintained without sufficient scientific evidence.

(e) Australia has not rebutted evidence from international trade that New Zealand apples do not provide a pathway for transmission of ALCM

2.265 New Zealand's *prima facie* case that apples are not a pathway for ALCM is reinforced by the reality of international trade in apples. For example, in its first written submission, New Zealand pointed out that it has, over the last 18 years, exported over 800 million apples, sourced from throughout the country, to Chinese Taipei, with no special measures for ALCM.[391]

2.266 While Australia claims in its first written submission, that "New Zealand has failed to provide the basis for its assertion that Chinese Taipei is 'free of this pest'",[392] in its third party submission Chinese Taipei confirmed that, despite the occasional detection of ALCM cocoons on the New Zealand apples it has imported, Chinese Taipei remains free of ALCM.[393] In their responses to the same question, Japan and the United States also confirmed that they have not experienced the entry, establishment, or spread of ALCM due to trade in apple fruit.[394]

2.267 In its first written submission, Australia objects to New Zealand apples exported to Chinese Taipei being used as a comparator, on the basis that "the failure

[391] NZFWS, para. 4.133.

[392] AFWS, para. 822.

[393] TPS TPKM, p. 11.

[394] JRPQ, p. 3. USRPQ, p. 3.

of ALCM to establish [in Chinese Taipei] is most likely due to Chinese Taipei's climatic conditions not being suitable for this pest's establishment, rather than because there may be insufficient numbers of ALCM infesting New Zealand apples. Chinese Taipei has an oceanic and subtropical monsoon climate….ALCM is a pest of cool climates".[395]

2.268 Given that Australia failed entirely to take into account climatic conditions in its assessment of the likelihood of ALCM spread in Australia – a fact now confirmed by the expert responses (see below paras. 2.761 to 2.767) – this is a surprising claim for Australia to make. Why are climatic conditions relevant to the potential for ALCM establishment in Chinese Taipei, but not Australia? In any event, and notwithstanding this clear inconsistency with the Australian argument on this point, New Zealand notes that, contrary to Australia's claims, the apple growing regions of Chinese Taipei have a climate that would be conducive to ALCM.

2.269 As explained by Professor Cross, in considering whether Chinese Taipei is a good comparator: "The geographic location, the climatic conditions and the availability and locations of suitable hosts would need to be taken into account".[396] However, Australia's assertion that Chinese Taipei would not have a suitable climate fails to take into account the key issues of host availability and location. Apple production in Chinese Taipei is centred in the counties of Taichung and Nantou, which are in the central mountainous backbone of the island. Because of the elevation of this area, unlike the lowland areas of Chinese Taipei, its climatic conditions are consistent with those identified by Professor Cross as conducive to ALCM survival (long cool winters and summers with regular rainfall).[397]

2.270 Thus, because of the suitable climate of Chinese Taipei's apple growing regions, Chinese Taipei's experience in importing New Zealand apples (ALCM has not established in Chinese Taipei, despite more than 18 years of trade) is a relevant

---

[395] AFWS, para. 821.

[396] Cross RPQ, Q 107, p. 16.

[397] Cross RPQ, Q 94 (v), p. 4. Thus, Professor Cross's conclusion that "[b]ecause of the unsuitable climate of Chinese Taipei, New Zealand's experience in exporting apples to there should not be used to draw conclusions about the risks of importation into Australia" (Cross RPQ, Q 107, p. 16) which is based on Australia's mistaken assumption about the apple growing regions of Chinese Taipei, is no longer relevant.

comparator, and confirms the scientific evidence that ALCM is not spread through trade in apples. Australia has not rebutted New Zealand's case in this regard.

(f) Australia's measures for ALCM

2.271 Taking into account issues related to viability, ALCM biology and normal trade practices, it is clear that there is no rational or objective relationship between the scientific evidence and Australia's measure requiring a 3000 unit sample size inspection or a 600 unit sample with mandatory fumigation of all apples.

5. General measures

2.272 As demonstrated in New Zealand's first written submission, because there is no rational or objective relationship between the scientific evidence and the pest-specific measures, there is no rational or objective relationship between the scientific evidence and the general measures applicable to all three pests.[398] In addition, as pointed out in New Zealand's first written submission, the IRA failed to identify any independent scientific basis for any of the three general measures.

2.273 In its first written submission, Australia relies on its flawed principal/ancillary distinction to argue that only principal risk reduction requirements (which, on Australia's interpretation, the general measures are not) need to be supported by sufficient scientific evidence. However, as explained above at paragraphs 2.1 to 2.17, Australia's attempt to draw a distinction between principal and ancillary measures has no basis in the *SPS Agreement*. In particular, Australia's attempt to place the onus on New Zealand to adduce "evidence to suggest that the ancillary requirements are not valid requirements for ensuring verification and support of the principal measures"[399] is fundamentally at odds with the text of Article 2.2 which requires that Member shall not maintain SPS measures "without sufficient scientific evidence". The only burden on New Zealand is to establish a prima facie case that Australia's measures are maintained without sufficient scientific evidence. Australia's legal arguments are misguided and must be dismissed.

---

[398] NZFWS paras. 4.141 to 4.149.

[399] AFWS, para. 959.

2.274 While in its first written submission Australia goes on to try to explain the rationale for imposing the three additional requirements, it fails to articulate, with reference to scientific evidence, any particular risks associated with the general measures.

(a) AQIS involvement

2.275 Australia claims that the AQIS involvement requirement[400] is part of "standard pre-clearance arrangement[s] for New Zealand apples" and "help[s] ensure that "non-conforming consignments of New Zealand apples will not enter Australia".[401] However, as set out in New Zealand's first written submission, because there is no rational or objective relationship between the scientific evidence and the pest-specific measures which the AQIS inspection would be supposedly checking for conformity with, there can be no rational or objective relationship between the scientific evidence and the AQIS involvement measure either.

2.276 Moreover, the AQIS involvement described in the IRA and clarified in subsequent argumentation by Australia is far from "standard". First, as set out above at paragraphs 2.25 to 2.30, it differs in scope and intensity from any form of systems audit familiar to New Zealand, or indeed Australia.[402] In particular, contrary to the assertion in Australia's responses to the Panel's questions[403] and Australian comments on experts' replies[404], the "AQIS involvement" proposed for New Zealand apples, within Australia's meaning of the term, is not similar to what was done for stone fruit from New Zealand to Western Australia. The AQIS and Department of Agriculture and Food Western Australia audit of stone fruit to Western Australia was for the first season of trade and examined only a sample of growers and packing houses.[405] This is

[400] Measure 15.

[401] AFWS, para. 962.

[402] NZRPQ, Q 51, see also paras. 2.912 to 2.922 below (Article 5.6).

[403] ARPQ, Qs 51-52.

[404] ACER, para. 279.

[405] Under the Final IRA Report: Pest Risk Analysis for Stone Fruit from New Zealand into Western Australia provides that "[d]uring the first season of trade, an officer from Biosecurity and/or an officer from AQIS will visit areas in New Zealand in order to audit the operation of the protocol…", p. 93.

clearly different from the audit of 100% of survey teams and packing houses as clarified by Australia in its first written submission and responses to Panel questions.

2.277 Second, as set out in New Zealand's responses to Panel questions,[406] the Australian attempt to link the AQIS involvement measure with standard pre-clearance arrangements is flawed. In its responses to Panel questions, Australia agrees with New Zealand that pre-clearance generally refers to on-arrival verification requirements undertaken outside Australia.[407] However, Australia now states that the reference to AQIS involvement in the pre-clearance section of the IRA refers to the ability of AQIS officers to separately undertake audits of survey teams and packing houses while they are in New Zealand engaged in routine pre-clearance activities (as a cost-cutting measure).[408] New Zealand does not agree that audits of survey teams would take place at the same time as pre-clearance. For example, in the case of fire blight and European canker, orchard inspections are to take place during spring and winter respectively, long after or well before the export of apples to Australia would have occurred.

2.278 The AQIS inspection measures appear to be based on a perceived risk that the usual systems audit procedures and standard pre-clearance arrangements will be insufficient to ensure compliance with pest specific measures. However, it provides absolutely no basis for this assumption. Indeed, as pointed out in New Zealand's first written submission,[409] Australia's measures are particularly unfounded given the long history of co-operation in SPS issues between the two countries.

(b) Details of the layout of packing house premises

2.279 With respect to the measure that details of the layout of packing house premises be provided,[410] the experts confirm the position expressed in New Zealand's

[406] NZRPQ, Q 51.

[407] ARPQ, Q 47.

[408] ARPQ, Qs 47-48.

[409] NZFWS, para. 4.449.

[410] Measure 17.

first written submission that Australia does not provide any scientific basis for such a measure.[411]

2.280 Dr Paulin states that "[v]ery few scientific data, if any, support the risks of contamination of fruits by *Erwinia amylovora* in the packing houses. It seems that the requirements of providing details of the layout of the premises <u>is not based</u> on any "scientific evidence".[412]

2.281 Dr Deckers states that "I don't see the scientific evidence for that measure"[413] and that "[i]t is not clear which risk Australia wants to reduce with this measure"[414] and "[t]here is no clear scientific background for this requirement".[415]

2.282 Dr Latorre states that "this measure does not apply, considering that there is no scientific evidence supporting the possibility that European canker can be disseminated at the packing houses".[416]

2.283 Dr Swinburne states that "[t]he requirement to provide details of pack house layout seems out of all proportion to the minute risk posed by any threat of cross contamination of apples supposedly coming from infected orchards".[417]

2.284 Professor Cross states that "[i]t is unclear how a detailed knowledge of pack house premises in NZ could be used to identify areas of risk with respect to ALCM."[418]

2.285 The only rationale the AFWS can provide, repeated in the Australian comments on experts' replies[419], is that it "support[s] the verification of packing

[411] NZFWS, para 4.149.

[412] Paulin, Q 47, p. 23.

[413] Deckers, Q 47, p. 17.

[414] Deckers, Q 92, p. 31.

[415] Deckers, Q 106, p. 35.

[416] Latorre, Q 93, p. 33. See also Latorre, Q 92, p. 31.

[417] Swinburne, Q 92, p. 16.

[418] Cross RPQ, Q 106, p. 16.

[419] ACER, para. 293.

house procedures by AQIS".[420] However, as demonstrated above, that requirement itself lacks any scientific basis. Accordingly, this measure must also be maintained without sufficient scientific evidence.

(c) Standard commercial practice

2.286 In respect of the standard commercial practice verification measure[421] Australia makes a number of flawed arguments in an attempt to provide a reputable scientific basis for its application to New Zealand apple imports.

2.287 First, Australia claims that it is needed because that was the "underlying assumption of the IRA Team".[422] But, in doing so, Australia has missed the key issue in respect of Article 2.2, which is whether Australia's requirement in this regard is maintained "without sufficient scientific evidence".

2.288 Second, Australia argues that New Zealand has not adduced any evidence as to why the Panel should feel confident that all orchards registered for export will continue to operate under standard commercial practices.[423] However, in so doing, it reverses the obligation. It is up to Australia to ensure that its measures were not maintained without sufficient scientific evidence. Australia has provided no evidence, either in the IRA or in its subsequent argumentation in this case, let alone sufficient scientific evidence, to justify its measure.

2.289 Third, the IRA provides no articulation as to how standard commercial practices would mitigate against assessed risk. In its responses to Panel questions, Australia now argues that "one of the reasons that the IRA Team did not consider that a buffer zone around designated export orchards would be required is because "standard commercial practices requires the removal of hosts and also of infected material" from orchards.[424] However, this is inconsistent with the IRA which states that "the risks associated with fire blight establishment are adequately addressed by

[420] AFWS, para. 963. See also ARPQ, Q 15, pp. 11-16.

[421] Measure 16.

[422] AFWS, para. 965.

[423] AFWS, para. 967.

[424] ARPQ, Q 15, p. 16, citing IRA, p. 114.

the requirement for inspection and the risks associated with fruit contamination are addressed by the requirement for disinfection treatment".[425]

2.290 Finally, Australia argues that standard commercial practices are required in relation to fruit imports from a number of other countries. However, as set out in the New Zealand responses to Panel questions, and below at paragraph 2.922 to 2.924, none of the examples given have the additional requirement to verify compliance with standard commercial practices.[426] New Zealand does not consider that the extracts exhibited to the Australian responses to Panel questions change this assessment.[427]

2.291 As is clear from Australia's attempted articulation of a scientific basis for the general measures, there is not just a lack of a rational or objective relationship between the scientific evidence and the measures imposed, but a complete absence of any scientific support.

6. Conclusion

2.292 For the reasons outlined above, Australia has failed to rebut New Zealand's case of a violation of Article 2.2.

G. ARTICLE 5.1

1. The legal standard

2.293 In its first written submission New Zealand demonstrated that the IRA is not a risk assessment within the meaning of Article 5.1 and paragraph 4 of Annex A of the *SPS Agreement*. The IRA does not evaluate the likelihood of entry, establishment or spread of the pests at issue according to the measures which might be applied, or the associated potential biological and economic consequences.

[425] IRA, p. 114.

[426] NZRPQ, Q 53. The IRA requires that "*MAFNZ will ensure* that all orchards registered for export to Australia are operating under standard commercial practices" (emphasis added), IRA, p. 315.

[427] **Exhibit AUS-119.**

(a) New Zealand has properly interpreted Article 5.1

2.294 Australia claims that "New Zealand does not adequately define the legal standard that a risk assessment has to meet".[428] This is patently incorrect. As is clear from its first written submission, New Zealand has applied the legal standard set out in Article 5.1 and Annex A(4) of the *SPS Agreement*, in accordance with the guidance provided by the Appellate Body.

2.295 In a recently circulated Report the Appellate Body has provided additional clarification regarding the proper interpretation of Article 5.1. The Appellate Body stated that the role of the Panel is to "determine whether [a] risk assessment is supported by coherent reasoning and respectable scientific evidence and is, in this sense, objectively justifiable."[429] It went on to note that in assessing the consistency of an SPS measure with Article 5.1 of the *SPS Agreement*, a panel should:

> [F]irst, identify the scientific basis upon which the SPS measure was adopted. This scientific basis need not reflect the majority view within the scientific community but may reflect divergent or minority views.
>
> Having identified the scientific basis underlying the SPS measure, the panel must then verify that the scientific basis comes from a respected and qualified source. Although the scientific basis need not represent the majority view within the scientific community, it must nevertheless have the necessary scientific and methodological rigour to be considered reputable science. In other words, while the correctness of the views need not have been accepted by the broader scientific community, the views must be considered to be legitimate science according to the standards of the relevant scientific community.
>
> A panel should also assess whether the reasoning articulated on the basis of the scientific evidence is objective and coherent. In other words, a panel should review whether the particular conclusions drawn by the Member assessing the risk find sufficient support in the scientific evidence relied upon.
>
> Finally, the panel must determine whether the results of the risk assessment "sufficiently warrant" the SPS measure at issue. Here, again, the scientific basis cited

[428] AFWS, para. 345.

[429] Appellate Body Report, *Canada – Continued Suspension*, para. 590.

as warranting the SPS measure need not reflect the majority view of the scientific community provided that it comes from a qualified and respected source.[430]

2.296 This is consistent with the approach taken by New Zealand in its first written submission. In particular, the central point of New Zealand's argument is that the conclusions in the IRA do not find sufficient support in the scientific evidence relied upon.[431] This is true of the IRA's overall assessments as to the probability of entry, establishment, and spread of the pests and issue, as well as many of the interim assessments in the IRA regarding different steps in the pathways. It also applies to the IRA's assessment of the potential biological and economic consequences.

2.297 In its first written submission New Zealand identified three fundamental methodological flaws which, in combination, result in a vastly overestimated probability of entry, establishment and spread of the pests at issue. These flaws magnify the assessment of risk, turning what are often the remotest of possibilities into events that are assessed as occurring with some frequency. In addition, with regard to many of the individual steps in the relevant pathways, New Zealand demonstrated that assessments in the IRA significantly overestimate the risk. While assigning these steps numerical ranges may give the appearance of objectivity and precision, in many instances, these are events which have never been demonstrated to occur, and for which there is no scientific evidence to suggest they would occur. Moreover the numbers actually assigned in the IRA find no support in the science. The distorting effect is compounded where a number of these events occur in the same pathway. The cumulative result of these errors is an estimation of risk that simply bears no rational relationship to the scientific evidence or real world experience.

2.298 It was on this basis that New Zealand showed that the IRA did not "evaluate the likelihood" of the risk in accordance with the *SPS Agreement*. In doing so New Zealand has applied the correct standard to assess compliance with Article 5.1.

---

[430] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

[431] See for example, NZFWS, paras. 4.208, 4.267 and 4.335.

(b) Australia's "objective and credible" standard is without basis

2.299 According to Australia, the appropriate legal standard under Article 5.1 is to determine "whether Australia's measures are based on an objective and credible risk assessment."[432] According to Australia, this standard reflects the standard applied by the compliance panel in *Australia – Salmon (Article 21.5 – Canada)* but "in a more detailed and elaborated way."[433]

2.300 As Australia itself admits, "[t]he appropriate legal standard is closely related to the Panel's standard of review".[434] As such, it is difficult to disentangle the way Australia interprets its "objective and credible" standard from its view that Members' risk assessments should be accorded "considerable deference" by panels. Indeed, immediately after proposing that "the Panel should be guided by the approach taken by the compliance panel in *Australia – Salmon (Article 21.5 – Canada),*[435] Australia claims that the *SPS Agreement* "establishes that the (non-WTO) competent bodies" that perform risk assessments "are given a pre-eminent position in the decision-making process as to whether there is a legitimate basis for particular SPS measures."[436] It is clear that Australia views its "objective and credible" standard through the lens of considerable deference, a standard that has been consistently rejected by panels and the Appellate Body. There is nothing in the decision of the compliance panel in *Australia – Salmon (Article 21.5 – Canada)* to suggest that Members' risk assessments be given "a pre-eminent position" under the *SPS Agreement*.

2.301 As a practical matter, in New Zealand's view the jurisprudence has been usefully clarified by panels and the Appellate Body in a number of cases subsequent to *Australia – Salmon (Article 21.5 – Canada),* including *Japan – Apples,* and *Canada – Continued Suspension*. New Zealand discussed these in detail in the section on standard of review above.[437] In any event, as made clear in New Zealand's first

[432] AFWS, para. 241.

[433] ARPQ, Q 58, p. 49, 4th para.

[434] AFWS, para. 346.

[435] AFWS, paras. 202-204.

[436] AFWS, para. 205.

[437] See paras. 2.43 to 2.64 above.

written submission, the flaws in the IRA are such that it is "impossible to have any degree of confidence in the levels of risk ascribed in the IRA."[438] This means that New Zealand has shown that Australia's assessment of risk clearly fails to meet the standard set out in *Australia – Salmon (Article 21.5 – Canada).*

(c) Australia's criticisms of New Zealand's interpretation of Article 5.1 are misguided

2.302 Australia has responded to New Zealand's approach to Article 5.1 with a grab-bag of complaints. At the outset Australia identifies what it claims are two "very significant deficiencies" in New Zealand's first written submission. The first is that New Zealand failed to acknowledge that risk assessments must be "appropriate to the circumstances". The second is the status attached to the *Japan – Apples* findings.

<u>(i) Appropriate to the circumstances</u>

2.303 New Zealand responded to Australia's argument on this point in its oral statement at the first substantive meeting with the parties and will not repeat itself here.[439] Suffice to reiterate that New Zealand agrees with the guidance provided by the panel in *Australia – Salmon*, namely that the phrase "appropriate to the circumstances" in Article 5.1 cannot:

> …annul or supersede the substantive obligation resting on Australia to base the sanitary measure in dispute (irrespective of the products that measure may cover) on a risk assessment. We consider that the reference "as appropriate to the circumstances" relates, rather, to the way in which such risk assessment has to be carried out.[440]

2.304 The "appropriate circumstances" identified by Australia include its favourable pest and disease status, and the potentially serious consequences of pest or disease incursion. Common sense suggests that such factors will be relevant in conducting risk assessments, and indeed it is clear that these factors were taken into account in the IRA. But it is not clear what Australia draws from this because New

[438] NZFWS, para. 4.160.

[439] Oral statement of New Zealand for first substantive meeting with the parties, 2 September 2008, paras. 85-87.

[440] Panel Report, *Australia – Salmon*, para. 8.57.

Zealand does not challenge the IRA in this respect. It is clear, however, that these circumstances could not justify a departure from the requirement to evaluate the likelihood of entry, establishment, or spread of the disease or pest.

2.305 Although Australia suggests that "significant deficiencies" result from New Zealand's treatment of this issue, it does not specify precisely what these deficiencies are. One clue is provided in Australia's discussion of the appropriate standard of review. In Australia's view "[t]he obligation that a risk assessment be 'as appropriate to the circumstances' (Article 5.1) supports Australia's view that a panel should show considerable deference to the findings reflected in a risk assessment."[441] Once again Australia's interpretation of the obligations in the *SPS Agreement* are coloured by its erroneous views on the appropriate standard of review. There is no basis in WTO jurisprudence or in the natural meaning of the terms themselves to sustain the view that the phrase "appropriate to the circumstances" supports any notion of "considerable deference".

<u>(ii) Japan – Apples</u>

2.306 *Japan – Apples* dealt with measures imposed in respect of the importation of mature, symptomless apple fruit, and in relation to fire blight. The central scientific issue that was resolved in *Japan – Apples* was whether mature, symptomless apples serve as a vector for transmission of fire blight. Due to this combination of similarities, it is beyond any doubt that the reports in that case are highly relevant in the present case.

2.307 Contrary to Australia's submission, New Zealand does not "defer" to *Japan – Apples*. Nor does New Zealand suggest Australia was required to abandon its own science-based risk assessment process and instead base its risk management measures solely on the outcomes of the *Japan – Apples* dispute.[442] New Zealand does not claim that *Japan – Apples* was a risk assessment.[443] Nor does New Zealand ask that the Panel "place the panel report [in *Japan – Apples*] on the same footing as the Final

[441] AFWS, para. 201.

[442] cf AFWS, paras. 4, 25, 194.

[443] cf AFWS, paras. 254, 302, 352.

IRA Report"[444] or argue that *Japan – Apples* disposes of the substance of this dispute.[445]

2.308 Moreover, New Zealand agrees with Australia's submission that it is essential that the Panel fulfil its mandate to make an "objective assessment of the matter before it, including an objective assessment of the facts of the case and the applicability of and conformity with the relevant covered agreements" pursuant to Article 11 of the DSU. New Zealand does not argue that the Panel in the present case should "simply adopt" the findings of the *Japan – Apples* dispute.[446]

2.309 New Zealand does, however, emphasise that the findings in *Japan - Apples* are highly relevant to this case,[447] in particular the Panel's central finding that:

> …the scientific evidence presented to the Panel show[s] that, with respect to mature, symptomless apple fruits, the risk that the transmission pathway be completed is "negligible".[448]

2.310 It is appropriate that a DSB panel takes into account those previous Panel or Appellate Body Reports that are relevant to the dispute before it. This approach was confirmed by the Appellate Body:

> Adopted panel reports are an important part of the GATT *acquis*. They are often considered by subsequent panels. They create legitimate expectations among WTO Members, and, therefore, should be taken into account where they are relevant to any dispute. However, they are not binding, except with respect to resolving the particular dispute between the parties to that dispute. In short, their character and their legal status have not been changed by the coming into force of the *WTO Agreement*.[449]

[444] cf AFWS, para. 256. See also para. 887.

[445] cf AFWS, paras. 262, 350, 927.

[446] In that regard, New Zealand notes the recent report in *United States – Zeroing* in which the Appellate Body confirms, at para. 190, that "[f]actual findings made in prior disputes do not determine facts in another dispute."

[447] AFWS, para. 26.

[448] Panel Report, *Japan – Apples*, para. 8.153. Australia misstates this finding at AFWS, fn. 227.

[449] Appellate Body Report, *Japan - Alcoholic Beverages II*, p. 14. This approach has recently been confirmed by the Appellate Body in *United States – Zeroing* at para. 362.

2.311 The desirability of referring to previous reports is not limited to legal matters but can include factual matters as well, according to the panel in *EC – Salmon,* which concluded that while it was not bound by the decisions of other Panels it would nevertheless:

> ...consider it appropriate to review those decisions to assess the similarities and the differences in the underlying facts, and determine whether the analysis of those Panels is helpful in our assessment of the arguments in this case.[450]

(iii) Australia cannot simply defer to the "expert judgement" of the IRA team in order to comply with Article 5.1

2.312 In earlier sections of this submission New Zealand has responded to Australia's assertion that Australia is entitled to rely on divergent scientific opinion and that New Zealand has merely presented an alternative view of the science.[451] As noted, the crucial question is whether conclusions in a risk assessment find sufficient support in the scientific evidence relied upon, regardless of whether that evidence represents mainstream or divergent views. New Zealand has done no more than demonstrate that the conclusions in the IRA do not find such support.

2.313 Another tactic employed throughout Australia's submissions is to invoke the "expert judgement" of the IRA Team. Australia states that:

> In this case, Australia relies on the scientific account provided in the Final IRA Report…[which] represents the culmination of a detailed scientific analysis. It expresses the views of qualified and respected scientists applying their expert judgement…[452]

---

[450] Panel Report, *EC – Salmon*, para. 7.69. New Zealand also notes that in *United States – Zeroing* the Appellate Body recently made the following comment, at para, 190, about the resolution of a factual question concerning the operation of municipal law: "Evidence adduced in one proceeding, and admissions made in respect of the same factual question about the operation of an aspect of municipal law, may be submitted as evidence in another proceeding. The finders of fact are of course obliged to make their own determination afresh and on the basis of all the evidence before them. But if the critical evidence is the same and the factual question about the operation of domestic law is the same, it is likely that the finder of facts would reach similar findings in the two proceedings.

[451] See paras. 2.69 2.77 above.

[452] AFWS, para. 239.

2.314 As noted in the section on the standard of review, to the extent that Australia is suggesting that the IRA is itself a source of scientific evidence upon which Australia can rely, this argument must be rejected.[453] Australia cannot avoid effective review of its IRA simply by designating it "divergent scientific evidence". The IRA must be objectively justifiable, contain reasoning that is objective and coherent, and conclusions that are sufficiently supported by the scientific evidence. The Panel, aided by the experts, is authorised to review the IRA in order to ensure that it meets these requirements. [454]

2.315 In Australia's recent comments on experts' replies, Australia has sought to re-emphasise the role of expert judgement, especially in instances where Australia claims that the science is "uncertain".[455] This comes in response to the experts' responses, which seriously undermine the credibility of the IRA's conclusions. However, simply deferring to the judgement of the IRA Team does not amount to rebutting New Zealand's case. In essence, it is no more than a variation of Australia's appeal for considerable deference. In New Zealand's view, it must be clear from the IRA itself how the conclusions of the IRA Team find sufficient support in the scientific evidence relied upon. And this is not at all clear from a reading of the IRA.

2.316 Australia invokes "scientific uncertainty" in an effort to read down the obligation to support the conclusions in the IRA with sufficient scientific evidence. Australia argues that "where the scientific evidence is uncertain – whether for lack of data, poor data or some other reason – then the Panel ought to bear this in mind when deciding whether there is "sufficient" scientific evidence to support a particular step in the pathway."[456] In other words, Australia is asking the Panel to apply a lower legal threshold in determining whether scientific evidence is "sufficient", in instances where Australia has no scientific evidence to support its conclusions. It amounts to suggesting that the less scientific evidence that Australia has, the less "sufficient" that scientific evidence needs to be. Clearly, this interpretation runs counter to the intention of establishing science-based obligations in the *SPS Agreement*.

---

[453] See para 2.76 above.

[454] Appellate Body Report, *Canada – Continued Suspension*, paras. 590-592.

[455] ACER, para. 10.

[456] ACNZCER, para. 8.

2.317 Moreover, Australia misinterprets "scientific uncertainty" by equating it to situations where there is no scientific support for its conclusions. The absence of data or scientific studies supporting the IRA's hypotheses does not amount to "scientific uncertainty"; rather, it is an example of the scientific evidence not supporting Australia's measures.

2.318 For these reasons, Australia's efforts to fall back on "expert judgement", to excuse the absence of sufficient scientific evidence, must be rejected.

(iv) <u>New Zealand did not conduct its own risk assessment or apply Biosecurity New Zealand's definition of "negligible"</u>

2.319 Closely related to these points is Australia's argument that New Zealand "purports to conduct its own risk assessment and attempts to pass it off as a satisfactory discharge of its burden of proof."[457] Oddly, in this context, the basis for this claim appears to be Australia's assertion that New Zealand uses the wrong conception of "negligible" in its criticisms of the IRA.[458] According to Australia, New Zealand uses the concept of negligible as applied by Biosecurity New Zealand in conducting risk assessments.[459] In that context "negligible" is defined as something "not worth considering; insignificant". Australia concludes:

> Viewed in this context, it becomes clear that by applying this method to its analysis of the Final IRA Report, what New Zealand in fact does is conduct its own risk assessment according to its own methodology.[460]

2.320 As an initial point, New Zealand fails to see how it would follow, as a matter of logic, that New Zealand "conducted its own risk assessment" even if it had applied Biosecurity New Zealand's definition of "negligible." New Zealand's first written submission in no way resembles a risk assessment conducted by Biosecurity New Zealand. Presumably, Australia's intention is to argue that New Zealand has assessed the IRA against the standards that New Zealand would apply to its own risk

[457] AFWS, para. 279.

[458] AFWS, paras. 280-283.

[459] AFWS, para. 283.

[460] AFWS, para. 283.

assessments, rather than the standards contained in the *SPS Agreement*. In this, Australia is mistaken.

2.321 First, it is clear that New Zealand did not adopt Biosecurity New Zealand's definition of "negligible" in its first written submission. The single instance in which New Zealand refers to a "negligible" risk as something "not worth considering, insignificant" is a quote from the Concise Oxford Dictionary,[461] used in the context of demonstrating the common meaning of the term. New Zealand's first written submission clearly focuses on the definition of negligible contained in the IRA, namely, an event that would "almost certainly not occur".[462]

2.322 Second, it is not accurate to state that "New Zealand's real complaint…is that "negligible" probabilities should not be examined in a risk assessment."[463] Rather, New Zealand's complaint is that events that under Australia's own methodology are stated to "almost certainly not occur" are assigned probability values that result in them being assessed as events that occur with some frequency.[464]

2.323 Third, Australia claims that "[b]y suggesting that only "likely" probabilities should be assessed in a risk assessment, New Zealand effectively contends that the *SPS Agreement* requires risk assessments to identify a minimum magnitude of risk".[465] But of course, New Zealand is not suggesting that only "likely" probabilities should be assessed. Rather, New Zealand is suggesting that where probability values are assigned to an event, these must bear a rational relationship to the likelihood of that event occurring. That is, New Zealand is arguing that conclusions in the IRA should find sufficient support in the scientific evidence.

2.324 Fourth, contrary to Australia's claim, New Zealand does not argue that "where the Final IRA assigns negligible likelihoods to steps in a pathway, such events should be treated as breaking the chain of causation…and accordingly, the assessment

[461] NZFWS, para. 4.177.

[462] See, for example, NZFWS, paras. 4.174-4.186.

[463] AFWS, para. 269.

[464] NZFWS, paras. 4.174-4.186.

[465] AFWS, para. 270.

of risk should have ceased".[466] While New Zealand considers that it makes sense to stop a risk analysis where one or more necessary steps in a pathway would "almost certainly not occur", New Zealand does not argue that Australia necessarily breached the *SPS Agreement* by continuing its risk assessment. In New Zealand's view, stopping a risk analysis in these circumstances avoids wasting time and resources, however. New Zealand notes that the responses of the experts support this approach,[467] and it is also consistent with guidelines for risk assessment by relevant international organisations.[468]

2.325 However, New Zealand's key point is that, if a risk assessment does continue, it is critical to ensure that the probability values assigned to a "negligible" step properly reflect the fact that it will "almost certainly not occur", allowing the step to be appropriately factored into the assessment of the risk that the overall pathway would be completed. Where the assigned probability values instead result in an outcome that predicts an event will occur with some regularity, the result is an inflated assessment of risk.

2.326 Finally, it is simply incorrect to suggest, as Australia does, that risk assessments must in every instance proceed to an evaluation of consequences.[469] Nothing in the *SPS Agreement* requires a WTO Member to assess consequences in circumstances where the entry, establishment and spread of relevant pests will almost certainly not occur. Indeed, Australia's own methodology recognises this fact.[470]

---

[466] Cf. AFWS, para. 274.

[467] See Experts' RPQ, Q 138. Dr Schrader states at p. 9 that "[i]f one risk element is rated "negligible", it has to be put into question, whether it makes sense to proceed further with the risk assessment." Dr Sgrillo states at p. 34 that "if '<u>almost certain not to occur</u>' refers to the likelihood of occurrences in the population as one occurrence in each several years, for example, then the probability range could be many times lower. In this case the path could be assessed to be removed from the model to increase the clarity and simplicity; and the causal chain could be broken. If '<u>almost certain not to occur</u>' mean that the possibility to occur is only a theoretical supposition and there are no records that the event has ever occurred then the path can be removed from the model and the causal chain would be broken." Dr Latorre states at p. 39 that some of the importation steps "(e.g., Steps 3, 5 and 7) are indeed mere possibilities (hypothesis rather than true facts) that need to be confirmed. In such cases, a probability equal to zero should be assigned or even better, disregard the steps considered almost certain not to occur."

[468] NZRPQ, Q 96, paras. 223, 224.

[469] AFWS, para. 275.

[470] For example, Australia's risk estimation matrix provides that if the likelihood of entry, establishment and spread of a pest is assessed as "negligible", it is not possible for the consequences of

2. Australia's attempted rebuttal of the three methodological flaws identified by New Zealand is misguided

2.327 In its first written submission New Zealand pointed out that the IRA for apples is one of only two occasions in which Australia has used a semi-quantitative analysis for plant pest risk analysis. Contrary to Australia's assertions,471 New Zealand is not challenging Australia's right to choose its own methodology, nor advocating any specific methodology. New Zealand does not object in principle to Australia using a semi-quantitative method. It simply notes that there are well-recognised problems and limits inherent in such an approach.[472] In this context, New Zealand referred to the problems described in the OIE Handbook on Import Risk Analysis for Animals and Animal Products, which noted, among other problems, that semi-quantitative methods "often give a misleading impression of objectivity and precision".[473] New Zealand observed that the limits of a semi-quantitative approach are nowhere more evident than in the IRA.474

2.328 The responses of the experts support this observation. Dr Sgrillo noted that "according to the OIE the semi-quantitative method would not be recommended"[475] and observed that the IRA provides "no…explanation for the use of a semi-quantitative approach."[476] Dr Sgrillo also stated that "[t]he semi-quantitative methodology used by IRA could introduce bias in the model because the parameters and the shapes of the distributions are mostly based in guesses and not derived from sampling. Assigning numbers to subjective estimation does not result, necessarily, in a more objective assessment."[477] He went on to note that "in most cases the data and

---

entry, establishment and spread to result in an estimate of overall risk that exceeds Australia's ALOP (see IRA, Table 11, p. 41). In addition, Table 14 in the IRA, (p. 47) indicates that 162 insect pests were identified as being associated with New Zealand apples and not present in Australia, but only 19 has "potential for being on pathway". That is, the IRA assessed 143 insect pests as not having "potential for being on the pathway" and therefore did not proceed to an assessment of consequences for these insect pests.

[471] AFWS, para. 286.

[472] NZFWS, para. 4.162.

[473] NZFWS, para. 4.165.

[474] NZFWS, para. 4.167.

[475] Sgrillo RPQ, Q 128, p. 24.

[476] Sgrillo RPQ, Q 128, p. 24.

[477] Sgrillo RPQ, Q 124, p. 22.

specific information needed were not available. So the IRA team has chosen the distributions and their parameters through guesses. The guesses represent hypotheses about the system, and these hypotheses were not validated because the necessary actual data were not available."[478] Dr Latorre noted that "Australia's IRA does not provide a technical explanation for the use of a semi-quantitative approach, except to say that this procedure apparently facilitates the interpretation by stakeholders and reinforces objectivity and transparency."[479]

2.329 Australia's own practice appears to acknowledge the limitations inherent in a semi-quantitative or quantitative approach. In the vast majority of plant pest risk analyses Australia has adopted a qualitative approach to risk assessment. The only two instances where a semi-quantitative method has been used involved what Australia refers to as "legacy" IRAs,[480] with close Australian Senate involvement, and in which WTO dispute settlement proceedings were initiated.[481] In a recent major review of Australia's quarantine system, Biosecurity Australia argued that a qualitative approach "has proven much more useful than attempting to provide numerical estimates for many of the parameters needed for quantitative risk analyses in a way that might give rise to spurious accuracy."[482] New Zealand notes that Australia has reverted back to a qualitative approach in its recently released draft IRA for apples from China, despite parallels between the commodity and pests considered in that IRA and the commodity and pests addressed in the IRA for New Zealand apples.[483]

2.330 In addition, Australia has not specifically responded to the inherent problems and limitations with a semi-quantitative methodology identified by New Zealand, or denied their validity. Instead Australia simply claims that it is "surprised by New

[478] Sgrillo RPQ, Q 129, p. 25.

[479] Latorre RPQ, Q 128, p. 34.

[480] One Biosecurity: A working partnership, The Independent Review of Australia's Quarantine and Biosecurity Arrangements, Report to the Australia Government, 30 September 2008, p. 125.

[481] NZFWS, para. 4.166.

[482] One Biosecurity, p. 98.

[483] Draft Import Risk Analysis Report for Fresh Apple Fruit from the People's Republic of China, January 2009.

Zealand's use of the OIE Handbook, as the OIE deals with animals, not plants."[484] This is hard to understand in light of Australia's subsequent confirmation in its responses to Panel questions that "the broad principles of risk assessment used for animals and animal products are similar to those used for plants and plant products"485 and that there is "comparatively more extensive OIE guidance available"486. In light of this, and as noted in New Zealand's responses to Panel questions, New Zealand can see no reason why the comments on the semi-quantitative methodology in the OIE Handbook would not be directly relevant to a risk assessment concerning plant life or health.[487] In New Zealand's view, the limitations of semi-quantitative analysis are the same whether the risk being assessed relates to animals or plants.[488] Indeed, at the first substantive meeting of the Parties, a member of the Australian Delegation confirmed that Australia uses the same risk assessment methodology for plant and animal risk assessments.

2.331 In responding to a panel question on this issue Dr Latorre stated that "[i]n biology, there are general principles that can be applied universally, independent of the nature of the organisms. Therefore, the use of OIE guidelines…seems appropriate in the context to which New Zealand applied it."[489] Dr Sgrillo agreed that the OIE and IPPC "share the same scientific principles and concepts. The general concepts, procedures and methods based in scientific principles, including risk analysis, developed by these Organizations have mutual applicability."[490]

2.332 In its first written submission, New Zealand went on to identify three fundamental methodological flaws in the IRA. Australia has failed to rebut New Zealand's first written submission on these points.

---

[484] AFWS, para. 292.

[485] ARPQ, Q 103, p. 85.

[486] ARPQ, Q 103, p. 85.

[487] NZRPQ, Q 102.

[488] NZRPQ, Q 102.

[489] Latorre RPQ, Q 131, p. 35.

[490] Sgrillo RPQ, Q 131, p. 25.

(a) First fundamental flaw – Australia's choice of maximum probability value for "negligible" events

2.333 The first fundamental flaw identified by New Zealand relates to the decision in the IRA to choose 1 x 10^{-6} as the maximum value for negligible events. Australia responds with three arguments. First, New Zealand should have focused on the numbers not the words. Second, New Zealand has failed to understand the use of the interval between 0 and 10^{-6}. Third, New Zealand's approach to the use of trade data was flawed.

(i) Focus on numbers not words

2.334 New Zealand finds wholly unconvincing Australia's attempts to suggest that the probability values assigned to "negligible" events have no relationship to Australia's own qualitative descriptor of negligible events as things that will "almost certainly not occur".

2.335 Australia states that "New Zealand's focus on the words, rather than the numbers, is misplaced."[491] Australia quotes from the IRA which provides that "the descriptive terms are only used for qualitative values. Numbers are given for quantitative values."[492] Australia concludes that "the focus must be on the numbers represented by the probability intervals in Table 12 of the Final IRA Report – not the words."[493]

2.336 Australia appears to be suggesting that there is no connection between the qualitative description of a "negligible" event as an event that will "almost certainly not occur", and the numerical values chosen to represent that "negligible" event. The logic of Australia's argument is that the IRA Team did not even attempt to correlate the numerical values used with the qualitative description of "negligible". New Zealand finds this bizarre. Australia's argument contradicts the fact that in explaining the same probability intervals, Biosecurity Australia stated that they "correlate

[491] AFWS, para. 298.

[492] AFWS, para. 298.

[493] AFWS, para. 298.

directly" with the six qualitative descriptors.494 Moreover, the title to Table 12 in the IRA makes it clear that the semi-quantitative probability intervals "correspond" to the nomenclature for qualitative likelihoods.495 Yet Australia now appears to be arguing that under the semi-quantitative analysis applied in this case, "negligible" events are not really "negligible". But if not "negligible", then what are they? Surely they must correspond to something. The fact that Australia attempts to put distance between the numerical values chosen and their qualitative descriptors, is an admission that the two do not properly correlate. It is an admission of a fundamental flaw in the IRA.

2.337 Part of the problem with the IRA in this regard is that it fails to adjust the probability values used in light of the unit being analysed, in particular in respect of the per apple methodology applied to the analysis of importation scenarios. In this context it is pertinent to note that the numerical ranges used in the IRA, as set out in Table 12, reproduce the numerical ranges developed in Biosecurity Australia's Draft Guidelines for Import Risk Analysis (2001). But the Draft Guidelines were not developed with the per apple methodology in mind.[496] The IRA uses the probability ranges given in the Draft Guidelines with no explanation as to why they might be relevant in the specific context of a methodology where the relevant unit for an event is an apple.

2.338 Australia now claims that it was appropriate to use individual fruit as the risk unit because "individual apple fruit carrying a pest could present a risk."497 New Zealand does not contest this. The issue is the relationship between that unit of measurement and the pre-determined probability ranges. As noted in New Zealand's first written submission, whether one in a million can be regarded as "negligible" will depend on the event in question. The chance of something happening once in a million years might seem to be "negligible" but the chance of something occurring

[494] Biosecurity Australia, *Draft Guidelines for Import Risk Analysis*, September 2001, Department of Agriculture, Fisheries, and Forestry, Canberra, p. 86.

[495] IRA, p. 43.

[496] Indeed, the commodity used as an example throughout the *Draft Guidelines* is 'widget semen'. While not familiar with the specific commodity discussed in the *Draft Guidelines*, New Zealand notes that straws of semen are traded in thousands or tens of thousands, rather than the tens of *millions* apples traded

[497]AFWS, para. 301.

once in a million apples may not, in terms of the volumes of apples traded.498 To take another example, it would be inappropriate to define a "negligible likelihood" as one in a million if the unit of risk was individual wheat grains, given the high volume of individual wheat grains that are traded. Thus, the probability ranges used need to be defined with regard to the unit of risk in question. The IRA does not provide any explanation of the probability ranges applied in light of the "per apple" methodology utilised, let alone "coherent and objective" reasons for its approach.

2.339 Dr Sgrillo has confirmed the importance of the relationship between the probability intervals and the unit of measurement. Dr Sgrillo states:

> "The probability interval seems to have been arbitrarily chosen to represent the qualitative descriptors. There are no perceived criteria for assigning probabilities intervals to the qualitative scale.
>
> …[I[n stochastic pest risk models the number of expected occurrences is found by multiplying the probability of occurrence by the number of units in the population.
>
> …The numeric probabilities representing the qualitative descriptors in the IRA are to be interpreted on a *per unit* basis. <u>However they have to reflect the concept of each category (negligible, low etc) also in population terms.</u>
>
> It can be noted that, in the lower part of the categories, some distortion become evident. The "very low" category contains up to 10,000,000 fruits, the "extremely low" category contains up to 200,000 fruits and the negligible category 200 fruits.[499]

2.340 Dr Sgrillo goes on to note that a "negligible" event should not represent "200 events in one year".[500] He concludes that "[t]his approach seems to be based in an arbitrary choice and not in scientific principles."[501] In response to a follow up question, Dr Sgrillo reiterates that "the numeric probabilities representing the

[498] NZFWS, para. 4.180.

[499] Sgrillo RPQ, Q 133, pp. 27-28. (Emphasis in original.)

[500] Sgrillo RPQ, Q 133, p. 28. The numbers used by Dr Sgrillo reflect a population size of 200,000,000 fruit imported per year. In response to Q 136 Dr Sgrillo makes the same point with respect to an estimated population size of 150,000,000 fruits per year.

[501] Sgrillo RPQ, Q 133, p. 28.

qualitative descriptors in the IRA…should reflect the category concepts also in populational terms but this is not occurring in the present case."[502]

2.341 The importance of the relationship between the unit of measurement and the probability intervals used is further highlighted by the fact that in the IRA the same probability ranges are used to represent, at different points in the analysis, a per apple methodology, proportions of utilities near certain types of plants (or "exposure groups"), and the likelihood of a single entry, establishment and spread event occurring in a particular year. There is no explanation in the IRA as to why it was appropriate to use the same probability ranges despite the numbers in those ranges representing very different units depending on what was being assessed.

2.342 To take one example of the implications of this, in the importation scenario an adverse event with a probability of 1×10^{-6} on a per-apple basis is equivalent to an expected occurrence of once in a million apples, or 150 times per year, based on an Australia's estimate of the most likely volume of apples traded (that is, 150 million apples per annum). However, when applied to the overall probability for entry, establishment and spread, 1×10^{-6} is equivalent to one adverse event (that is, entry, establishment and spread of the pest in question) every one million years. While "once in a million years" may equate to an event that will almost certainly not occur, "150 times every year" clearly does not.

2.343 In making the argument that the focus should be on the numbers and not the words Australia appears to be suggesting, in effect, that the PEES analysis in the IRA was "quantitative" rather than semi-quantitative.[503] Yet a truly quantitative analysis would not apply the same pre-determined probability ranges to virtually every step. Rather, the appropriate probability ranges would be derived from an assessment of the

---

[502] Sgrillo RPQ, Q 134, p. 29. See also Dr Sgrillo's responses to Q 75 and Q 81 which reinforce the idea that "the parameters chosen should reflect the category concepts also in population terms."

[503] See, for example, AFWS, para. 291, "[The IRA] uses *a quantitative approach* in its evaluation of the likelihood of entry, establishment and spread of pests as a result of trade in New Zealand apples"; AFWS, para. 294, "the methodology used by the IRA Team…combined *a quantitative approach* to estimating the probability of entry, establishment, and spread with a qualitative approach to estimating consequences to give an estimate of risk." (emphasis added). See also ACER, para. 18, p. 5: "The IRA team applied a quantitative methodology in evaluating pathways for pests associated with apples from New Zealand and a qualitative methodology to evaluate the consequences…".

science and the data, and this would be step-specific and pest-specific. This can be contrasted with the approach taken in the IRA where the same probability ranges are applied with very little variation across a multitude of steps in the pathway and across the various pests at issue.

2.344 Australia argues that the common probability intervals are used to "assist consistency in risk analysis". This may be true of a more conventional "semi-quantitative" methodology, but it is difficult to reconcile this objective with Australia's claims that the focus must be on numbers not words, and that it has conducted a quantitative analysis for PEES. In this context, using the same probability ranges across all pests and pathways actually artificially imposes consistency, with no regard for the scientific evidence relating to the particular pest or step in the pathway. At a minimum the IRA should have provided a coherent and objective explanation as to why common probability ranges were appropriate, and this is particularly so in light of Australia's subsequent assertion that they bear no relationship to the qualitative descriptions of risk. The IRA provides no explanation at all in this regard.

2.345 Finally, the suggestion that the quantitative values are not related to the qualitative descriptions is clearly incorrect in light of the fact that, under the IRA's methodology, the annual probability of entry, establishment, and spread is directly correlated back to the qualitative descriptions.[504] Indeed, this is necessary in order for Australia to apply its risk estimation matrix. Clearly, the relationship between the quantitative probability ranges and the qualitative descriptions is extremely close. They must directly correlate in order for Australia to apply its risk estimation matrix, which is based on qualitative descriptions.

2.346 In any event, contrary to Australia's suggestion, New Zealand's focus in the first written submission is very much on the "numbers" assigned in the IRA. In New Zealand's view the IRA provides no coherent and objective explanation for the numerical values chosen to represent the various probability ranges. Simply asserting that the IRA Team "considered carefully whether they were confident that the range they had chosen would contain the actual value and that the chosen distribution

[504] IRA, p. 42.

reflected their beliefs"[505] is insufficient. New Zealand accepts that the probability range of 0 to 1 x 10^{-6} "contains" the "actual value" – after all it includes values close to and including 0. But this misses the point. New Zealand's criticism is that the probability range includes many other values, including values that (given Australia's per apple methodology) represent events that will occur with some frequency. Indeed, in its first written submission Australia itself admits that events which are predicted to occur at rates of "10^{-6} on a per apple basis" are "significant".[506] Australia has not explained the inclusion of these values for an event that, supposedly, would "almost certainly not occur". It is unclear to New Zealand how the numerical ranges adopted in the IRA, which treat "negligible" events as being events that are likely to occur with some frequency, find sufficient support in the scientific evidence. Indeed, as demonstrated in New Zealand's first written submission, there is no support for Australia's approach in scientific evidence or real world data.

<u>(ii) New Zealand has not failed to understand the use of the interval between 0 and 10^{-6}</u>

2.347 Given the similarities between Australia's response on this point and its attempted rebuttal of New Zealand's criticism of the use of a uniform distribution, New Zealand will respond under discussion of the second fundamental flaw below at paragraphs. 2.353 to 2.358.

<u>(iii) New Zealand's approach to the trade data</u>

2.348 In New Zealand's view, to treat as "negligible" a range and distribution that results in a mid-point of 1 in two million apples, when Australia expects that 150 million New Zealand apples will be imported each year, is inexplicable. And indeed, Australia makes no effort in the IRA even to attempt to explain this point, let alone to provide "coherent and objective" reasons. It merely notes that the IRA Team was "confident" that the range included the actual value. As noted above, this misses the point. When using 'expert opinion' to determine the upper and lower bounds of a probability distribution, it is not sufficient to select a range of values so broad as to

---

[505] IRA, p. 42.

[506] AFWS, para. 475.

include all the extremes of opinion of those consulted, particularly in the circumstances of the IRA Team, whose members' areas of expertise and interests were so varied. Solicitation of values from expert opinion should be a structured process. The OIE Handbook [volume 2, pages 73 to 76] is explicit: "Psychological research has shown that accurate subjective probability judgements cannot be elicited simply by asking an individual to provide a probability." The OIE Handbook discusses the problem of avoiding bias and outlines a structured approach to minimise the likelihood of bias being introduced. There is no evidence, presented anywhere, that the Australian IRA process used any structured or recognised method for eliciting expert opinion. The mechanistic approach demonstrated by the often repeated use of the same probability distributions, and the frequent and unexplained application of a uniform distribution, is evidence that no such methods were used.

2.349 New Zealand's first written submission underlined the importance of risk assessments being based on technically justified conclusions, including scientific evidence and real world data.[507] New Zealand noted that Australia could have used available trade data to test the validity of a maximum value of 1 x 10^{-6}. In this context, New Zealand used data for the export of apples from New Zealand and the United States to Chinese Taipei to demonstrate that Australia's choice of a maximum value bears no relationship to what occurs in the real world.[508]

2.350 Australia objects to this on the basis that "the IRA Team was concerned with New Zealand exporting its apples to Australia and not to Chinese Taipei."[509] While this is undoubtedly true, it is striking that elsewhere in its submissions, Australia emphasises the desirability, and indeed the necessity, of relying on data from outside Australia in order to assist its assessments of risk. New Zealand is not suggesting that the trade data should have been determinative, or applied uncritically. At the least, however, the IRA should have included reference to existing trade data to assist in its assessments of risk. In this context, allowances could have been made for differences between the conditions in Chinese Taipei and Australia, if such differences were relevant to the risk. The point is that the IRA ignored the data completely, and

[507] NZFWS, para. 4.181.

[508] NZFWS, paras. 4.181 to 4.186.

[509] AFWS, para. 309.

provided no alternative explanation for the maximum value chosen, let alone "objective or coherent" explanations.

2.351 Australia also claims that "without transparency as to the known data used as an input, the outcome cannot be verified".[510] In fact the outcome is easily verified. The "known data" comprise the fact that fire blight is present in the exporting countries (New Zealand and the United States); the fact that it is not present in the importing Member (Chinese Taipei), and the recorded volume of apples imported into Chinese Taipei. The inputs and outputs of applying the beta distribution were described in paragraphs 4.183 and 4.184 of New Zealand's first written submission.

2.352 In summary, the arguments put forward by Australia in an attempt to rebut the first fundamental flaw, are themselves flawed. They simply serve to underline the absence of any possible justification for using a value which represents a frequent occurrence, in a probability interval supposedly reflecting a "negligible" likelihood that "almost certainly" would not occur.

(b) Second fundamental flaw - the choice of a uniform distribution

2.353 In New Zealand's view the effect of Australia's choice of a maximum value of 1×10^{-6}, combined with Australia's choice of a uniform distribution to model key events with a negligible likelihood of occurring, is that negligible events that would "almost certainly not occur" are transformed into events that will occur with some frequency. The mid-point in such a probability range is 5×10^{-7}, or one in two million apples. New Zealand recalls that, according to the most likely value in the IRA, Australia expects to import from New Zealand 150 million apples per year.

2.354 Australia's response is that:

> …the probability of a particular event occurring is equally likely to be any probability value within the interval bounded by the minimum and maximum values of the distribution. In other words, the probability of an event happening is equally likely to be zero as one in a million or any value in between.[511]

[510] AFWS, para. 310.

[511] AFWS, para. 300.

2.355 Australia further notes that, "in a uniform distribution 'every value between the maximum and minimum value is equally likely to occur'".[512] These statements merely underline New Zealand's point. The choice of a maximum value is highly significant precisely because the probability of an event occurring is "bounded" within the range chosen.

2.356 As Australia notes, at each step of the model the "full distribution of output values" are taken forward to the next step. The choice of 1×10^{-6} (one in a million apples) as a maximum value therefore ensures that among those output values taken forward are those up to and including 1×10^{-6} (one in a million apples). The further choice of a uniform distribution means that every value between the maximum and minimum value is equally likely to occur. The mid-point of the probability range will be 5×10^{-7} (one in two million apples), meaning that 50% of the values generated by the @Risk simulation model will be greater than this. New Zealand notes that Dr Sgrillo confirmed that using a risk analysis software package that randomly selects numbers from within the uniform distribution effectively averages the higher and lower ends of the probability range.[513] By selecting a probability distribution resulting in a mid-point of 5×10^{-7} and applying this to something traded in millions of units (individual apples), Australia ensures that an event that "almost certainly would not occur" is assessed as being likely to occur numerous times each export season.

2.357 Clearly, had the IRA Team chosen a lower maximum value for negligible events, with a correspondingly lower mid-point, the result would have been a smaller probability range, and the probability values used as inputs by the model would have reflected this smaller range and lower mid-point. Equally, had the IRA Team applied a triangular or pert distribution with a most likely value at or below the mid-point, there would have been fewer values at the upper end of the distribution carried through in the analysis.

2.358 In summary, Australia's choice of a maximum value of 1×10^{-6} results in the inclusion of values that significantly over-estimate the risk. The uniform distribution

[512] AFWS, para. 313, citing NZFWS, para. 4.189.

[513] Sgrillo RPQ, Q 136.

then gives the same weight (or likelihood) to these values as it does to lower, more realistic values. The result is that within the output values taken forward there will be an over-representation of values that, given Australia's per apple methodology, predict that the event in question will occur with some frequency. To include these output values for steps in a pathway that would "almost certainly not occur", is to significantly overestimate the risk.

(c) The third fundamental flaw – volume of trade

2.359 The third fundamental flaw in Australia's risk assessment is that its estimate of the likely volume of trade, taken alone, inflates the assessed level of risk by a factor of at least three.[514] This flaw has a significant impact on Australia's assessment of risk because the higher the estimated volume of trade, the higher the overall assessed risk.

2.360 Australia has chosen to represent the annual trade volume with a range of 50 million to 400 million apples (5% to 40% of the Australian market), with a most likely value of 150 million apples (15% of the Australian market). New Zealand considers that the lower value on Australia's range, 50 million apples per annum, is in fact the "most likely" value.

2.361 New Zealand expects that demand for its apples will be limited in the Australian market because of: the clear Australian preference for locally sourced produce; the fact that the New Zealand varietal mix does not match Australian consumer preferences; and because there are limited opportunities for New Zealand to exploit any niche advantage it currently may have.[515]

2.362 Australia appears to accept New Zealand's limited ability to exploit any niche advantage.[516] It disputes the presumption that consumer preferences can be inferred from the composition of a country's production. It argues that the current composition of Australian production does not provide a template for the varieties of

[514] NZFWS, paras. 4.194-4.204.

[515] See NZFWS, para. 4.199.

[516] AFWS, para. 328.

New Zealand apples that Australian consumers would purchase.[517] In response, New Zealand submits that the relatively closed Australian market means consumer preference can be inferred from the composition of varieties grown locally.[518]

2.363 Australia does not challenge New Zealand's submission that Australian supermarkets have a policy of purchasing Australian produce except where it cannot be sourced in Australia.[519] For example, more than 95% of the fresh produce sold by Coles Myer, Australia's second biggest supermarket chain, is locally grown.[520]

2.364 The IRA ignored the economic impact that 150 million additional apple fruit would have on the Australian market.[521] New Zealand refers to analysis by ABARE that prices in the Australian apple market are sensitive to volume and that it is unlikely that New Zealand imports would make up a significant proportion of Australian domestic sales. That conclusion is reached on the basis of the size of the assumed reduction in the Australian domestic apple price required if New Zealand apples were to make up a significant proportion of domestic sales (which would render the Australian market less attractive to New Zealand exporters than alternative overseas markets). In its first written submission, Australia incorrectly claims that the ABARE report does not assist New Zealand's argument in relation to volume of trade.[522] But even the IRA correctly acknowledges that the ABARE analysis supports New Zealand's argument that the Australian market could not absorb a large volume of imports.[523]

2.365 Furthermore, New Zealand would not be in a position to supply 150 million apples per year to the Australian market because of existing supply commitments to the northern hemisphere and constraints on increasing the volume of apples produced for export.[524] Australia says, in response, that it is common for exporters to switch

---

[517] AFWS, paras. 325-327.

[518] NZRPQ, paras. 238-240.

[519] AFWS, paras. 331-333.

[520] See also NZRPQ, paras. 242-244.

[521] NZFWS, paras. 4.200-4.201.

[522] AFWS, para. 335.

[523] IRA, p. 18; see also NZRPQ, paras. 245-247.

[524] NZFWS, para. 4.202; see also NZRPQ, paras. 248-252.

markets.[525] However, Australia fails to appreciate that existing long-term relationships between New Zealand orchards and European importers have strengthened, due in part to consumer driven preferences for "safe food" with its associated contractual audit requirements. Through compliance with these requirements, New Zealand growers have increasingly been able to extract a price premium for apples supplied to the European market, and the long term contracts that have been secured give greater certainty for large export volumes. New Zealand growers are unlikely to wish to put such contracts at risk by switching to the Australian market, where such premiums are unlikely to be available. In addition, New Zealand's total volume of production has dropped in recent years, since peaking in 2004.

2.366 Finally, Australia also argues that treatment of fruit with 1-methylcyclopropene, marketed as SmartFresh™, will limit New Zealand's ability to profit from northern hemisphere markets from its counter-seasonal production, because it will extend the selling season for northern hemisphere fruit.[526] SmartFresh™ has been in use for several years. While New Zealand growers were initially concerned that northern hemisphere producers would use SmartFresh™ to extend their supply window at New Zealand's expense, these concerns have not materialised. SmartFresh™ has instead been used to maintain the quality of apples in shorter-term storage, rather than to extend the selling window. SmartFresh™ has not resulted in any negative impact on New Zealand apple exports to the United States or Europe.

2.367 In sum, Australia has failed to rebut New Zealand's arguments that the volume of trade will be significantly lower than the IRA's most likely value.

3. Fire blight

2.368 In its first written submission, New Zealand argued that Australia has failed to evaluate the likelihood of importation, establishment and spread of fire blight, or of the associated potential biological and economic consequences, in relation to imports

[525] AFWS, paras. 338-339.

[526] AFWS, para. 340.

of mature, symptomless apples from New Zealand. New Zealand's view, set out in its first written submission, is that the IRA is not supported by coherent reasoning or respectable scientific evidence, and accordingly does not meet the criteria for a valid risk assessment under Article 5.1.[527]

(a) Australia's assertion that New Zealand has made four key errors is incorrect

2.369 In its first written submission, Australia asserts that New Zealand has made four key errors in its argument that Australia's IRA is inconsistent with Article 5.1, namely that:[528]

a. *Japan – Apples* decides this case;

b. the spread of fire blight to other countries via trade in apple fruit has never been demonstrated;

c. populations of *E. amylovora* are insufficient at every stage of the pathway to initiate infection of fire blight; and

d. the Roberts and Sawyer 2008 study provides a "correct" assessment of the risk of fire blight introduction through apple fruit.

2.370 As New Zealand will show, none of these alleged "key errors" stands up to analysis and Australia has failed to rebut New Zealand's case.

<u>(i) New Zealand is not arguing that *Japan – Apples* decides this case</u>

2.371 New Zealand refers to paragraphs 2.306 to 2.311 above, in which the relevance of *Japan – Apples* to the present dispute is set out. Contrary to Australia's first written submission, New Zealand is not arguing that *Japan – Apples* "decides this case". As New Zealand indicated in its response to the Panel's question 116, the primary relevance of *Japan – Apples* to the present case is the recognition by the panel and Appellate Body in that case that pathways must have a basis in science before they can legitimately form part of a risk assessment. Pathways must be actual pathways, not merely hypothetical ones. Australia's risk assessment for fire blight

[527] NZFWS, paras. 4.208-4.265.

[528] AFWS, para. 350.

does not withstand scrutiny because it depends on a hypothetical pathway rather than one for which there is any scientific evidence. The same hypothetical pathway was the subject of scrutiny in *Japan – Apples* and was rejected because it lacked any scientific support.

(ii) New Zealand's argument that the spread of fire blight to other countries via trade in apple fruit has never been demonstrated is correct

2.372 All of Australia's fire blight measures depend upon the contention that there is a pathway for the introduction of the disease via mature, symptomless apples. Therefore, Australia needs to rebut New Zealand's case that there is no scientific evidence that mature, symptomless apples provide or could provide a pathway for the introduction of fire blight. Australia has failed to rebut New Zealand's case.

2.373 No evidence of the existence of such a pathway is contained in the whole of the IRA and thus the IRA fails to assess risk in accordance with Article 5.1.[529]

2.374 The only paper identified in Australia's first written submission in support of its contention that a pathway exists is Billing and Berrie 2002. The authors of that paper speculated that fire blight might have become established in England in 1955 via fruit boxes contaminated by rotting pears carrying *E. amylovora*.[530]

2.375 Australia describes the Billing and Berrie conference paper as an "example" (albeit the only one that Australia provides) of "internationally recognised research which indicates that risks may arise from apple fruit".[531] New Zealand notes, however, that Billing and Berrie's hypothesis was not referred to in the IRA itself. The fact the IRA did not refer to Billing and Berrie 2002 is unsurprising given the lack of evidence to support the hypothesis it mentions. Billing and Berrie themselves

[529] In addition, none of the experts have identified any scientific evidence supporting Australia's contention that a pathway exists for the introduction of fire blight via mature, symptomless apples.

[530] AFWS, paras. 357-358; **Exhibit AUS-26**.

[531] AFWS, para. 357.

only ever made appropriately modest claims in respect of their theory. Indeed, they expressly acknowledge the lack of supporting evidence.[532]

2.376 In response to a question from the Panel, Dr Deckers responded that Billing and Berrie 2002 "does not prove the way of introduction by mature fruit sufficiently scientifically."[533] Dr Paulin noted that it is clear the authors themselves were not providing any "scientific evidence", and that "[t]his cannot be considered to support the evidence relied upon by Australia."[534] Dr Paulin also observes that the authors suggest rotten pears as possible vehicles for the bacteria leading to introduction of fire blight in the South East United Kingdom, but never mature, symptomless apples. A hypothesis that pears are involved in the introduction of fire blight would not necessarily apply to apples in any event.

2.377 The Billing and Berrie paper is the sole basis of Australia's attempt to rebut New Zealand's point that the spread of fire blight to other countries via trade in apple fruit has never been demonstrated.[535] Billing and Berrie's paper is effectively also the only "evidence" advanced by Australia to support its central contention that mature symptomless apples could provide a pathway for the introduction of fire blight. As the experts have confirmed, Billing and Berrie 2002 does not constitute scientific evidence that supports Australia's contention that mature apples provide a pathway for introduction of fire blight. Moreover, subsequent studies cast even more doubt on the hypothesis that *E. amylovora* was spread by boxes contaminated by rotten pears.[536]

2.378 Even if the IRA had referred to Billing and Berrie 2002, the paper could not be regarded as scientific evidence that would support the conclusions in the IRA and thus meet the requirements of Article 5.1. The authors of that paper themselves

---

532 **Exhibit AUS-26**, p. 64.

533 Deckers RPQ, Q 17, p. 7.

534 Paulin RPQ, Q 17, p. 12.

535 AFWS, paras. 350 (2nd bullet), 353-362.

536 As described in Roberts *et al.* 1998: 23. The Pest Data Sheet on *E. amylovora* published by CABI and EPPO for the EU (**Exhibit NZ-6**) states at p. 4: "Bacterial ooze on fruit containers was supposed to have been the means for the first introduction into Europe but the risk of transmission on fruit is considered insignificant in current trade practice."

acknowledged the lack of physical evidence to support their hypothesis regarding boxes being contaminated by rotting pears.

2.379 No other scientific evidence is adduced by Australia to support its contention that a pathway exists for the introduction of fire blight via mature, symptomless apple fruit. Accordingly, Australia has failed to ensure that its risk assessment is supported by scientific evidence. It follows that Australia's risk assessment is not objectively justifiable.[537]

<u>(iii) Populations of *E. amylovora* are insufficient at every stage of the pathway to initiate infection of fire blight</u>

2.380 As New Zealand has noted earlier (para. 2.113 above), there is a consensus that, under natural conditions in an orchard environment, for transmission and infection to occur, large populations of actively growing *E. amylovora* would be required to be present during the early stages of flowering.[538] Studies such as those cited by Australia, in which *E. amylovora* was directly applied onto infection sites under controlled experimental and climatic conditions, do not reflect what would occur under natural environmental conditions, and are therefore of little relevance to an assessment of risk for the importation of apples.[539] This was confirmed by the experts in their responses to questions from the Panel. Dr Paulin noted that such experiments give very few useful indications for the description of events taking place in natural conditions.[540] Dr Paulin added that:

> …the experimental manipulation of very low level of bacterial populations (say less than 100cfu/ml) is extremely difficult to perform with a sufficient level of accuracy. In order to be sure to actually use this low number of cells, it is necessary to use

[537] The risk assessment therefore fails to meet the requirement set out by the Appellate Body in *Canada – Continued Suspension*, para. 590.

[538] NZRPQ, paras. 101-107.

[539] The studies on which Australia relies, such as Hildebrand 1937, were confined to *in vitro* or greenhouse conditions (as acknowledged in the IRA at p. 92), or even merely mathematical modelling using experimentally forced conditions under constant temperature (Cabrifega and Montesinos 2005, **AUS-37** – not referred to in the IRA). They cannot be relied upon as indicative of what occurs in an orchard environment, where a number of biological hurdles need to be overcome: UV radiation; nutrient availability; other competing microflora; host susceptibility (flower age); and fluctuating climatic conditions: Taylor *et al.* 2003b: 1

[540] Paulin RPQ, Q 27, p. 16.

particular statistical pattern of experiments, or special kind of experiments. Papers suggesting a minimal concentration threshold for infection by *E. amylovora* are not all really credible in this respect.[541]

2.381 Dr Paulin also observed that such experiments utilise actively growing cells issued from a culture on an artificial medium: "the few cells inoculated in these scientific papers are cells at their optimum capacity: artificially grown on suitable medium as pure culture, they are collected during their phase of exponential growth."[542] By contrast, the *E. amylovora* cells that would be present on the surface of a mature apple in the period after harvest would be dormant and unable to multiply.[543] Dr Paulin added that "In natural conditions, the bacterial cells would be placed in far less favourable conditions, and the number of cells needed to succeed in infection could be expected to be far higher."[544]

2.382 In a similar vein, Dr Sgrillo criticised the IRA for implying that "fruit with 1, 10 or 1 million bacteria has exactly the same probability of initiating an infection.[545] Dr Sgrillo referred to the existence of a dose-response curve, presenting an inoculum threshold below which no infection would occur.[546]

2.383 Accordingly, New Zealand maintains its submission that under natural orchard conditions, the number of *E. amylovora* that may, very rarely, be present on fruit will be low, dormant and declining, and as such will be insufficient to be transferred to susceptible hosts and initiate new infections.

2.384 The scientific evidence to which Australia refers, to support its argument that only small populations may be required to initiate infections, does not support the reasoning in the IRA, for the reasons New Zealand articulated in its responses to the Panel's question 63, namely that the studies on which Australia relies were confined to artificial conditions and cannot be relied upon as indicative of what occurs in an

[541] Paulin RPQ, Q 38, p. 19.

[542] Paulin RPQ, Q 38, p. 20.

[543] Paulin RPQ, Q 27, p. 16.

[544] Paulin RPQ, Q 38, p. 20.

[545] Sgrillo RPQ, Q 28, p. 7.

[546] Sgrillo RPQ, Q 28, p. 7.

orchard environment.[547] In their responses to questions posed by the Panel, the experts have also noted that the research relied upon by Australia gives very few useful indications for the description of events taking place in natural conditions,[548] that the probability of establishment is a function of the initial population size, and that the presence of insufficient bacteria may break the pathogen cycle.[549]

2.385 The one orchard based study which Australia relies upon in seeking to make its point, van der Zwet *et al.* 1994, does not reach any definite or consistent conclusions on the topic, as the question of the number of bacteria required for infection was not the primary subject of the research. Furthermore, infections resulting from the inoculation of negative controls, indicate a level of contamination in the study which will have affected interpretation of its results.[550]

2.386 Accordingly, as it is correct that populations of *E. amylovora* are insufficient at every stage of the pathway to initiate a fire blight infection under natural conditions, Australia is incorrect to say that New Zealand made a “key error” in making this point.

(iv) New Zealand is not arguing that the Panel should regard Roberts and Sawyer 2008 as the “correct” assessment of the risk of fire blight introduction through apple fruit

2.387 Australia alleges that New Zealand’s fourth “faulty assertion” is that Roberts and Sawyer 2008 should be adopted by the Panel in the present case as a “correct” assessment of the risk of fire blight introduction through apple fruit. New Zealand does not make such an assertion. Australia misunderstands the purpose of New Zealand’s reference to the Roberts papers.

2.388 Roberts *et al.* 1998 and Roberts and Sawyer 2008 are examples of a science based assessment of the phytosanitary risk associated with the movement of export-quality apple fruit to countries where fire blight does not occur.

[547] This was acknowledged by the IRA at p. 92.

[548] Paulin RPQ, Q 27.

[549] Sgrillo RPQ, Q 28.

[550] See also Dr Paulin’s description of the results obtained in the field by van der Zwet *et al.* 1994 as “just technical data”.

2.389 New Zealand does not claim that the assessment of likelihoods in Roberts and Sawyer 2008 is necessarily "correct". After all, the authors of that paper were attempting to assess the possibility of an event which has never been recorded as occurring. Nor does New Zealand consider that Roberts and Sawyer 2008 "prove" that mature apples are not a vector for the introduction of fire blight. Nevertheless, the Panel is entitled to look at the conclusions in Roberts and Sawyer 2008 and Roberts *et al.* 1998 in considering whether the conclusions in the IRA are supported by the scientific evidence.

2.390 Australia's attempts to discredit the two Roberts papers do not detract from the fact that Australia must ultimately rebut New Zealand's case that there is no scientific support for Australia's risk assessment, something Australia has failed to do.

2.391 In the two Roberts papers, the authors employed a statistical model to estimate the likelihood of fire blight outbreaks in new areas due to commercial apple fruit shipment. They conservatively used a non-zero estimate for transmission from infested apple to susceptible host, even though there was "no evidence a step in the hypothetical pathway could be completed".[551] Otherwise, if zero had been used for the transmission stage, their model would have predicted the number of years before an outbreak of fire blight to be infinite. Australia asserts that its own estimate for "exposure" was lower than that in Roberts and Sawyer 2008, "thereby indicating that the IRA Team did not overestimate this likelihood or the risk."[552] Although Australia is happy to claim support from Roberts & Sawyer when it suits it to do so, Australia fails to acknowledge Roberts & Sawyer's qualification that there is no evidence to support the completion of the pathway at the exposure stage. Australia simply does not address the issue of the absence of evidence to support the existence of a pathway.

2.392 Roberts and Sawyer concluded that the risk of importing *E. amylovora* on commercial apple fruit, and the concomitant risk of establishing new outbreaks of fire blight is so small as to be "insignificant". Attempting to quantify that descriptor, Roberts and Sawyer 2008 estimated the chance of an imported apple being contaminated with *E. amylovora* and passing that contamination on to an uninfested

[551] Roberts & Sawyer 2008: 363.

[552] AFWS, para. 478.

host in a fire blight free area and an infection occurring as about 1 in 4.3 trillion apples.[553] This is approximately 1300 times less likely than Australia's median PEES estimate, which assesses that 1 in every 3.3 billion apples will be contaminated with *E. amylovora* and pass that contamination on to an uninfested host in a fire blight free area with an infection occurring.[554]

2.393 None of Australia's criticisms of the Roberts papers has any merit. First, Australia's argument[555] that Roberts and Sawyer 2008 is not a risk assessment which meets the definition in Annex A(4) of the *SPS Agreement* because it fails to consider the consequences of entry, establishment and spread, is incorrect. According to international standards, a risk assessment is not always required to proceed to an analysis of consequences.[556] Australia's own risk estimation matrix illustrates this point – if the likelihood of entry, establishment and spread of a pest is assessed as "negligible" then the risk will always be "very low" (and will thus meet Australia's ALOP) even if the consequences are "extreme".[557] In such a case, where the risk of entry, establishment and spread was negligible, even the IRA acknowledges it would be pointless to go on and assess the consequences.[558] As Roberts and Sawyer 2008 concluded the risk of entry, establishment and spread is negligible, there was simply no point in going on to consider consequences.

2.394 Second, contrary to Australia's submission, Roberts and Sawyer 2008 included results from orchards not subject to phytosanitary measures and was

[553] Roberts and Sawyer 2008: 367 Table 2 estimates, for S3 (orchards with no phytosanitary requirements imposed for *E. amylovora*), 1 fire blight outbreak every 217,925 years, based on trade of 20 million apples per annum This equates to 1 apple in every 4.3587 trillion apples.

[554] IRA, Table 21, p. 97. The median overall probability of entry, establishment and spread where a small proportion of apples are handled through orchard based wholesalers is 4.4 x 10^{-2} which equates to one instance of entry, establishment and spread every 22 years. Based on the most likely volume of New Zealand apples which the IRA considers would be imported, 150 million apples per year, it can be ascertained that the IRA assesses that 1 in every 3.3 billion apples will be contaminated with *E. amylovora* and pass that contamination on to an uninfested host in a fire blight free area with an infection occurring.

[555] AFWS, para. 363.

[556] ISPM 2 (2007) Guidelines for Pest Risk Analysis, section 1.5; OIE handbook, Article 1.3.2.4 – (September 2008).

[557] AFWS, Table 2, p. 59.

[558] See for example IRA, Table 14, p. 47 in which pests are classified as being "on the pathway" or not. If pests are not "on the pathway" they are not considered further.

designed to assess the risk of fire blight being introduced as a result of the export of apples from areas with no measures in place.[559]

2.395 Third, Australia is wrong to claim that the studies cited in the Roberts papers were not sensitive enough to detect the very low numbers of *E. amylovora* on apple fruit. In Roberts *et al.* 1989, from which came 1,555 of the mature fruit used in the later Roberts papers, the authors employed detection sensitivities of 20-30 cells per fruit. Despite such sensitivity, no *E. amylovora* was detected on any of the fruit in Roberts *et al.* 1989. Furthermore, New Zealand notes that the IRA specifically mentions Roberts *et al.* 1989 in the context of the IRA's statement that there was no justification or evidence to show systematic underestimation of bacterial numbers because of lack of sensitivity in the studies cited by the IRA.[560]

2.396 Fourth, Australia's criticism that Roberts and Sawyer 2008 is inapplicable because it did not involve trade in apples from New Zealand to Australia is invalid. For fire blight there has been no evidence presented to suggest that the biology of *E. amylovora*, or the epidemiology (spread) or etiology (cause) of fire blight disease, differs between countries. *E. amylovora* is a very homogenous species.[561] Furthermore, Roberts *et al.* 1998: 20 observed that similar conditions exist with respect to the incidence of fire blight in the growing regions of New Zealand and the

[559] Roberts and Sawyer 2008 used the three scenarios that were used by Roberts *et al.* 1998, S1, S2, and S3, to represent orchards meeting different phytosanitary standards. S3 represented orchards with no phytosanitary requirements imposed for *E. amylovora*. Table 1 of Roberts and Sawyer 2008 shows that 3144 of the 5407 fruit tested came from S3 orchards. Both Roberts *et al.* 1998 and Roberts and Sawyer 2008 estimated the risk of introduction of fire blight associated with the importation of apples from orchards with no phytosanitary requirements imposed for *E. amylovora*. New Zealand's calculation, extrapolated from Roberts and Sawyer 2008 and taking into account the IRA Team's (inflated) most likely volume of trade of 150 million apples, that an outbreak of fire blight in Australia caused by a New Zealand apple would be expected to occur once in 29,057 years is not based on an assumption that significant risk management measures would be in place in 95% of New Zealand orchards (cf AFWS, para. 369). Rather, New Zealand's calculation of 29,057 years assumes (as did the Roberts studies) that 95% of apples come from orchards with infestation levels consistent with S1 and S2 orchards, even if no phytosanitary measures were in place.

[560] IRA, p. 57.

[561] Vanneste JL 1995. *Erwinia amylovora*. In: Singh US, Singh RP, Kohmoto K, eds. *Pathogenesis and Host Specificity in Plant Disease: Histopathologies, Biochemical, Genetic and Molecular Bases; vol. 1., Prokaryotes*. Oxford, UK: Pergamon Press, 21–41, at p 22. Roberts *et al.* 1998: 23-24 reports that divergences among strains of *E. amylovora* have not been associated with any particular adaptation of the bacterium to a specific environmental requirement or new host

Western United States, and in any event nearly half of the fruit assayed in the study was actually from New Zealand.[562]

2.397 Fifth, Australia's criticism of the use of an upper confidence limit of 50% in calculating the value for the hypothetical transmission step is misconceived.[563] Roberts and Sawyer 2008 expressly refused to acknowledge that a positive value should be assigned for the risk of transmission, given the lack of scientific evidence for it and the existence of scientific evidence against it. They described the value used for P5, the probability that *E. amylovora* is transferred to a new host and infection occurs, as an "inflated hypothetical value",[564] and said that there was no scientific evidence to support using a non-zero value for this step, and that the available scientific evidence in fact indicated that the pathway would not be completed at the transmission stage. As confirmed by the experts selected by the Panel in the present case, there is no evidence of a pathway from mature fruit to flower infection in orchard conditions (or even in the laboratory).[565] Roberts and Sawyer nevertheless observed that even using inflated hypothetical values for this step, the theoretical probabilities were "extraordinarily low".

2.398 Finally, Australia's suggestion that Roberts and Sawyer 2008 actually supports the conclusions in the IRA is incorrect.[566] In making such a suggestion, Australia appears to have ignored Roberts and Sawyer's overall conclusion that the risk of importing *E. amylovora* on commercial apple fruit, and the concomitant risk of establishing new outbreaks of fire blight, is so small as to be insignificant. Australia has adduced no evidence to rebut those propositions, just as it has adduced no evidence to support its contention that mature symptomless apples provide a pathway for the introduction of fire blight.

[562] Citing Thomson and Hale 1987: 96.

[563] Cf IRA, p. 44 where the IRA itself recognises that it can be inappropriate to use "extreme percentiles"/ "worst case values" because this can lead to a "very significant overestimate of the risk".

[564] Roberts and Sawyer 2008: 363.

[565] See for example Dr Paulin's comment as part of his response to Question 27 that "[t]he spread of surface population from fruit to infection sites is similarly hard to imagine, especially because these non-multiplying cells are not embedded in exudate, and therefore not attractive to insects or other vectors. In artificial inoculations, bacterial populations at low level need to be placed very precisely at the right site of infection, to successfully infect its host plant (Cross *et al.*[1972]). This is probably a difficulty impossible for the bacteria to tackle in natural conditions."

[566] For example at AFWS, paras. 371 and 478.

(b) There are problems with Australia's analysis of its 'importation steps'

2.399 In the IRA, Australia divides its hypothetical pathway into steps (described as an "importation scenario") and ascribes probability values to each of those steps. First, Australia purports to estimate the number of apples entering Australia with *E. amylovora* on them. Then, the IRA purports to estimate the likelihood of transfer of *E. amylovora* from an apple to a susceptible host plant, and then to estimate the likelihood of fire blight establishing and spreading in Australia.

2.400 A significant problem with Australia's IRA, however, is that there is no rational or objective relationship between the scientific evidence that Australia cites for several of the steps in its "importation scenario", and the probability value that is chosen for those steps. In other words many of the particular conclusions drawn by the IRA do not find sufficient support in the scientific evidence relied upon.

2.401 In its first written submission, New Zealand challenged the probability values which the IRA assigns to each of importation steps 1-7.[567] Australia has failed to rebut New Zealand's challenges. New Zealand therefore maintains the position that, in relation to all of these steps Australia has overstated the applicable probability values and that the conclusions in the IRA do not find sufficient support in the scientific evidence relied upon. For this reason the IRA is not objectively justifiable. Moreover, for several of the fire blight importation steps, Australia assigns particular probability values without any scientific basis.

<u>(i) Importation step 1</u>

2.402 Importation step 1 addresses the presence or absence of *E. amylovora* in source orchards in New Zealand. In its first written submission, New Zealand noted that this step has been grossly overestimated, at 100%, by Australia.[568] Australia has failed in its first written submission to point to any scientific evidence that *E. amylovora* is present in every source orchard in New Zealand. Rather, the evidence suggests *E. amylovora* is not always present in New Zealand source orchards. Hale *et*

[567] NZFWS, paras. 4.208-4.235. New Zealand did not challenge the probability value (1) assigned to importation step 8 (likelihood that *E. amylovora* remains with the fruit after on-arrival minimum border procedures) but criticised the importation step itself as not being meaningful.

[568] NZFWS, paras. 4.209-4.212.

al. 1987 surveyed 10 orchards, and *E. amylovora* was not detected on apple flowers from 5 orchards where no fire blight symptoms were seen, suggesting that the pathogen was not present in these orchards. Clark *et al.* 1993 tested approximately 60,000 immature apple fruit calyxes from 10 orchards free of fire blight symptoms and again no *E. amylovora* was detected. It seems highly improbable that if *E. amylovora* was present in all of those orchards, as Australia asserts, no *E. amylovora* would have been recovered from any of the fruit tested.

2.403 New Zealand also notes that the experts selected by the Panel consider that the IRA's conclusion in relation to importation step 1 is not sufficiently supported by scientific evidence. Dr Paulin noted that "if the probability of 1 means that all orchards are contaminated by *E. amylovora* each year, it is probably a mere exaggeration…each apple orchard symptom-free in New Zealand may be temporarily contaminated by *E. amylovora*, not permanently. Therefore the chance for apples to be sourced from orchards harbouring *E. amylovora* should be significantly less than one."[569] Dr Sgrillo concluded that the scientific evidence presented in the IRA did not support its conclusion that *E. amylovora* is present in every source orchard in New Zealand: "The IRA's assessment is not sufficiently supported…the results show that it would be possible to find orchards free from *E. amylovora*."[570] Dr Schrader also considered that: "The assumption, that orchards in New Zealand are 100% infested with *E. amylovora*, lacks sufficient scientific evidence."[571]

<u>(ii) Importation step 2</u>

2.404 Importation step 2 relates to the likelihood that picked fruit is infested or infected with *E. amylovora*. New Zealand pointed out in its first written submission that Australia has greatly overestimated this likelihood.[572] The experts also considered that the IRA's conclusion in relation to this step is not sufficiently supported by the scientific evidence. Dr Paulin indicated that, in relation to the infestation of mature fruit, Australia's overall "evaluation <u>is not scientifically based</u>,

[569] Paulin RPQ, Q 22 (f), p. 14.

[570] Sgrillo RPQ, Q 22 (d), (e), p. 3.

[571] Schrader RPQ, Q 22, p. 4.

[572] NZFWS, paras. 4.213-4.220

cannot be objective, and…is just not credible as a whole."573 Dr Deckers concluded that the IRA's assessment "doesn't take into account the sporadic character of the fire blight disease."574 Dr Deckers also noted that "the value of 3 x 10^{-2} seems to be quite a high rate of picked fruit being infected with EA."575

a. Infestation of mature fruit

2.405 It follows from Australia's conclusion in relation to importation step 1, that it considers that *E. amylovora* is constantly present, even in orchards with no symptoms of fire blight, despite the evidence to the contrary, including that fruit from asymptomatic orchards are extremely unlikely to harbour the bacteria.[576]

2.406 Australia now concedes that it was wrong, however, to rely on Clark *et al.* 1993's apparent finding that 14.7% of immature fruit from an orchard with no fire blight symptoms were found to be infested with *E. amylovora*: the finding relied on from that paper actually relates to an orchard with fire blight symptoms, but the paper contains a typographical error.[577] Australia nevertheless downplays New Zealand's objection as "inconsequential", claiming that it did not place significant weight on that aspect of the study. New Zealand observes, however, that the IRA expressly relies on the data from Clark *et al.* 1993, even dismissing a sceptical stakeholder's insightful question as to how a figure of 14.7% could possibly have been derived from an orchard with no symptoms.[578]

2.407 In its first written submission, Australia claims that the IRA Team took into account that apples could be sourced from anywhere in New Zealand, irrespective of the fire blight status of the orchards.[579] But Australia admits, however, that the IRA

[573] Paulin RPQ, Q 24, p. 15. (Emphasis in original.)

[574] Deckers RPQ, Q 25, p. 10.

[575] Deckers RPQ, Q 24, p. 10.

[576] Thomson 2000: 17; Roberts *et al.* 1998: 23; Hale *et al.* 1987: 37.

[577] AFWS, para. 392; NZFWS, para. 4.214. (**Exhibit NZ-53**). The typographical error was the omission of an asterisk in table 2, p. 64 next to Orchard "V" to indicate that, on further inspection, fire blight symptoms were seen in that orchard (explaining why some of the fruit from that orchard were infested). Despite the omission in table 2, the text on p. 62 of the paper indicates clearly that Orchard V was showing symptoms of fire blight.

[578] IRA, p. 56.

[579] AFWS, para. 384.

Team gave "much less weight" to studies that found no evidence of *E. amylovora* on mature apples.[580] This is clear from the fact that all of the studies relied upon at table 4 of Australia's first written submission were of apples from orchards with fire blight.[581] Table 4 accordingly overestimates the likelihood of infestation by referring to studies that were biased towards detecting *E. amylovora* because they preferentially included orchards where fire blight was known to be present. In one case (Sholberg *et al.* 1998), an experimental orchard where apple trees were interplanted with heavily blighted pear trees was included.[582] The consequence of such a bias in results is that Australia has grossly over-estimated the likelihood of mature apples carrying live *E. amylovora*.

2.408 Moreover, New Zealand considers that several of the other studies referred to in table 4 should be disregarded. Despite Australia's assertion to the contrary,[583] New Zealand maintains that the van der Zwet *et al.* 1990 fruit injury experiment appears to have involved immature fruit, given the time of the year at which the fruit in that experiment were harvested, and the fact that the paper itself does not identify the fruit as mature.[584] Australia's assertion in the IRA that the fruit used in the fruit injury and inoculation experiments were mature, is without foundation.[585] Dr van der Zwet also noted in his paper that the unusually high concentration of bacterial inoculum used may have overstated the predisposition associated with injuries.

---

[580] AFWS, para. 385, citing IRA, p. 65.

[581] AFWS, p. 140.

[582] Roberts and Sawyer 2008: 366-368 illustrates the need for caution when using data that has a particular bias such as that relied upon by Australia. That study calculated the probability of fruit being contaminated with *E. amylovora* in orchards where no phytosanitary requirements are implemented for *E. amylovora* at 0.0013817, not 0.0200382 as incorrectly stated by Australia at AFWS, para. 400. Roberts and Sawyer 2008: 365 explains that the higher figure represents the contamination rate derived from a "highly biased sample given that most of the fruit were selected because of their close proximity to fire blight disease. The lower figure (0.0013817) was instead calculated to represent a hypothetical stratified random sample of fruit from areas without phytosanitary measures. Roberts and Sawyer 2008: 367-368 criticise Yamamura *et al.* (2001) for doing what Australia has mistakenly done in the IRA and in Table 4 of AFWS: "The sum of all infested fruit, from all studies, was divided by the sum of all fruit assayed…While this is the correct method of obtaining a ratio estimate of the proportion infested among all studies reported in Table 1 (Roberts *et al.* 1998), it is inappropriate for the purpose at hand. This is because the data in Table 1 do *not* represent a random sample of fruit shipped from any production area, as assumed by Yamamura *et al.* (2001)….it is certain to be too high, overestimating the true rate of infestation."

[583] AFWS, para. 395.

[584] See also para. 2.116 above, referring to Dr Paulin's question in RPQ, Q 33, p. 18, as to whether the apple fruit in van der Zwet 1990 were mature.

[585] IRA, p. 56.

2.409 In addition, Dr van der Zwet's declaration[586] clearly indicates that the results of his study, which used fruit sourced from heavily infected orchards in West Virginia, were not relevant for the purposes of setting quarantine restrictions, a point he makes repeatedly throughout. Australia appears to have ignored this crucial qualification, despite going to the trouble of putting Dr van der Zwet's declaration to this effect before the Panel. Further, Dr van der Zwet's paper indicates that "[m]oreover, all information is indicative that fruit from asymptomatic trees at harvest time are not likely to be infested with the bacterium."[587] Dr Paulin criticised Australia's reliance on van der Zwet *et al.* 1990 due to "the complexity of the design of the paper",[588] and said that it should have been removed from table 4 of Australia's first written submission.[589] Dr Paulin also said that van der Zwet at al. 1990 can be "considered as irrelevant for the case."[590]

2.410 Table 4 of Australia's first written submission also refers to data from McManus and Jones 1995, a study which did not differentiate between live and dead cells. The IRA acknowledged that "this data would not provide an accurate estimation of calyx infestation rates by *E. amylovora*",[591] and that "often extremely sensitive techniques such as PCR are of limited use because they are unable to distinguish between dead and live bacteria.[592] New Zealand therefore finds it inexplicable as to why the McManus and Jones 1995 data appears in table 4 of Australia's first written submission. Australia's claim that the study "provides support for the possibility that many of the older studies may have significantly underestimated the number of mature apples carrying *E. amylovora*"[593] appears to be untenable, especially in light of the comment in the IRA that "there is no justification or evidence to show that the bacterial numbers reported in the scientific papers cited

[586] **Exhibit AUS-32**.

[587] van der Zwet *et al.* 1990: p 715 (**Exhibit AUS-31**).

[588] Paulin RPQ, Q 6(b), p. 4.

[589] Paulin RPQ, Q 24, p. 15.

[590] Paulin RPQ, Q 33, p. 18.

[591] IRA, p. 56.

[592] IRA, p. 57.

[593] AFWS, para. 403.

above were systematically underestimated because of lack of sensitivity".[594] Australia has no justification for adopting an approach on this point in its first written submission that is inconsistent with the approach taken in the IRA.

2.411 Indeed, Australia's reference to McManus and Jones in Table 4 of its first written submission has startling implications. Despite the comments in the IRA, Australia now seems to be saying that it is legitimate to include dead *E. amylovora* cells in its calculation of the probability of entry, establishment and spread of fire blight. New Zealand firmly rejects such an argument – dead cells could not be involved in the initiation of an infection – and notes that Australia's reliance on such data is further evidence that the likelihoods calculated for importation steps 1-8 are grossly exaggerated.

2.412 Similarly, the data from Sholberg *et al.* 1988 that appears in Table 4 should be disregarded. The Sholberg paper is an extreme example involving an unusual situation where pear trees that were severely infected with fire blight were interplanted adjacent to apple trees.[595] In addition, there were climatic conditions highly conducive for the survival of epiphytic bacteria. The Okanagan Valley of British Columbia very rarely experiences relative humidity above 75%. During the year in which the experiments were conducted, the average humidity at harvest was approximately 35%. Low relative humidity is considered to be one factor that contributes to the epiphytic survival of *E. amylovora*.[596] New Zealand's relative humidity is typically greater than 75%. [597]

2.413 In summary, for the reasons outlined, New Zealand considers that the data from the McManus, van der Zwet and Sholberg studies should not have been relied on in Australia's assessment of the probability range for importation step 2. Inclusion of such data has led to a probability range that is grossly inflated.

---

[594] IRA, p. 57.

[595] See also Dr Paulin's response to Question 24, p. 15 in which he observed that the data from Sholberg was "was probably very different from a normal situation, that would be an orchard devoted to export of apples".

[596] Rosen 1938; Maas Geesteranus and de vries 1984.

[597] See the mean relative humidity spreadsheet at http://www.niwa.co.nz/education-and-training/classroom-resources/resources/climate/humidity

2.414 Australia refers to a recent study by Ordax *et al.*[598] to support the submission that a viable but non-culturable (VBNC) state can exist in the calyces of mature apples.[599] This study relies on highly artificial laboratory conditions and does not show that VBNC *E. amylovora* occur under natural conditions, or can exist in export quality mature, symptomless fruit. It does not come close to replicating what occurs in the real world of growing, harvesting and processing apples for export. No evidence has been presented that VBNC bacteria have any epidemiological significance in the spread of bacteria via apple fruit, or that VBNC populations of *E. amylovora* occur in nature. The comments of Roberts and Sawyer 2008: 365 continue to apply regarding the lack of:

> …any evidence that [the VNBC] state is epidemiologically significant with regards to natural populations of Ea or the initiation of fire blight disease, there is no path to inclusion of VNBC cells of Ea in the PRA other than speculation, which would be inappropriate and contrary to the stated goal of providing a quantitative assessment of risk. Given the total absence of such data, it is inappropriate to speculate how such a state, should it ever be demonstrated to occur naturally with Ea, might influence our understanding of fire blight epidemiology. Given that the extremely low incidence of culturable Ea cells reported in the scientific literature is entirely consistent with the historical fact of non-transmission of Ea and fire blight via commercial apple fruit and the lack of a demonstrated pathway by which such an event could occur, it would be a striking development indeed should data eventually be published proving a causal relationship between Ea in a VBNC state on fruit and the establishment of fire blight disease.

2.415 In response to the Panel's question regarding the scientific evidence supporting ability of *E. amylovora* to enter a VBNC state, Dr Paulin observed that a very low proportion of cells would be able to survive as VBNC and that there is a "complete absence of data on the occurrence of VBNC for *E. amylovora* in natural conditions."[600] Indeed, the IRA itself acknowledges that the conditions under which

[598] **Exhibit AUS-36**.

[599] AFWS, para. 405.

[600] Paulin RPQ, Q 42, p. 21. See also Q 24, p. 15.

VBNC studies have been conducted differ significantly from those present on apple trees under natural conditions.[601]

b. Infection of mature fruit[602]

2.416 Due to the limited transparency of the IRA, it is unclear just how much weight it gave to what Australia now argues in relation to endophytic infection. Furthermore, Australia's position on infectivity of mature fruit keeps changing. In its first written submission, Australia stated that it "disagrees with New Zealand's assertion that infection of mature fruit does not occur and cannot serve as a source of new infection."[603] Moreover, the IRA refers throughout to risks associated with infected apples, which indicates that the IRA team must have given such risks some weight.[604] Some steps in the analysis (for example, importation step 7) appear to depend entirely on the contention that mature fruit may be endophytically infected.[605] The IRA states that: "On the basis of the work reviewed in Imp2 the IRA team concluded that endophytic infection was not a risk factor for fruit sourced from orchards free from symptoms".[606] This indicates that the IRA Team did consider endophytic infection to be a risk factor for fruit from orchards with symptoms. Furthermore, the IRA, in considering the effectiveness of chlorine treatment, states that such treatment would not be fully effective against bacteria protected in the tissue, including those "in symptomless infected fruit."[607] However, more recently, in its comments on the experts' responses to questions posed by the Panel, Australia has begun to assert that the IRA did not consider risks associated with endophytic

[601] IRA, p. 58.

[602] New Zealand notes that Australia appears to concede that there is no scientific evidence to support any measures being based on endophytic infection of mature fruit. Nevertheless it is New Zealand's position that the IRA's assessment of the risk associated with the importation of fruit from New Zealand assumes that endophytic infection of mature fruit does occur and that there are risks associated with endophytic infection: see NZCACER, para. 36.

[603] AFWS, para. 78.

[604] IRA, pp. 52, 53, 55, 62, 63, 64, 74, 78, 79, 80, 85, 86, 95, 105, 106, 108, 109.

[605] IRA, p. 79.

[606] IRA, p. 106.

[607] IRA, p. 108.

infection of mature fruit.[608] But it is simply not open to Australia to retrospectively exclude from the Panel's consideration the IRA's treatment of endophytic infection.

2.417 The experts confirmed the absence of scientific evidence of the endophytic infection of mature apples by fire blight. Dr Paulin stated that "[he] do[es] not know of any description of internally infected symptomless mature fruits."[609] Dr Deckers said that "[t]he chance to find an endophytically infected fruit that develops to a healthy looking mature fruit is not sufficiently scientifically documented in the fire blight epidemiology."[610] He also said that "there is not sufficient qualified research available that indicate the importance of endophytic populations of *Erwinia amylovora* in apple fruits."[611]

(iii) Importation step 3

2.418 Importation step 3 addresses the potential for apples being harvested and transported to packing houses to be contaminated with *E. amylovora* that may be present, for example, in ooze on trees, or on the hands of pickers, picking bags, bins or machinery. Although Australia's first written submission asserts that the IRA reached its conclusions in relation to this step "on the basis of the scientific literature",[612] it is apparent that those conclusions do not find sufficient support in the "scientific literature" relied upon. The only scientific paper relied upon in the IRA to support Australia's contamination theory is Ceroni *et al.* 2004. As the IRA acknowledges, however, this paper was based on assumptions, in relation to the transfer of bacteria, that were "extreme or worst case ones". Also, the paper related to pears and the IRA acknowledges that it was "difficult to extrapolate to apples", concluding that "these data are not particularly useful in estimating the likelihood of contamination of clean fruit during picking and transport."[613]

[608] ACER para. 56.

[609] Paulin RPQ, Q 6, p. 3.

[610] Deckers RPQ, Q 6, p. 3.

[611] Deckers RPQ, Q 7, p. 4.

[612] AFWS, para. 412.

[613] IRA, p. 70.

2.419 The IRA also concedes that "the likelihood of the presence of epiphytic bacteria on leaves and mature fruit surface (except calyx) at the time of apple picking is very small, and the likelihood of transfer of bacteria to clean fruit during picking and transport would be even lower."[614] In short, there is no documented evidence of this type of contamination of fruit.

2.420 Despite these concessions in the IRA, and the lack of any scientific evidence to support its contamination theory, Australia is nevertheless prepared to assign to this step a triangular distribution with a maximum value of 3%, a minimum value of 0.1%, and most likely value of 1% (equating to contamination of 1.5 million apples annually, according to Australia's inflated estimate of the most likely volume of trade). The absence of scientific evidence in relation to contamination is at odds with the use of a triangular distribution which, the IRA claims, is "used when information (for example, literature and expert opinion) on the most likely value is available.[615] The experts considered that the IRA lacked sufficient scientific evidence for its conclusions in relation to this step. Dr Sgrillo noted that the "scientific evidence is scarce"; that "[t]he conclusions of the IRA are not well supported"; and that the available scientific evidence is not sufficient to support the IRA's evaluation.[616] Dr Paulin noted that *E. amylovora* "cannot multiply, but only survive, with decreasing population on contaminated surfaces." He went on to note that "[m]ature fruits are then concerned only at best with transient populations, which are likely to be soon disappearing.…Therefore mature symptomless fruit will not bring in a packing house significant population of *E. amylovora* on their surface. Consequently, the evaluation of risk for this step seems too high, for mature, symptomless fruits."[617] Dr Deckers stated that "the overall chance of 1% seems to be rather high when the fire blight infections are only sporadically present in an orchard."[618]

[614] IRA, p. 69.

[615] IRA, p. 42. See, generally, Dr Sgrillo's comments that it is inappropriate to use a triangular distribution in circumstances where there is no factual evidence of a most probable value: eg Sgrillo RPQ, Qs 78, 80 and 135, pp. 13, 14 and 29-30.

[616] Sgrillo RPQ, Q 26, pp. 5-6.

[617] Paulin RPQ, Q 26, pp. 15-16.

[618] Deckers RPQ, Q 26, p. 11.

2.421 When the responses from the experts are taken into account, it is clear that the IRA's conclusions in relation to step 3 are not supported by scientific evidence and that the probability values chosen are exaggerated. Nevertheless, this step has major importance in the IRA's overall assessment of the likelihood of importation of fruit with *E. amylovora*. Pathway 6, which relies on Australia's conclusions about clean fruit being contaminated during picking and transport, accounts for nearly 16% of the apples which the IRA claims will arrive in Australia bearing *E. amylovora*.[619]

<u>(iv) Importation step 4</u>

2.422 Importation step 4 relates to the likelihood of *E. amylovora* surviving packing house procedures. In its first written submission, New Zealand pointed out that, in reaching its conclusions in relation to this step, the IRA had ignored the impact of cold storage on the survival of *E. amylovora* on apple fruit.[620] In response, Australia has indicated its agreement that the scientific literature confirms that the number of *E. amylovora* bacteria on or in apples declines with storage.[621] Australia argues that this does not matter because only one bacterium needs to survive under the risk scenario it has evaluated.[622] New Zealand has already rebutted Australia's argument that only one bacterium is sufficient to initiate an infection in its arguments under Article 2.2.[623] New Zealand has adduced evidence that, for transmission and infection to occur in an orchard environment, large populations of *E. amylovora* are required in the early stages of flowering.[624] There is no scientific evidence that, in orchard conditions, a single bacterium or low numbers of bacteria can initiate infections.

2.423 In his responses to questions posed by the Panel, Dr Sgrillo expressed doubts about Australia's contention that even a single bacterium would suffice, according to its risk scenario, for the introduction of fire blight via mature, symptomless apples. Dr Sgrillo rejected Australia's implicit hypothesis that fruit with 1, 10 or 1 million

[619] This can be observed from Annex 1.

[620] NZFWS, para. 4.226.

[621] AFWS, para. 422.

[622] AFWS, paras. 362, 404, 421, 459.

[623] See paras. 2.112 to 2.117 above.

[624] NZFWS, para. 4.244 citing Thomson and Gouk 2003: 1; 267 Taylor *et al.* 2003b: 332.

bacteria has exactly the same probability of initiating an infection.[625] Rather, Dr Sgrillo observed that "[i]t is known that the probability of establishment is a function of the initial population size."[626] Dr Sgrillo also noted that "[t]he dose-response curve may present a threshold for the inoculum's concentration, below which no infection will occur….If it is accepted that there is a relationship between the dose of inoculum and the probability of starting a new infection then the decrease of quantity of inoculum may be enough to break the pathogen cycle, having the same effect as the total elimination of the inoculum."[627]

2.424 Australia's reference to Temple *et al.* 2007, to support an argument that bacteria survived better on fruit in cold storage than at room temperature, has been taken out of context.[628] The overall conclusions supported by the experimental data from this paper were that the presence of *E. amylovora* on commercially produced fruit is itself exceptionally rare, and that "epiphytic survival of *E. amylovora* through a post harvest chilling period is expected to be an exceptionally rare event given the unrealistically high population size required for persistence." Taylor and Hale 2003 showed that on apple fruit > 104 cfu[629] of *E. amylovora* are required to persist through a normal cold storage period. This is a level far greater than those found to occur on calyces of infested apple fruit at harvest. It follows that the number of bacteria which would, very rarely, be present at harvest time on mature, symptomless apples are unlikely to be present at time of sale in Australia.

2.425 Similarly, Australia's reliance on the Ordax experiments is misplaced.[630] Those experiments involved a hypothetical situation and were conducted under ideal conditions in a laboratory. As Dr Paulin confirmed in his responses to questions posed by the Panel, there is a "complete absence of data on the occurrence of VBNC

[625] Sgrillo RPQ, Q 28, p. 7.

[626] Sgrillo RPQ, Q 28, p. 7.

[627] Sgrillo RPQ, Q 28, p. 7.

[628] AFWS, para. 424.

[629] Colony forming units.

[630] AFWS, para. 425.

for *E. amylovora* in natural conditions.[631] In other words, there is no scientific evidence that *E. amylovora* exist in VBNC form under natural conditions.

(v) Importation step 5

2.426 Importation step 5 relates to the likelihood that clean fruit will become contaminated by *E. amylovora* during processing in the packing house. As for importation step 3, the IRA provides no scientific evidence to support the contention that such contamination does or could occur. Again, however, despite the complete lack of scientific evidence, the IRA Team considers a triangular distribution to be appropriate, with a maximum value of 5%, a minimum value of 0.1%, and most likely value of 2.5% (this would equate to 3.75 million apples annually, according to Australia's inflated estimate of the most likely volume of trade).[632] Dr Paulin noted that "[v]ery few scientific data, if any, support the risks of contamination of fruits by *Erwinia amylovora* in the packing houses."[633] Dr Paulin considered that the "probability suggested in the IRA seems to be strongly exaggerated."[634] Dr Sgrillo stated that "The scientific evidence presented in IRA does not guarantee the probability range chosen" and that the scientific sources relied upon by the IRA do not support its conclusions.[635]

2.427 New Zealand also notes that pathway 7, which relies on Australia's conclusions about clean fruit being contaminated in the packing house, is the biggest single contributor to Australia's conclusion as to the probability of entry of *E. amylovora* according to the risk model developed in the IRA; it accounts for a remarkable 52.3% of the probability of entry.[636]

[631] Paulin RPQ, Q 42, p. 21.

[632] See, generally, Dr Sgrillo's comments that it is inappropriate to use a triangular distribution in circumstances where there is no factual evidence of a most probable value: eg Sgrillo RPQ, Qs 78, 80 and 135, pp. 13, 14 and 29-30.

[633] Paulin RPQ, Q 47, p. 23 (emphasis in original).

[634] Paulin RPQ, Q 30, p. 17.

[635] Sgrillo RPQ, Q 30, p. 8.

[636] IRA, p. 24 and Annex 1

(vi) Importation step 6

2.428 Importation step 6 relates to the survival by *E. amylovora* of palletisation, quality inspection, containerisation and transportation to Australia. New Zealand argued that the fact that it might be possible for bacteria to survive to this stage does not mean that they will do so in epidemiologically significant numbers.[637] Australia responded by repeating its argument that it was only concerned whether any bacteria survived.[638] New Zealand has pointed out that in rejecting the concept of an epidemiologically significant number of bacteria, Australia also rejects the notion that there is a significant difference between the potential risk associated with the presence of one bacterium on an apple and the presence of 10,000 bacteria.[639] The experts' responses, while confirming that *E. amylovora* present on mature symptomless apples is unlikely to be eliminated completely during palletisation, quality inspection, containerisation and transportation to Australia, do not provide any support for the proposition that such bacteria would exist in quantities that are epidemiologically significant.[640]

2.429 Dr Paulin also indicated that in his view the conclusions of Roberts and Sawyer 2008: 366 for P2 (*E. amylovora* survives storage, transport and discard conditions (0.0035088)) "remain probably valid".[641] "Storage, transport and discard" is likely to cover a longer period than that assessed under importation step 6 (palletisation, quality inspection, containerisation and transportation), which Dr Paulin considered could be as short as 10 days. Thus, Dr Paulin's conclusions are consistent with his comments that populations of *E. amylovora* tend to decrease over time[642] and that "[m]ature fruits are considered only at best with transient populations, which are likely to be soon disappearing".[643] They are also consistent with Dr Deckers'

[637] NZFWS para. 4.229.

[638] AFWS, para. 433.

[639] New Zealand's response to this argument, drawing on the responses by Dr Sgrillo to questions posed by the Panel, is set out above in relation to importation step 4 at paras. 2.422 to 2.425 above.

[640] Deckers RPQ, Q 31, p. 12; Paulin RPQ, Q 31, p. 17.

[641] Paulin RPQ, Q 42, p. 21.

[642] Paulin RPQ, Q 6(a), p. 4.

[643] Paulin RPQ, Q 26, p. 15.

comment that "it is generally accepted that fire blight bacterium is not surviving well as an epiphytical bacterium. On the fruit skin the EA bacteria will dry out easily and die while in the calyx end they will be able to survive for a longer period. But multiplication of the epiphytical EA bacteria in the calyx end of the fruits will not occur; multiplication of the bacteria will only occur on a medium rich in sugar or in amylum. This means that the level of epiphytic populations of the EA bacteria on the apple fruits will remain low."[644]

(vii) Importation step 7

2.430 Importation step 7 relates to the likelihood that clean fruit will become contaminated by *E. amylovora* during palletisation, quality inspection, containerisation and transportation. As New Zealand explained in its first written submission, the value adopted in the IRA for a "negligible" event, especially when combined with a uniform distribution, inflates the calculation of risk well beyond that which is supported by the scientific evidence.[645]

2.431 In its first written submission, Australia argued that because the probability interval for this step corresponded with Australia's "negligible" qualitative descriptor, "New Zealand can have no complaint with Importation step 7".[646] But New Zealand regards this as another example of Australia using a probability range with a maximum value that is not justified by the scientific evidence, with the effect of inflating the overall probability of entry, establishment and spread.

2.432 The experts agreed that the IRA's conclusion is not sufficiently supported by the scientific evidence. Dr Deckers stated that "[t]here is no scientific data available that demonstrate the risk of contamination during palletisation, quality inspection, containerisation and transportation."[647] Dr Paulin noted that the "IRA does not provide any scientific evidence that such external pollution can happen, except in the case of oozing fruits [which] …if any, would have been discarded well before this step. I would consider the probability to be nil in this case, for symptomless mature

[644] Deckers RPQ, Q 7, pp. 3-4.

[645] NZFWS, paras. 4.187-4.193.

[646] AFWS, para. 439.

[647] Deckers RPQ, Q 32, p. 13.

apples."[648] Dr Sgrillo stated that "[t]he scientific evidence is scarce and the IRA is not fully supported by it….One percent seems to be a very large proportion for events that actually would have a negligible probability of occurrence. However if the three partial probabilities are taken to be negligible…then the maximum value for the probability of step 7 would be … practically equal to zero….The scientific source is qualified but not adequate to support the conclusions in the IRA"[649]

(viii) Importation step 8

2.433 Importation step 8 relates to the likelihood that *E. amylovora* survives and remains with the fruit after on-arrival minimum border procedures, which Australia assessed as 1 (i.e. any such bacteria are certain to survive such procedures). In its first written submission, New Zealand pointed out that this step was hardly meaningful. If *E. amylovora* was present at the border, then "on-arrival minimum border procedures" would not have any effect on it.[650] Contrary to Australia's first written submission, New Zealand does not "agree with the IRA Team's assessment that Importation step 8 should be represented by a certain probability of 1."[651] Rather, New Zealand considers that importation step 8 has no purpose, other than to indicate that Australia's border procedures are not designed to eliminate any *E. amylovora* that might be carried on imported apples. Nor, in New Zealand's view, need they be designed to do so.

(ix) Australia's conclusion in IRA on probability of entry is not supported by scientific evidence

2.434 The result is that the IRA asserts a highly inflated value for the likelihood of entry of *E. amylovora* into Australia.[652] Australia has failed to respond to New Zealand's argument that the IRA's conclusion on the probability of entry is greatly inflated and is not supported by scientific evidence. The experts also expressed significant reservations in relation to Australia's conclusion on entry. Dr Paulin stated

[648] Paulin RPQ, Q 32, p. 18.

[649] Sgrillo RPQ, Q 32, p. 9.

[650] NZFWS, paras. 4.233-4.234.

[651] AFWS, para. 440.

[652] NZFWS, paras. 4.208-4.237.

that "…if one can speculate or discuss on the likelihood of any event involved in the possible transport of *E. amylovora* with apples, the quantification of probabilities of each one of these events is just not feasible. This quantification relies on an arbitrary estimation, which, even in the best-documented case, is just hidden behind a "scientific" explanation, which is never completely relevant, if only because the conditions in the laboratory are only partly mimicking natural conditions….The overall figure resulting from the combination of these probabilities is just not credible: if the 3.9% figure had any consistency, it is a figure that could be quite easily checked experimentally ... (emphasis in original)."[653] Dr Deckers considered that the IRA's mean risk of importation of 3.9% is "a relative[ly] high percentage and could be overestimated."[654] Dr Sgrillo stated that scientific evidence on the rates of infestation of apples imported from New Zealand are scarce, and that the scientific evidence which does exist suggests that the level of infestation generated by the IRA's model (3.9%) is greater than what would occur in reality.[655]

2.435 The IRA's failure to estimate the probability of entry based on scientific evidence means that the IRA fails to evaluate the likelihood of the entry, establishment and spread of fire blight in accordance with the requirements of Article 5.1 and Annex A.

(c) Australia's analysis of establishment and spread is based on a hypothetical pathway

2.436 As a preliminary matter, Australia applies the wrong test by arguing that its analysis of establishment and spread is "objective and credible".[656] Such a test would imply that the Panel is required to approach Australia's risk assessment with considerable deference rather than in accordance with Article 11 of the DSU. Australia's argument should be rejected for the reasons set out above.[657] Rather, the

[653] Paulin RPQ, Q 34, p. 18.

[654] Deckers RPQ, Q 34, p. 13.

[655] Sgrillo RPQ, Q 34, p. 10.

[656] AFWS, para. 447.

[657] See New Zealand's arguments in relation to the legal test to be applied in this case, at paras. 2.299 to 2.301 above.

correct test to apply to the IRA is whether the conclusions drawn by Australia in its risk assessment find sufficient support in the science relied upon.[658]

2.437 Secondly, as stated above, in relation to Article 2.2, risk assessments must be based on actual rather than hypothetical risk. Australia's risk assessment fails to meet the requirements of Article 5.1 because it does not assess the actual risk of introduction of fire blight via mature, symptomless apples. Australia expressly acknowledges that the pathway for transmission of *E. amylovora* being examined in the IRA is "hypothetical", using a "potential vector", and is a pathway that "has never been shown to 'demonstrate' transmission of *E. amylovora*".[659]

2.438 Australia asserts that "[t]he risk assessment techniques promulgated by the IPPC, and therefore the techniques that Australia is obliged to take into account under Article 5.1, clearly permit the exploration of hypothetical pathways".[660] For this argument, Australia relies on IPSM No 11, para. 2.4, which states:

> **2.4 Degree of Uncertainty**
>
> Estimation of the probability of introduction of a pest and of its economic consequences involves many uncertainties. In particular, this estimation is an extrapolation from the situation where the pest occurs to the hypothetical situation in the PRA area. It is important to document the areas of uncertainty and the degree of uncertainty in the assessment, and to indicate where expert judgement has been used. This is necessary for transparency and may also be useful for identifying and prioritizing research needs.

2.439 The sense in which the word "hypothetical" is used in IPSM No 11 does not relate to the pathway itself, however, contrary to Australia's interpretation. Rather IPSM No 11 is referring to "the hypothetical situation in the PRA [Pest Risk Assessment] area", namely the situation were the pest to be introduced into an area where it currently does not exist. There is no reference to "hypothetical pathways" in IPSM No 11 and the definition of "pathway" in IPSM No 5 is "[a]ny means that

[658] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

[659] AFWS, para, 473. See also AFWS, para. 443. However, the IRA itself makes no mention of the alleged pathway being "hypothetical" and nor does it acknowledge that the pathway has never been proven.

[660] AFWS, para. 445.

allows the entry or spread of a pest". IPSM No 11, para. 2.2.1 refers to the need to assess "potential pathways, which may not currently exist", but there is a significant difference between a potential pathway and a hypothetical pathway. According to the natural and ordinary meaning of each of these words, a potential pathway is one that is "capable of coming into being or action".[661] By contrast, a hypothetical pathway is one based on a hypothesis, supposed or assumed but not necessarily real or true.[662]

2.440 In *Japan – Apples* the Panel and Appellate Body recognised that pathways must have a scientific basis before they can legitimately form part of a risk assessment. In other words, pathways must be actual pathways, or at least potential ones, not merely hypothetical pathways. Absent scientific support for the pathways involved, a risk assessment will not withstand scrutiny. That is precisely why Australia's risk assessment fails under scrutiny: it depends upon a purely hypothetical pathway, one which was rejected in *Japan – Apples* as lacking sufficient scientific support, and which should be rejected for the same reason in the present case.

2.441 Australia's concession that its risk assessment makes use of hypotheticals could only potentially have been relevant in the context of an argument under Article 5.7, were Australia to have adopted a provisional measure on the basis of insufficient scientific evidence, meaning that it could not objectively assess the risk. However, Australia is not making an argument under Article 5.7, which is unsurprising given the billions of apples that have been traded over several decades from regions affected by fire blight to regions without the disease. Despite such trade occurring in enormous volumes there has never been a single recorded instance of fire blight being introduced via a mature symptomless apple. New Zealand notes also the Appellate Body's finding in *Japan – Apples* that "with respect to the risk of transmission of fire blight through apple fruit exported from the United States to Japan ("normally", mature, symptomless apples), the "relevant scientific evidence" is not "insufficient" within the meaning of Article 5.7."[663]

[661] Shorter Oxford Dictionary, ed Lesley Brown, 1993, Oxford, Clarendon Press, p. 2310.

[662] Shorter Oxford Dictionary, ed Lesley Brown, 1993, Oxford, Clarendon Press, p. 1297.

[663] Appellate Body Report, *Japan – Apples*, para. 182.

(d) Australia's crucial transmission theory lacks evidence

2.442 In addition, there is no scientific evidence to support Australia's crucial transmission theory, described in the IRA as "exposure", which speculates that *E. amylovora* from mature, symptomless apples would be transferred, either by insects or by mechanical means, to susceptible hosts, and that an infection would be initiated.

2.443 Firstly, Australia's theory that bees or other insects would be involved in the spread of *E. amylovora* from a discarded apple to a susceptible flower is not supported by scientific evidence, and none is provided by Australia.

2.444 The experts have indicated that Australia's conclusions on its analysis of the likelihood of exposure of a susceptible host to *E. amylovora* by an infested/infected apple do not find sufficient support in the scientific evidence. Dr Paulin considered that "…only some fragments [of the IRA's analysis] are supported by scientific evidence. Very often suppositions or speculations are proposed rather than certitudes, just because these problems have never been addressed scientifically (or at least experimentally). As a consequence, I do not see how it is possible to rely objectively on any figure for the likelihood of this "exposure" step."[664] Dr Paulin also indicated that there is no scientific evidence that epiphytic infestations of *E. amylovora* can be transferred to a susceptible host and initiate an infection.[665] Dr Paulin pointed out that there is no objective analysis in the IRA of the proposition that the introduction of fire blight via mature apple fruit has ever occurred or could occur.[666] He noted that "…the probability of bacteria from the calyx of mature apple to infect a plant supposes many steps. One only (infectivity of one or very few cells) is based on scientific evidence, but in conditions very different from natural conditions."[667]

2.445 Secondly, there is no scientific evidence provided by Australia to support its theory of mechanical transfer via workers or equipment leading to infection. In relation to Australia's "mechanical transfer" hypothesis, Dr Paulin stated that

[664] Paulin RPQ, Q 36, p. 19.

[665] Paulin RPQ, Q 19, pp. 12-13.

[666] Paulin RPQ, Q 37, p. 19.

[667] Paulin RPQ, Q 38, p. 20.

"[m]echanical transfer in a natural environment of phytopathogenic bacteria by worker's hands to susceptible host has never been published, or observed."[668]

2.446 Dr Deckers pointed out that "[f]or this aspect there is no sufficient scientific data available that describes the likelihood of this transfer possibility."[669] He also noted that "[m]echanical transfer of the bacteria in a natural environment from workers hand to a susceptible host seems to be extremely unlikely."[670]

2.447 Dr Sgrillo observed that "…the scientific evidence presented does not support the [IRA's] conclusions because there are no factual data to validate the hypothesis."[671] He considered that 10^{-14} (50 million times lower than the mid point of Australia's conclusion in regard to the probability of exposure – 1 in 2 million) "would be more appropriate to represent an event that has never been reported to occur."[672]

2.448 As Dr Sgrillo stated: "If 'almost certain not to occur' means that the possibility to occur is only a theoretical supposition and there are no records that the event has ever occurred then the path can be removed from the model and the causal chain would be broken."[673] On this basis, Australia would have been justified in concluding that *E. amylovora* was not "on the pathway" for the purposes of the IRA,[674] and discontinuing its risk assessment.

2.449 Both Dr Paulin and Dr Deckers also observed that other than in flowering time, usually in spring and early summer, receptivity to natural infection of a susceptible host will be absent.[675] Dr Paulin stated that the IRA maximises the risks in taking no account of the discontinuity in susceptible host plant receptivity during the

[668] Paulin RPQ, Q 20, p. 13.

[669] Deckers RPQ, Q 36, p. 14.

[670] Deckers RPQ, Q 20, p. 9.

[671] Sgrillo RPQ, Q 36, p. 11.

[672] Sgrillo RPQ, Q 36, p. 11.

[673] Sgrillo RPQ, Q 138, p. 34.

[674] IRA, Table 14, p. 47.

[675] Paulin RPQ, Q 10, p. 7; Deckers RPQ, Q 10, p. 5.

year.[676] Thus, the IRA failed to factor in reduced host availability at the time when New Zealand apples are likely to be supplied.

2.450 Lacking any scientific evidence to support either of its two transmission contentions, or any evidence to support the existence of the pathway in its entirety, Australia then attempts to shift the burden of proof back to New Zealand. Australia criticises New Zealand's objection that there is no scientific evidence that transfer of fire blight bacteria from mature, symptomless apple fruit to a susceptible host with infection resulting has ever occurred or will ever occur. Australia states:

> Since the pathway being examined is hypothetical, the IRA Team was not obliged to disregard a potential vector simply because it has never been shown to "demonstrate" transmission of *E. amylovora*.[677]

2.451 In making this assertion, Australia denies its obligation to ensure that scientific evidence supports the conclusions in its risk assessment. The corollary of this assertion is that Australia considers New Zealand to be under an obligation to provide the evidence to disprove Australia's hypothetical pathway. That is obviously incorrect. Australia must rebut New Zealand's case that the conclusions in its risk assessment are not supported by scientific evidence. Australia cannot reverse the burden of proof in this regard. Australia has failed to provide any scientific evidence in rebuttal supporting the IRA's conclusions. This is because there is no scientific evidence supporting the contention that mature, symptomless apples provide a pathway for the introduction of the disease.[678]

2.452 The probability of all of the steps in the sequence of events Australia asserts as the basis for its hypothetical pathway occurring in the correct sequence at the correct time must be very close to zero. Yet, based on Australia's projected volume of trade in New Zealand apples, Australia concludes that this hypothetical scenario is likely to occur once every 22 years.[679] This exaggerates potential risk, without

---

[676] Paulin RPQ, Q 10, p. 7.

[677] AFWS, para. 473.

[678] In *EC – Hormones*, the Appellate Body found at para. 98 that, in the absence of effective refutation by a defending party, a Panel is required as a matter of law to rule in favour of a complaining party that has established a prima facie case.

[679] IRA, p. 107, Table 24.

scientific justification. The IRA merely offers speculation about hypothetical events that have never been shown to occur.

2.453 Australia freely admits that the underlying scenario being assessed in the IRA – the likelihood that mature symptomless apples are a pathway for introduction of fire blight – is "not a particularly likely one."[680] Australia also appears to concede that the transmission pathway asserted for fire blight has never been proven,[681] and that therefore its risk assessment makes use of hypothetical pathways.[682]

2.454 Australia is utterly dependent on its theory that only a small number of bacteria present on an imported apple would be sufficient to be transferred (by an unproved mechanism) to a susceptible host during conducive climatic conditions and initiate a fire blight infection. But, even if Australia were correct that only a small number of bacteria are required (which it is not), this theory on its own would not be adequate to demonstrate that the pathway could be completed. There is no scientific evidence that, under natural conditions, low (or any) numbers of *E. amylovora* bacteria on mature apple fruit can be (or have ever been) transferred onto a susceptible host and initiate an infection. Rather, the scientific evidence shows, to the contrary, that the likelihood of such occurrence is so small as to be insignificant.

(e) Australia has exaggerated the consequences of establishment and spread of fire blight

2.455 Australia also relies heavily on an assessment of the consequences of establishment and spread of fire blight, in an attempt to boost the asserted likelihood of the underlying scenario exceeding Australia's ALOP.

2.456 New Zealand considers that Australia has over-estimated the consequences of establishment and spread of fire blight. But the consequences of a fire blight outbreak, no matter how serious, do not increase the chances of a pathway being completed, given that any pathway is merely hypothetical, lacking sufficient scientific evidence to support it.

[680] AFWS, para. 446.

[681] AFWS, para. 443.

[682] AFWS, paras. 445 and 473.

2.457 New Zealand also notes Dr Paulin's comments that "[t]he overall production of fruits in a whole country has never been seriously decreased, even by a severe fire blight epidemy, even if damages can be very costly at the local level, in certain years for certain varieties."[683]

(f) Conclusion

2.458 Accordingly, the evaluation of the likelihood of entry, establishment or spread in the IRA in relation to fire blight has not been an evaluation of likelihood in terms of the definition of "risk assessment" in the *SPS Agreement*. Australia has therefore not complied with its obligations under Article 5.1.[684]

4. European canker

2.459 In its first written submission, New Zealand established that the IRA failed to evaluate the likelihood of entry, establishment and spread of European canker in relation to imports of mature, symptomless apples from New Zealand. The IRA's conclusions about entry, establishment and spread, as well as its assessment of consequences are not supported by sufficient scientific evidence.[685]

2.460 In particular, in New Zealand *N. galligena* fruit rots are rare and absent from major producing regions, and latent fruit rots, upon which the Australian pathway ostensibly relies, are virtually non-existent. Further, spores are unlikely to be produced and dispersed onto a susceptible host from discarded apple fruit in Australian conditions. Moreover, the Australian climate is not conducive to European canker establishment and spread, as evidenced by the Tasmania outbreak, which failed to move beyond the four affected orchards. Finally, the failure of the IRA to consider the Australian circumstances, specifically climate, in its assessment of consequences means that the final rating for consequences is significantly over-estimated.

[683] Paulin RPQ, Q 11, pp. 7-8.

[684] NZFWS, paras. 4.238-4.265.

[685] Appellate Body Report, *Canada – Continued Suspension*, para. 590.

2.461 The experts' responses confirm New Zealand's position that the IRA's conclusions are not sufficiently supported by scientific evidence with respect to: the probability of importation of *N. galligena*; exposure of a susceptible host to *N. galligena* by an infested or infected apple; the probability of establishment and spread; and Australia's assessment of consequences.

2.462 In an effort to rebut these points, Australia is forced to rely on an unverified personal communication as evidence of latent infection of apples in New Zealand; to introduce another new climate analysis; and invent novel explanations about 'strains' of *N. galligena* to bolster the conclusions of the IRA. As New Zealand will elaborate below, Australia's arguments cannot be sustained.

(a) The IRA's analysis of the probability of entry is not supported by scientific evidence

2.463 As in the case of fire blight, in an attempt to find some scientific evidence where none exists, the IRA deconstructs a hypothetical pathway for the transmission of European canker into discrete steps. The IRA assesses the scientific evidence in relation to each of those steps and assigns a probability value. In its first written submission, New Zealand pointed out the lack of scientific support for the pathway as a whole. In addition, New Zealand pointed out the lack of scientific support for the individual steps in the pathway. In particular, New Zealand established that there is no objective or rational relationship between the scientific evidence and the probability value that is chosen at each step. In other words, the conclusions drawn by the IRA do not find sufficient support in the scientific evidence relied on.[686]

2.464 The IRA analysed two different risk scenarios for the entry of European canker into Australia; first via latently infected New Zealand apple fruit, and second via surface-contaminated (infested) apples.[687] As set out in New Zealand's first written submission, neither of these pathways for the transmission of European canker into Australia have support in the scientific evidence relied on.

[686] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

[687] IRA, p. 118.

(i) Importation step 2

2.465 The probability for this step (likelihood that picked fruit is infested/infected with *N. galligena*) is assessed in the IRA as having a uniform distribution with a minimum value of 10^{-6} and a maximum value of 10^{-3}. On average, therefore, the IRA anticipates that approximately 1 in every 2,000 apples will be infested or latently infected with *N. galligena* each year from orchards infected with European canker. New Zealand's first written submission contrasted this conclusion with the following realities:

a. Records of pre-harvest fruit rots caused by *N. galligena* are extremely rare in New Zealand, as evidenced by the limited references to fruit rots in the scientific literature.

b. The IRA did not provide any evidence to show confirmed reported instances of latent fruit infections caused by *N. galligena* in New Zealand.

c. These points reflect the fact that summer time conditions in New Zealand (unlike in Northern Ireland and the United Kingdom) are not conducive to fruit infection, let alone latent fruit infection.

d. These observations are reinforced by the fact that no trading partner has ever reported *N. galligena* rots associated with New Zealand apples despite billions of apples traded, and that there is no scientific evidence that apples from any country have ever been the cause of long distance spread of European canker.[688]

2.466 In light of this, New Zealand concluded in its first written submission that the IRA's conclusion for importation step 2 is not sufficiently supported by the scientific evidence. Australia's efforts to rebut this, based primarily on an unverified personal communication and information from countries with climates conducive to European canker, should be rejected.

[688] NZFWS, paras. 4.270-4.275, 4.299.

a. N. galligena fruit rots are extremely rare in New Zealand

2.467 Australia's attempted rebuttal of the New Zealand arguments on this importation step focuses in large part on proving that fruit rots do occur in New Zealand. Australia argues that New Zealand is "noticeably silent" on the "four relevant studies" in relation to *N. galligena* fruit rots in New Zealand identified in the IRA.[689] However, the Australian rebuttal misses the point.

2.468 New Zealand has never denied the occurrence of pre-harvest fruit rot in New Zealand, but demonstrated in its first written submission that the incidence is extremely rare.[690] The "four studies" referred to in Australia's first written submission are entirely consistent with New Zealand's position.

2.469 In two of the articles cited, fruit rot is mentioned only with the general description of symptoms recorded for the pathogen.[691] Tellingly, both these articles focus on control of wood cankers in Auckland (and not on the incidence of fruit rot).

2.470 The third "study" refers to the sample of 3,300 pre-harvest field rots collected in the Waikato region over the period 1999-2005, of which only 7 were found to be caused by *N. galligena*. While Australia extrapolates this to a 0.21% incidence of *N. galligena* fruit rots, as advised in the letter from MAFBNZ of 16 May 2005,[692] it is not possible to relate the 3300 rots to the volume of fruit they were taken from. Accordingly, the most that can be said of the 0.21% figure is that represents the percentage of rots that could be attributed to *N. galligena* of all pre-harvest rots occurring in the region. Further, it is significant that the Waikato region (a minor apple-producing region) is climatically more favourable to European canker than the major apple-producing regions of New Zealand.

---

[689] AFWS, para. 536.

[690] NZFWS, para. 4.271.

[691] Brook and Bailey 1965: 117 (**Exhibit AUS-53**): "The fungus also causes fruit rot occasionally". (p. 117) Atkinson 1971: 71 (**Exhibit AUS-52**): "occasionally fruits are attacked and rotted by this fungus" (p. 71). The discussion in these articles is about symptoms on the tree, accordingly these references are understood to relate to pre-harvest rather than post-harvest storage rots.

[692] **Exhibit AUS-51**.

2.471 The fourth "study" is a reference to the 1996 Braithwaite report which cites New Zealand Plant Protection Centre (NZPPC) records to show that pre-harvest fruit rot occurrences have been reported in New Zealand.[693]

2.472 Australia's reliance in its first written submission and comments on expert replies[694] on demonstrating the occurrence of pre-harvest fruit rots in New Zealand (to which the above examples relate) is misplaced. As the IRA concedes, fruit that rots on the tree is not harvested.[695] The transmission of *N. galligena* through imports of New Zealand apples depends on harvested fruit being latently infected or infested with European canker.[696]

2.473 While latent infections are known to occur in some regions of the world with conducive climatic conditions, as demonstrated in New Zealand's first written submission, a fundamental problem in the IRA's analysis is that it fails to provide sufficient evidence of latent infections of apple fruit in New Zealand to support its conclusions under importation step 2.

2.474 As set out in New Zealand's first written submission, the low recorded incidence of fruit rots (both pre- and post-harvest) in New Zealand simply reflects the fact that summer conditions in New Zealand are generally not conducive to fruit infections, being typically too dry and too hot for fruit infections to occur.[697]

2.475 This is confirmed by the experts. Dr Swinburne confirms that "[t]he weather data presented in Annex [3] of the NZ FWS would accord with a low incidence of fruit infection, and, based on Wilson's (1966) observations in California, even conidial production from stem cankers may be sparse during summer. It is perhaps

[693] **NZ Exhibit 34**, p. 5. Given that Braithwaite goes on to talk about storage rots (with reference to Mike Dance Pers. Comm.), it is understood that Braithwaite uses the NZPPC records to refer to pre-harvest fruit rots.

[694] ACER, para. 154.

[695] IRA, p. 123. This is confirmed in the ACNZCER, "The Final IRA Report explicitly acknowledges that rotten fruit would not be picked", para. 34.

[696] IRA, p. 118.

[697] NZFWS, Annex 3.

significant that in what was described as an epidemic of canker in Auckland that Brooke& Bailey (1965) only found occasional fruit rots….”[698]

2.476 Dr Swinburne concludes that the development of post harvest rots will depend on “(a) the presence of the disease in the trees harvested and (b) the climate during the summer season. Given that some 95% of NZ orchards are either disease free or have very low levels of infection, coupled with a climate that is not well suited to summer fruit infection, it necessarily follows that the probability of there being post harvest rots is very low indeed.”[699]

2.477 Dr Latorre also confirms that “[f]requent summer rainfalls are necessary for inoculum production, dissemination and infection. If summer rainfalls are frequent, it would be reasonable to assume that some of the infected fruits may develop symptoms on the tree, and other fruits may be latently infected, developing symptoms after several weeks or even months in cold storage. After reviewing [New Zealand’s first written submission] …it appears that summer conditions in New Zealand are very unfavourable for the development of European canker, and that fruit infection would be an extremely rare event. Therefore, the likelihood of latent infection on mature apple fruits would be extremely low or negligible.[700]

b. The IRA’s use of northern hemisphere data is neither objective nor coherent

2.478 In its comments on expert responses, Australia argues that “…it is clear that the IRA Team took into account the available scientific evidence both in New Zealand *and overseas*”[701] citing (*inter alia*) Swinburne 1975, Snowdon 1990 (United Kingdom), and Bondoux and Built 1959 (France). Equally Australia’s first written submission “rejects the suggestion that there is no scientific evidence of latent

[698] Swinburne RPQ, Q 57, p. 7.

[699] Swinburne RPQ, Qs 62/63, p. 9.

[700] Latorre RPQ, Q 57, p. 13. See also Q 49, p. 6, Q 55, p. 11, Q 63, p. 16. Q 56, p. 12, Q 72, pp. 20-21.

[701] ACER, para. 156.

infections occurring in New Zealand",[702] but it immediately goes on to cite examples of latent infections from Northern Ireland in 1963-64.[703]

2.479 However, as demonstrated in New Zealand's first written submission, it was neither objective nor coherent for the IRA Team to simply base their assumptions on evidence of latent infections from the northern hemisphere countries where conditions are significantly different. Beresford and Kim's climate analysis shows that fruit infection occurs only where there is both summer rainfall and moderate temperatures, conditions which are more prevalent in Northern Ireland but not in New Zealand, particularly in the main apple-growing regions of Hawke's Bay and Nelson.[704]

2.480 The relevance of these climatic differences to the likelihood of latent fruit infections occurring in New Zealand is confirmed by the experts' responses.

2.481 Dr Latorre states that "[b]ased on rainfall patterns, two critical periods for infection by *N. galligena* can be defined for apples: a. Autumn infections associated with leaf fall and infection through leaf scars. b. Summer infection associated with fruit infection around the time of harvesting ….while summer infections are prevalent in other apple-producing areas (e.g., United Kingdom). Based on this weather analysis, weather conditions are relatively less conducive during the summer as compared to autumn for infections in New Zealand."[705]

2.482 Dr Latorre confirms that "[t]hese results [with reference to Swinburne 1964, 1975] were obtained on apple varieties quite different from those produced today in New Zealand and under environmental conditions that appear to be far more conducive to fruit infection (in Northern Ireland) than those in New Zealand…*it is a factor that should be taken into consideration by Australia's IRA.*" (Emphasis added.)[706]

---

[702] AFWS, para. 539.

[703] Citing Swinburne 1964, **Exhibit NZ-11**.

[704] NZFWS, pp. 221-222.

[705] Latorre RPQ, Q 72, pp. 20-21.

[706] Latorre RPQ, Q 55, p. 11.

2.483 Dr Swinburne also comments that "… rots attributable to *N. galligena* in fruit grown in New Zealand are by no means as common as they are in Europe…."[707]

2.484 Australia argues in its first written submission that it was completely justifiable for the IRA Team to draw on scientific evidence from other countries where the disease is present.[708] While New Zealand does not object to the use of overseas research per se, New Zealand's position is that evidence of latent infection that relates to one geographic area (for example, Northern Ireland) is not relevant to evaluating the likelihood of latent infection occurring in another area where the conditions are materially different (such as New Zealand). Relying on evidence that is not relevant to justify conclusions in the IRA demonstrates neither objective nor coherent reasoning.

2.485 Australia now suggests that the IRA "only refers to the United Kingdom and Northern European research on latent infection to demonstrate how this event is likely to occur when conditions are favourable".[709] This argument simply misses the point that the summer conditions in New Zealand are not favourable to latent fruit infection, as the experts' responses confirm.

c. A personal communication is neither respectable nor sufficient scientific evidence of latent fruit infections

2.486 The only "evidence" of latent fruit infections in New Zealand cited throughout the IRA, Australia's first written submission, responses to Panel questions, or comments on experts replies, is the "Mike Dance. Pers Comm" referred to in the 1996 Braithwaite Report, which noted that the fungus had been associated with storage rots in New Zealand. This 'suggested' to Braithwaite that latent infections also occurred in New Zealand.[710]

[707] Swinburne RPQ, Q 57, p. 7.

[708] AFWS, para. 541.

[709] AFWS, para. 541. See also para. 539: "under favourable climatic conditions, with sufficient inoculum and host susceptibility, latent infections in summer have the potential to cause storage rots anywhere where apples are grown".

[710] **Exhibit NZ-34**, p. 5.

2.487 However, as noted above at paragraphs 2.138 2.147 and 2.152 to 2.156, an unconfirmed and anecdotal 'personal communication' does not amount to "respectable scientific evidence".[711] This assessment is confirmed by Dr Latorre who confirmed that Braithwaite "is not a reliable and relevant reference to support the hypothesis that latent infections also occur in mature apple [fruit] in New Zealand".[712] By itself, the Braithwaite report does not provide anything close to "sufficient scientific evidence" to support this conclusion in the IRA.

d. Australia attempts to reinterpret the IRA

2.488 In its first written submission, New Zealand pointed to information contained in the IRA which supported New Zealand's position that latent infections are virtually unknown in New Zealand. Australia now attempts to qualify that information in an attempt to bolster the conclusions of the IRA.

2.489 For example, New Zealand pointed to AQIS interception data cited in the IRA which did not isolate the fungus *N. galligena* from New Zealand apples intercepted at the border by AQIS 1998-2003.[713] Dr Latorre draws attention to this sample in his responses to Panel questions.[714] Australia now attempts to argue that "when interpreting this [AQIS interception] data the IRA Team was conscious of the fact that latent infection will often only express itself after it has been stored for a long period. In any event, the small sample size (450 apples) of this AQIS interception data meant that it was given little weight by the IRA".[715] However, it is not at all clear from the face of the IRA that the IRA Team either considered length of incubation (if indeed it was possible for the IRA team to draw any conclusions about the length of time that *N. galligena* rot, if present, had had to develop in the apples sampled) or gave any weight to the AQIS data at all. Indeed, given the outcome of the AQIS interception data (no *N. galligena* rots) it is impossible to see any correlation between that evidence and the probability values ascribed in the IRA, which estimated several thousand of such rots occurring annually.

---

[711] Appellate Body Report, *Canada – Continued Suspension*, para. 590.

[712] Latorre RPQ, Q 54, p. 11.

[713] NZFWS, para. 4.274. See also IRA, p. 123.

[714] Latorre, RPQ Q 65, p. 17.

[715] AFWS, para. 536.

e. Probability values assigned to importation step 2 not supported by scientific evidence

2.490 Without providing any evidence which showed confirmed reported incidences of latent infections in New Zealand, the IRA assigned a probability range which estimated that on average 1 in every 2,000 apples harvested from infected orchards would be latently infected. The experts' responses confirm that the probability range assigned by the IRA to importation step 2 is not supported by scientific evidence.[716] The arguments made in Australia's first written submission in support of the IRA's conclusion, relying primarily on an unconfirmed sighting and evidence of latent infections from countries with very different climatic conditions from those in New Zealand, do not provide the necessary scientific evidence to support this conclusion.

(ii) Importation step 3

2.491 Importation step 3 relates to the likelihood that clean fruit is contaminated by *N. galligena* during picking and transport to the packing house. This step was assessed in the IRA as having a triangular distribution with a minimum value of 10^{-6}, a maximum value of 10^{-4} and a most likely value of 10^{-5}.

2.492 In its first written submission, New Zealand demonstrated that these probability values were not sufficiently supported by scientific evidence, given that: surface-contamination of clean fruit with *N. galligena* has never been recorded anywhere; the conditions in New Zealand in the orchard during harvest are not suitable for spore production or dispersal; and conidia spores are unlikely to survive on the surface of fruit.[717]

2.493 In response, Australia's first written submission asserts, without evidence, the existence of different ways in which clean fruit may become contaminated during picking and transport to the packing house. In addition, Australia's first written submission invents sources of fruit contamination not considered by the IRA and contradicts earlier statements in the IRA in an attempt to provide additional scientific

[716] Swinburne RPQ, Q 75, p. 12. Latorre RPQ, Q 75, p. 22-23. Sgrillo RPQ, Q 75, p. 13.

[717] NZFWS, paras. 4.276-4.281.

justification for its conclusions. Finally, in an attempt to prove that spores may survive for prolonged periods of time, Australia's first written submission confuses surface-contamination with latent infection. None of these arguments are supported by scientific evidence.

a. No scientific evidence to support the mechanisms for surface-contamination

2.494 In its first written submission, Australia asserts that the IRA "identified various means by which clean fruit could be contaminated".[718] These included: pickers' hands or gloves contaminated with spores through touching cankers or infected fruit; spores carried by rain splash or wind during harvesting or transport; and trash with actively sporulating fungus and spores making contact with fruit in bins.[719]

2.495 However, as set out in New Zealand's first written submission, and confirmed by the experts' responses, none of the 'means' identified by the IRA have ever been demonstrated to occur.[720] Surface contamination of clean fruit in these ways is not actually reported in any of the articles cited by the IRA[721] and Australia's first written submission does not provide any new evidence to support the IRA's contentions. Australia does not make things more "objective and coherent" simply by restating the conclusions of the IRA.

2.496 Dr Sgrillo confirms that there is no scientific evidence to support the transfer mechanisms described in the IRA when he states that "[t]he IRA team describes hypotheses to explain how a clean fruit could be contaminated by *N. galligena*. However there is no factual evidence to validate [these hypotheses]. There are no records of *N. galligena* spores being transferred to clean fruit."[722] Dr Latorre agrees

---

[718] AFWS, para. 549.

[719] IRA, p. 124.

[720] NZFWS, para. 4.277.

[721] For example, the IRA states that "foliage is not affected and trash presents an extremely small likelihood of contamination unless twigs with active cankers are picked along with fruit". The only article cited in support of this statement is Butler 1949, which only stands for the first proposition that foliage is not affected. The IRA cites no evidence at all as to the likelihood of twigs with cankers being picked with apples. The IRA cites absolutely no evidence to support the contention that pickers' hands may vector spores onto clean fruit: IRA, p. 124.

[722] Sgrillo RPQ, Q 78, p. 13.

that "the external contamination (epiphytically) of apple fruits with *N. galligena* has not been documented scientifically; it is very possible that external contamination does not occur or has no epidemiological consequences. Therefore, the probability that mature fruits carry *N. galligena* externally should be equal to zero, and disregarded in the risk analysis."[723]

b. Australia invents new sources of spores for fruit contamination

2.497 In addition, Australia's first written submission asserts new sources of contamination in the orchard, not previously considered by the IRA. Australia now speculates that rotting fruit may be a source of contamination of clean fruit in the orchard, which, according to Australia, "produce spore pustules bearing numerous conidia".[724] Not only does this constitute a belated attempt to remedy the inadequacies of the IRA but it also lacks any scientific support.

2.498 As set out above, *N. galligena* fruit rots in New Zealand are very rare and unknown in the major apple-producing regions of New Zealand. In addition, as Dr Swinburne makes clear in his responses, sporulation in the orchard from rotting fruit requires prolonged exposure to free moisture on the fruit surface (i.e. several days of continued rainfall).[725] As New Zealand's first written submission points out, and the IRA concedes, rainfall at harvest is not typical in New Zealand's major apple-producing regions.[726] Accordingly, this is unsubstantiated speculation on the part of Australia's first written submission.

c. No evidence that perithecia form on mummified fruit in New Zealand orchards

2.499 Australia in its first written submission maintains the position in the IRA that mummified fruit which develop perithecia capable of producing ascospores may be a source of contamination of clean fruit, relying on research by Dillon-Weston 1927[727]

[723] Latorre RPQ, Q 50. p. 7.

[724] AFWS, para. 553.

[725] Swinburne RPQ, Q 58, p. 8.

[726] IRA, pp. 122, 125.

[727] **Exhibit NZ-60**.

and Swinburne 1975.[728] There are a number of problems with Australia's reliance on these studies.

2.500 First, these studies related to fruit which had overwintered under orchard conditions in the United Kingdom. Mummified fruit forming perithecia capable of producing ascospores have never been reported in New Zealand. Moreover, the contention that infected fruit would drop, and be left on the orchard floor to mummify over the winter and develop perithecia capable of producing spores in the following spring is inconsistent with normal orchard hygiene practices in New Zealand, which require the removal of infected material from the orchard.[729]

2.501 Second, even if fruit were to mummify, perithecial formation and ascospore production are dependent on climate, favouring wetter, milder conditions.[730] Dillon-Weston reported ascospore production in March to May (European spring).[731] Dillon-Weston therefore confirms that the conditions suitable for ascospore production are not prevailing at harvest time (late summer–autumn). In New Zealand, perithecia on trees form towards the end of June (in early winter, well after harvesting is complete), they mature during winter and produce ascospores during late winter and spring.[732] Dr Swinburne confirms "[t]he contention that fruit could become contaminated by spores at harvest depends on their presence on tree cankers during any period of rain at that time. It is extremely unlikely that these would be ascospores as even in the wetter summers of Europe perithecia are usually … produced in winter to spring (Swinburne 1975)."[733] Accordingly, ascospores are not a source of contamination of clean fruit in New Zealand at harvest.

2.502 Third, the Dillon-Weston study did not show that those mummified apples contaminated clean fruit in the orchard, let alone during picking and transport as the

[728] **Exhibit NZ-9**.

[729] Pipfruit New Zealand Integrated Fruit Production Manual, **Exhibit NZ-108**, p. 36.

[730] Wessel 1980, **Exhibit NZ-117.**

[731] Dillon Weston, **Exhibit NZ-60**, pp. 5-7. This is the equivalent of New Zealand September to November.

[732] NZFWS Pests and Issue, para. 3.60 Brook and Bailey, **Exhibit AUS-53**, pp. 117-118.

[733] Swinburne RPQ, Q 67/68, p. 10.

IRA posits. Accordingly, the IRA's conclusion that mummified fruit are another source of contamination is not supported by the findings of the study.

2.503 The expert responses confirm that the Australian reliance on ascospores as a source of contamination in the orchard is not supported by the scientific evidence. Dr Swinburne comments that "[t]he formation of perithecia on fruit has been observed very rarely (Dillon-Weston, 1927) and does not feature in any subsequent epidemiological study (Swinburne 1975, CAB 2001). It is therefore most unlikely that ascospores would be formed or released from rotted fruit."[734]

2.504 Dr Latorre comments that "[m]ummified fruits in the autumn may produce ascospores under cool humid ambient conditions the following spring, or after a prolonged period in cold storage. However, this is a rare event …."[735]

2.505 Accordingly, the conclusions in the IRA do not find sufficient support in the scientific evidence relied on.

d. No evidence to support spore production and dispersal at harvest

2.506 As set out in New Zealand's first written submission, summer and harvest conditions in New Zealand's major apple-growing regions are not suitable for production or dispersal of spores (whether from cankers on trees or from rotten or mummified fruit), as both spore production and dispersal require rainfall. This is explicitly recognised in the IRA which states that "[c]limatic conditions typically experienced during harvest periods in most New Zealand orchards are not conducive to spore release and infection"[736] and that "climatic conditions typically reported for Hawke's Bay and Nelson during the harvest periods are normally dry and not conducive to spore release".[737]

2.507 The position set out in New Zealand's first written submission is confirmed in the experts' responses. Dr Latorre comments that "Australia does not provide objective data regarding spore (conidia, ascospore) production and release under the

[734] Swinburne RPQ, Q 58, p. 8.

[735] Latorre RPQ, Q 77, p. 24.

[736] IRA, p. 125.

[737] IRA, p. 122.

environmental conditions of New Zealand. There are not qualified scientific sources to support the view that mature apple fruit can be infested (surface-contaminated) with spores at harvest, including via wind currents. … In my opinion this analysis overestimates the risk of inoculum dispersal". (Emphasis added.)[738]

2.508 Australia now attempts to downplay its earlier concession about lack of rainfall in New Zealand's major apple producing regions. First, it relies on the qualification in the IRA that "in the wetter districts of Auckland and the Waikato region, conditions favour these processes".[739] However, it is neither objective nor coherent to base a theory about spore production and dispersal on the climatic conditions of two minor-apple producing regions – regions which furthermore are in decline relative to overall apple production.[740]

2.509 Second, Australia points to new data that it claims shows that "during harvest time…there is considerable rain in all New Zealand's apple-growing regions during these months".[741] However, Australia does not even explain how these long term average monthly rainfalls relate to known rainfall requirements for disease development. In any event, as Dr Swinburne points out, it is the duration of rain, not the amount of rain (to which the Australian data relates), that determines whether spore production will occur.[742] Accordingly simply asserting that this new data shows "considerable rain" at harvest is virtually meaningless when determining whether spores will be produced and dispersed onto the surface of clean fruit at harvest.

e. No evidence to support spore survival on the surface of fruit

2.510 Australia also attempts to revisit the IRA's position on spore survival. As demonstrated in New Zealand's first written submission, even if conidia were dispersed onto the surface of clean fruit during harvest or transport, conidia are

[738] Latorre RPQ, Q 67, p. 18.

[739] IRA, p. 125, AFWS, para. 552.

[740] Apple planted area in Auckland declined between 2000 and 2005 from 720 ha to 36 ha (95% decrease). In Waikato apple planted area declined from 820 ha to 227 ha (72% decrease). (Horticulture facts and figures 2000, HortResearch, Private Bag 11030 Palmerston North, p. 16 Fresh facts New Zealand Horticulture 2007, HortResearch, Private Bag 92169, Auckland, p. 20). **Exhibit NZ-122**.

[741] AFWS, para. 552, **Exhibit AUS-55**.

[742] Swinburne RPQ, Q 56, p. 6.

sensitive to desiccation and would be unlikely to survive on the surface of fruit for any length of time. This is a point that is explicitly acknowledged in the IRA.[743]

2.511 Dr Latorre confirms that the conclusion that spores may survive on the surface of fruit "has no credibility."[744]

2.512 Dr Swinburne agrees that "[t]here is no evidence that *N. galligena* can survive as an epiphyte per se. … The data obtained by Dubin & English (1974) implies that conidia on the fruit surface would only survive for a few days if humidity was maintained at 100%. At lower humidity (85%) the half-life of conidia would be a matter of hours."[745]

2.513 Australia cites Puia *et al.* 2004[746,] a study not referred to in the IRA, to suggest that *N. galligena* was isolated from the surface of the fruit after several months in cold storage.[747] However, the article showed that some fruit developed *N. galligena* rot symptoms in storage.[748] The fact that *N. galligena* was isolated from the surface of rotten fruit is not the same as the scenario posited by the IRA at importation step 3 whereby conidia remain on the surface of a mature, symptomless fruit. As Dr Latorre confirms: "the Materials and Methods used by Puia *et al.* (2004) (AUS-56) do not allow the authors to conclude that *N. galligena* was on the surface of the fruits."[749]

f. Australia confuses spore survival on fruit surface with latent infection

2.514 Australia's misreading of the Puia paper is consistent with a wider misunderstanding evident in Australia's first written submission, concerning the difference between spore survival on the surface of fruit and latent infection.

2.515 On the one hand, at several importation steps, the IRA is premised on the fungal spores remaining on the surface of the fruit (i.e. infestation) as a source of

[743] IRA, p. 124.

[744] Latorre RPQ, Q 68, p. 18.

[745] Swinburne RPQ, Q 49, p. 4.

[746] **Exhibit AUS-56**.

[747] AFWS, para. 555.

[748] **Exhibit AUS-56**, *N. galligena* developed rots "sporadically" on cv. Jonathan (p. 10).

[749] Latorre RPQ, Q 68, p. 18.

cross-contamination of clean fruit or potential future infection of the host fruit. However, in responding to New Zealand's argument that conidia are unlikely to survive on the surface of fruit, the argument in Australia's first written submission describes the process by which a fruit may become infected (rather than infested):

> …given that fruit infection occurs in New Zealand, it is clear that not all conidia deposited on the fruit in summer are killed by desiccation…..<u>rather, some conidia survive the summer, allowing storage rot to occur later"</u>.[750] (Emphasis added.)

2.516 Accordingly, the statement in Australia's first written submission that "some conidia survive the summer"[751] now appears to mean that some conidia may survive the summer inside the fruit, which is simply another way of saying that fruit may be latently infected. In this way it seems that importation step 3 (likelihood of contamination of fruit during picking and transport) of Australia's analysis is no different from importation step 2 (likelihood that picked fruit will be latently infected). "Surface contamination" now merely describes a stage in the process by which a fruit may become latently infected.

2.517 Accordingly, it is clear that Australia can only attempt to justify its flawed contamination/infestation pathway by collapsing it into the latent infection pathway.

g. Probability values assigned to importation step 3 are not supported by sufficient scientific evidence

2.518 Although in its first written submission Australia asserts that New Zealand's arguments in relation to importation step 3 "[are] just one of many examples where New Zealand argues that there is a "correct conclusion to draw from the scientific literature", ignoring the fact that there can be more than one credible interpretation of the evidence"[752] the reality is that there is simply no scientific evidence at all to support Australia's assignment of probability values to this step.

2.519 The absence of scientific support for the probability ranges assigned by the IRA to importation step 3 is confirmed by the experts' responses. Dr Swinburne states

[750] AFWS, para. 555.

[751] AFWS, para. 556.

[752] AFWS, para. 562.

that "any conidia deposited on the surface of an apple during harvesting operations would not survive for any length of time (see Q 49) and may be discounted from all subsequent calculations. Similar considerations would apply to conidia redistributed from trash."[753] He also confirms that "[i]t is extremely unlikely that in the event that spores deposited on the open surface of fruit at or before harvest would play any part in an entry pathway."[754]

2.520 Dr Latorre expresses the view that "…fruit contamination with spores of *N. galligena* during picking and transport to the packing house should be disregarded. There is no scientific evidence on the subject…."[755] Accordingly, he concluded that "[i]t is difficult to accept and may be impossible to support the probability values assigned to this step…this evaluation overestimates the risk at this point on non-objective and credible bases."[756]

2.521 Despite the absence of evidence, Australia is prepared to assign to this step a triangular distribution, which, as explained above, should only be used when information is available on the most likely value. As Dr Sgrillo noted: "There is no scientific evidence to support the choice of a triangular distribution and its respective parameters."[757]

2.522 It is notable that the Australian comments on experts' replies and comments on New Zealand comments on expert responses are entirely silent on the experts responses in relation to importation step 3, other than to downplay the significance of the infestation pathway generally, describing it as only of "minor concern".[758] However, a close analysis of the IRA shows that the surface-contamination/infestation pathways account for more than 80% of the total probability of entry of *N. galligena*

[753] Swinburne RPQ, Qs 77, 78 and 79, p. 13.

[754] Swinburne RPQ, Q 57, p. 7. See also Q 67/68, p. 10.

[755] Latorre RPQ, Q 77, p. 24.

[756] Latorre RPQ, Q 78, p. 24.

[757] Sgrillo RPQ, Q 78, p. 13.

[758] ACER, para. 141, ACNZCER, para. 30.

into Australia.[759] The scientific evidence, as confirmed by the experts' responses, simply does not support the conclusions of the IRA.

(iii) Importation step 4

2.523 The IRA assigned a triangular distribution to importation step 4 (likelihood that *N. galligena* survives routine processing procedures) of between 0.7 and 1, with a most likely value of 0.85. In its first written submission, Australia clarifies that the "0.7 – 1 probability range for Importation Step 4 illustrates that the IRA Team allowed for removal of some surface spores, otherwise it would have assigned a probability of 1 to this step".[760]

2.524 However, as set out in New Zealand's first written submission, and confirmed by the experts' responses, the probability values assigned in the IRA were not based on scientific evidence. In particular, the assignment of an effective probability of 1 for survival of latent infections was not based on scientific evidence. In addition, the IRA did not take into account the scientific evidence that spores will not survive on the surface of fruit.

a. No scientific basis for assuming all latent infections would survive packing house processes

2.525 As set out in New Zealand's first written submission, the IRA's conclusion of a value of 1 for survival of latent infections under importation step 4 failed to take into account that the majority of trade is likely to be "retail ready" apples, delivered "just in time" to the Australian market.[761] Accordingly, any rots that have developed during the period of storage in New Zealand may be graded out prior to packaging and shipment to Australia.

2.526 In its first written submission, Australia accuses New Zealand of its "continued ambivalence towards the mode of trade".[762] New Zealand has

[759] Annex 2 below. Pathways 3, 4, 6 and 7 account for 81.1% of the probability of entry.

[760] AFWS, para. 579.

[761] NZFWS, para. 4.285.

[762] AFWS, para. 576.

comprehensively responded to Australia's arguments on this point at paragraphs 2.36 to 2.42 above.

2.527 Further, contrary to what is suggested in the Australian comments on expert replies[763] and reflected in some of the expert responses to Panel questions,[764] fruit would not be stored for any prolonged period of time in Australia. The nature of 'retail ready' fruit combined with 'just in time' delivery means that fruit would be stored in bulk bins in New Zealand and only packed in order to fulfil specific orders. On this model, fruit is graded immediately prior to packaging and shipment to Australia, minimising the time spent between packing and appearance of the product on the retail shelf in Australia.[765] Accordingly, trading in retail ready fruit would not prevent the detection and removal of any *N. galligena* rots that may develop in cold storage.

2.528 That the IRA team failed to factor in either duration of storage or storage conditions in arriving at an effective figure of 1 for latent survival is confirmed by both experts in their responses to Panel questions.

2.529 Dr Swinburne states that "the store conditions and the duration of the holding period will be a factor in any subsequent development of any quiescent infections that may be present (Berrie, Xu & Johnson 2007 in appendix). For example, if apples held in bulk bins are at a later time graded into retail ready packs those infections which have become visible rots will be removed."[766]

2.530 In addition, Dr Swinburne confirms that "[a]ny infections present may develop into rots during this [storage] time, and this will be strongly influenced by

[763] ACER, para. 170.

[764] Swinburne RPQ, Qs 52, 91.

[765] This has both a quality and economic rationale. First, the suppliers' cool store in New Zealand is likely to be a purpose-designed facility and better for maintaining fruit quality than a distribution centre which deals with a variety of fresh produce. Second, it is uneconomic for New Zealand suppliers to pay (Australian) distribution centres to hold New Zealand fruit for any period of time.

[766] Swinburne RPQ, Qs 77/78/79, p. 13.

both the store temperature and environment (Berrie et al 2007, appendix1). At grading these would be removed, so the numbers of infected fruit will diminish with time."[767]

2.531 Dr Latorre also states that "[i]f lots of mature asymptomatic fruits are kept for several weeks in cold storage in New Zealand, it would be possible to remove infected fruits before export to Australia, lowering the risk of entrance."[768]

2.532 The experts' responses therefore confirm that the IRA's assignment of a value of 1 to this step for survival of latent infections is not supported by the scientific evidence. Dr Swinburne concludes that "the statement that 'none of the pack house measures would reduce infection' is incorrect, as it must also embrace the CA store period"[769] and also that "there are pack house operations that could reduce the probability of the shipment of infected fruit."[770]

2.533 In its comments on experts' replies, Australia states that "[Dr Swinburne] does not appear to acknowledge that the IRA Team's reasoning was concerned with the potential for substantial reductions…."[771] However, the point is that by effectively assigning a probability value of '1' for latent survival the IRA Team assumed that no packing house processes would have any impact on latent infections, a conclusion which Dr Swinburne clearly states is not supported by the scientific evidence.

2.534 Indeed, when Australia in its first written submission notes that "quick export following varying periods of storage" would "*reduce* the likelihood of detecting latent infections" (emphasis added),[772] it also appears to admit that some latent infections would develop and be detected during the period of storage and removed prior to export. "Reducing the likelihood of detecting latent infections" does not mean the likelihood of detecting infections is zero, which is the implication of a probability value of 1 being assigned by the IRA Team for latent survival.

[767] Swinburne RPQ, Qs 78/80/81/82/83, pp. 13-14.

[768] Latorre, Q 79, p. 25.

[769] Swinburne RPQ, Qs 78/80/81/82/83, pp. 13-14.

[770] Swinburne RPQ, Qs 77/78/79, p. 13.

[771] ACER, para. 160.

[772] AFWS, para. 577.

2.535 Accordingly, the reasoning in Australia's first written submission does not support the conclusions arrived at under importation step 4.

b. No evidence that spores survive packing house processes on the surface of fruit

2.536 As set out above, Australia argues in its first written submission that the "0.7 – 1 probability range for importation step 4 illustrates that the IRA Team allowed for removal of *some* surface spores" (emphasis added).[773]

2.537 However, as New Zealand pointed out in its first written submission,[774] and confirmed by the experts' responses,[775] there is no scientific evidence that spores would survive for any length of time on the surface of fruit in the first place. Dr Swinburne confirms that "[t]here is… no evidence to support assertions… such as 'spores would survive waxing' or 'brushing', *because these processes are irrelevant to the inherent inability of conidia to survive for long periods*" (emphasis added).[776]

2.538 Dr Latorre agrees that "[t]he likelihood that inocula contaminating the surface of the fruits can survive this process, attached to the fruit surface, is negligible or zero and it should be disregarded from the risk analysis."[777] He states that "[t]his assumption, 80% likelihood that *N. galligena* will survive routine processing procedures in the packing house, falls within a range that is difficult to legitimise, if this assumption implies that the inoculum must remain on the fruit surface."[778]

2.539 In its comments on experts' replies, Australia appears to concede that the IRA all but ignored surface contamination in the context of importation step 4.[779] This is impossible to reconcile with the fact that, under the IRA, the pathways relating

[773] AFWS, para. 579.

[774] NZFWS, para. 4.282.

[775] See for example Swinburne RPQ, Q 49, p. 4, Latorre RPQ, Q 49, p. 6.

[776] Swinburne RPQ, Qs 77/78/79, p. 13.

[777] Latorre RPQ, Q 79, p. 25.

[778] Latorre RPQ, Q 80, p. 25.

[779] ACER, para. 161. This is also relevant to the IRA's consideration of importation step 6, ACER, para. 164.

to surface contamination (importation steps 3, 5 and 7) account for more than 80% of the overall probability of importation.[780]

(iv) Importation step 5

2.540 Importation step 5 relates to the likelihood that clean fruit is contaminated by *N. galligena* during processing in the packing house. This step was assessed in the IRA as having a triangular distribution with a minimum value of 10^{-5}, a maximum value of 10^{-4} and a most likely value of 5×10^{-5} or 1 in every 20,000 apples. Using Australia's inflated value for the most likely volume of trade this amounts to approximately 7,500 apples per year being contaminated during processing in the packing house.

2.541 Australia argues that New Zealand "conveniently ignores the fact that the Final IRA report contains detailed discussion on importation step 5 including references to relevant scientific literature".[781] In fact, as pointed out in New Zealand's first written submission, none of the scientific studies cited support the conclusions arrived at in the IRA.

2.542 As New Zealand pointed out in its first written submission, the IRA itself considered that the probability of contamination from latent fruit infections presented a "minimal likelihood", the probability of contamination via surface spores on fruit and contaminating the dump water was "extremely small" and the likelihood of clean fruit getting infected due to cankered twigs as "extremely low".[782]

2.543 In its first written submission, Australia criticises New Zealand's "focus on descriptive likelihoods" and "its fixation with using its own qualitative method for risk assessment".[783] However the point, as set out at paragraphs 2.335 to 2.347, is simply that the probability intervals assigned bear no relation either to the qualitative descriptions in the IRA or the underlying science.

2.544 This is confirmed by the experts' responses. Dr Sgrillo states:

[780] See Annex 2 below.

[781] AFWS, para. 591.

[782] IRA, p. 127, NZFWS, paras. 4.288-4.292.

[783] AFWS, paras. 585, 588.

> The IRA Team concludes: "Given the extremely small likelihood of fruit being infested/infected with *N. galligena*, the probability of surface spores being present on fruit and contaminating the dump water is similarly extremely small." and "The likelihood of clean fruit getting infected due to twigs at this stage would be extremely low." However the values chosen do not reflect this conclusion. These values shows that for each 200,000,000 fruit passing through the packing house 10.000 could be contaminated by N. galligena and this could not be considered extremely low. *There is no scientific support to justify the values chosen for the parameters of the distribution* (emphasis added).[784]

2.545 As set out in New Zealand's first written submission, the IRA provides no evidence of contamination of clean fruit by *N. galligena* spores in the dump water. Australia now relies on Scheper[785] to show that during post-harvest washing apples with wounds were prone to storage rots in the presence of high fungal concentration. However, this overlooks the key finding of the study, namely that of the 12,675 New Zealand apples examined following post-harvest apple washing, none of the fruit rots discovered were caused by *N. galligena*.

2.546 Moreover, the Scheper study shows that uninjured fruit would not be susceptible to contamination following post-harvest washing, even in the presence of high fungal concentrations. This is supported by the comments of Dr Swinburne who states that "Conidia are not able to initiate infection through the intact cuticles of fruit, so conidia adhering to unbroken surface are unlikely to survive".[786] As set out at paragraphs 2.33 to 2.35, New Zealand fruit exported to Australia would be Class 1, export quality fruit (i.e. mature, symptomless and wound-free apples). Accordingly, New Zealand fails to see how the Scheper paper supports the IRA's theory about contamination of New Zealand export-quality apple fruit by *N. galligena* spores in the dump tank.

2.547 Australia has provided new "photographic evidence"[787] in an attempt to provide a modicum of scientific credibility to support the IRA's assumptions about

---

[784] Sgrillo RPQ, Q 81, pp. 14-15.

[785] **Exhibit NZ-36**.

[786] Swinburne RPQ, Q 49, p. 4.

[787] **Exhibit AUS-64**.

contamination via cankered twigs in the dump tank. However, the photo exhibited in Australia's first written submission is not evidence of cankered twigs – let alone contamination by those twigs in the dump tank. As Australia concedes, this is simply evidence of "plant debris".[788] Further, it is impossible to relate the image to the particular volume of fruit which has passed through the dump tank. The photograph certainly does not provide a scientific basis for assigning a most likely value of 1 in 20,000 (or 7,500 apples per year) to represent the proportion of apples that would be contaminated with *N. galligena* in the dump tank.

2.548 Australia also cites Lolas and Latorre 1997,[789] a study not referred to in the IRA, as evidence of the development of small cankers around the buds of one year old twigs which it asserts could be harvested with the fruit and end up as trash in the dump tank.[790] However, unless there is rainfall at harvest (which the IRA concedes is not the case in the major apple producing regions of New Zealand[791]), these buds will not produce spores and therefore will not be a source of contamination of clean fruit in the packing house. Further, Lolas and Latorre do not deal with contamination of clean fruit from cankered twigs, nor do they consider whether this would or could occur in the dump tank. Accordingly, this additional study does not support the IRA's conclusions either.

2.549 Finally, Australia now appears to be arguing that latent infections could be a source of contamination in the packing house.[792] Latent infections are by definition, asymptomatic (that is, they do not show rot symptoms and therefore do not produce spores).

2.550 Even if latently infected fruit were to develop rot in storage and produce spores, these spores would be unlikely to survive in the packhouse. Dr Swinburne states that "…if any of the rotted apples had produced spores, it is probable that these [conidia], as mere surface contaminants, would not survive unless, after grading, the

[788] AFWS, para. 592.

[789] **Exhibit AUS-65**.

[790] AFWS, para. 592.

[791] IRA, p. 122.

[792] AFWS, paras. 584-586.

fruit was kept wet for several hours, which is commercially undesirable.[793] In addition, Dr Swinburne states that "[i]f a washing process was interposed in this final grading, disinfectant in the water would destroy any conidia thus displaced."[794]

2.551 While Australia concludes that the IRA team "clearly"[795] took into account the low likelihood of contamination in the pack house in determining the probability range for importation step 5, the reality is that it is far from "clear" how, in the absence of scientific evidence, the IRA could arrive at the conclusion that 7,500 fruit annually would be contaminated in this way.

2.552 Although Australia continues to insist that the infestation/surface contamination pathways (importation steps 3, 5 and 7) were only of minor concern,[796] in fact pathway 3, which relies on Australia's conclusions about clean fruit from non-infected orchards being contaminated in the packhouse[797] accounts for more than 76.6% of the total probability of entry under the IRA.[798]

2.553 As the experts confirm, there is absolutely no scientific support for the IRA's consideration of this importation step. Dr Latorre states that "the possibility that clean fruits may be infected from inocula contaminating epiphytically mature fruits in dump water in packing houses (importation step 5) is negligible and irrelevant…there is no experimental information convincingly supporting this conclusion".[799] He concluded that "[t]here is no scientific literature to support the assumption that the rate of clean fruit contamination with *N. galligena* would vary between 10^{-4} and 10^{-5} (most likely value of 5×10^{-5})…in the packing house. Based on disease knowledge, it is extremely

[793] Swinburne RPQ, Qs 77/78/79, p. 13. Relative humidity in cold stores in New Zealand is below 100% humidity and therefore conditions are not conducive to sporulation from European canker rots, Amos et al, *The effect of coolstore design and operation on air relative humidity*, Massey University, Palmerston North, New Zealand, 1993 **Exhibit NZ-123**.

[794] Swinburne RPQ, Qs 77/78/79, p. 13. As the IRA acknowledges, more than 50% of New Zealand pack houses use disinfectants, IRA, p. 72.

[795] AFWS, para. 593.

[796] ARPQ, Q 70, ACER, para 141, ACNZCER, para 30.

[797] Pathway 3, IRA, p. 24.

[798] Annex 2 below.

[799] Latorre RPQ, Q 49, pp. 6-7.

unlikely to occur under normal fruit management. *This should be disregarded from the risk analysis*" (emphasis added).[800]

2.554 Accordingly, the IRA's analysis of importation step 5 is neither supported by respectable scientific evidence nor objectively and coherently related to the scientific evidence relied on.

(v) Importation step 6

2.555 The IRA also assigned a probability value of 1 to importation step 6 (likelihood that *N. galligena* survives palletisation, quality inspection, containerisation and transportation).

2.556 Australia states in its first written submission that it "does not accept New Zealand's bald assertion that the probability assigned to importation step 6 'must certainly be lower than 1'"[801] However, as set out in relation to importation step 4 above, there are significant reasons to doubt the Australian assignment of 1 (*N. galligena* certain to survive) for this importation step. In particular, the IRA's analysis overlooks the possibility that rots that develop during storage may be removed prior to export. Dr Swinburne comments that "the removal of any rots during grading in NZ would … reduce the number arriving in Australia; this does not seem to have been allowed for in Step 6 (IRA p127)".[802] Dr Sgrillo states that "the parameters of the distribution should reflect the probability of some infected fruits being detected in quality inspection. The choice of the value 1 for the probability of survival of *N. galligena* means that infected fruits will never be detected in the quality inspection".[803]

2.557 Moreover, the probability of '1' assigned to importation step 6 assumes that all surface spores would survive palletisation, quality inspection, containerisation and

[800] Latorre RPQ, Q 81, p. 26. See also Swinburne RPQ, Qs 77/ 78/79, 78/80/81/82/83 pp. 13-14.

[801] AFWS, para. 598.

[802] Swinburne RPQ, Q 91, p. 16.

[803] Sgrillo RPQ, Q 82, p. 15.

transport.[804] For the reasons outlined above, there is no scientific basis for the assumption that spores on the surface of fruit would survive these processes. Dr Latorre confirms that "…these post-harvest processes can affect survival of external inoculum, epiphytically contaminating the fruit surface" and that "a value of 1 would be unacceptable".[805]

2.558 Accordingly, the IRA's conclusions do not find scientific support in the evidence relied on.

<u>(vi) Importation step 7</u>

2.559 Importation step 7 relates to the likelihood that clean fruit is contaminated by *N. galligena* during palletisation, quality inspection, containerisation and transportation. This step was assessed in the IRA as having a uniform distribution with a minimum value of 0 and a maximum value of 10^{-6}.

2.560 The key point made in New Zealand's first written submission regarding importation step 7 concerned the incongruity between the description in the IRA of the risk of contamination at this stage as "negligible", and the application of a probability range with a midpoint of one in two million apples. In assigning this probability range, the IRA treats a negligible event as one that will occur with some regularity.

2.561 Australia's attempted rebuttal fails to engage with this point. Instead, Australia simply asserts that it "rejects New Zealand's unsubstantiated assertion that the probability range for importation step 7 'has no basis in science'".[806] It is notable however, that Australia's first written submission then fails to refer to any evidence, scientific or otherwise, that contamination during this importation step has ever happened or could ever happen. It also ignores the fact that the IRA, similarly,

[804] IRA, p. 127: "Because spores are microscopic any remaining surface infestation will also remain undetected and survive".

[805] Latorre RPQ, Q 82, p. 26. See also Q 49, p. 6, Q 71, p. 20.

[806] AFWS, para. 601.

provides no references to any such evidence. Indeed, the IRA's assessment is limited to two sentences, and concludes that the risk is "negligible".[807]

2.562 The expert responses confirm the probability range assigned to this step in the IRA is not sufficiently supported by the scientific evidence.

2.563 Dr Latorre states that "[t]here is no experimental evidence allowing us to assume that the likelihood that packed clean fruit is contaminated with *N. galligena* would be different from zero…this evaluation...falls within a range that could not be considered legitimate. I suggest discounting this step from the risk analysis."[808]

2.564 Dr Latorre also states that "…some of these steps (e.g., steps 3, 5 and 7) are indeed mere possibilities (hypothesis rather than true facts) that need to be confirmed. In such cases, a probability equal to zero should be assigned or even better, disregard the steps considered almost certain not to occur."[809]

2.565 The treatment of this importation step in the IRA highlights the problems of using a per apple methodology in conjunction with inappropriate pre-determined probability ranges. The arguments in Australia's first written submission simply underline that Australia is unable to provide any reasons, let alone coherent and objective ones, as to why this importation step should be ascribed a probability that predicts on average 75 apples per year (based on Australia's inflated most likely volume of trade estimate) becoming contaminated in the course of palletisation, quality inspection, containerisation and transportation.

<u>(vii) Summary of entry</u>

2.566 The result of the IRA's flawed analysis of the individual importation steps is a highly inflated value for the likelihood of entry of *N. galligena* into Australia – a mean infection/infestation rate of 0.0068% of apples imported annually from New Zealand. This anticipates that approximately 1 in 15,000 apples would be latently

[807] IRA, p. 128.

[808] Latorre RPQ, Q 83, pp. 26-27. See also Swinburne RPQ, Qs 77/78/79 and 78/80/81/82/83, pp. 13-14, Sgrillo RPQ, Qs 133-134, pp. 26-29.

[809] Latorre RPQ, Q 138, pp. 38-39.

infected or infested, or around 10,000 occurrences per year – for an event that has never been documented to occur.

2.567 As demonstrated in New Zealand's first written submission, despite the billions of apples traded by New Zealand over the past decades, there has been no reported discovery of imported mature New Zealand apple fruit with fruit rots caused by *N. galligena*.

2.568 That the IRA's overall probability of entry is not sufficiently supported by scientific evidence is confirmed by the experts. Dr Latorre concludes that "considering that mature apple fruits are from areas where climate conditions are not particularly conducive for fruit infection, a mean infection/infestation rate of 0.0068% falls out off the range that could be considered legitimate on the basis of general knowledge regarding the European canker."[810]

2.569 Dr Sgrillo confirms that "…the data presented in the IRA were not considered sufficient to validate each of the hypotheses proposed because most of the values of the distributions were established by guesses and not by sampling of the real world. … Many of the parameters used in the simulation were considered overestimated because they didn't reflect the meaning of the qualitative category in the population. As consequence, the final result could also be overestimated."[811]

2.570 Dr Swinburne states that "…this outcome does not inspire confidence."[812]

2.571 As demonstrated above, Australia attempts to overcome the lack of scientific support for its conclusions about a pathway via latently infected New Zealand apples by relying on evidence of latent infections from areas climatically distinct from New Zealand and an unverified personal communication. It attempts to overcome the flawed infestation/surface contamination pathway by collapsing the distinction between contamination and latent infection and by downgrading its significance to the IRA's analysis of the probability of entry, which is not supported by the IRA's

[810] Latorre RPQ, Q 84, p. 27.

[811] Sgrillo RPQ, Q 84, p. 16.

[812] Swinburne RPQ, Q 84/85, p. 14.

calculations. Finally, Australia attempts to substantiate the IRA's conclusions by revising positions taken in the IRA and presenting new evidence.

2.572 None of these arguments can obscure the fact that the IRA's evaluation of the probability of entry was not based on coherent reasoning or respectable science and is not sufficiently supported by the scientific evidence.

(b) The IRA's evaluation of proximity, exposure, establishment and spread is not supported by sufficient scientific evidence

2.573 As for probability of entry, in its first written submission New Zealand identified a lack of sufficient and respectable science in the Australian evaluation of proximity, exposure, establishment and spread. Australia's submissions in response fail to rebut New Zealand's case on these points.

<u>(i) Proximity</u>

2.574 In its first written submission, Australia argues that the proximity ratings are clearly set out and that "importantly, the IRA team provided a justification for all of the proximity ratings".[813] However, the point made in New Zealand's first written submission is that the numerical ranges assigned in the IRA are arbitrary and turn events which are described as mere possibilities into events which have a high probability of occurring.

2.575 Australia now attempts to preclude challenge to any proximity rating in the IRA report other than in relation to the combination of commercial fruit crops near orchard wholesalers.[814] However, the absence of an objective or rational relationship between the proximity rating and scientific evidence is true of all the proximity ratings for each of the utility point by exposure group combinations set out in the IRA. In its first written submission New Zealand identified the proximity rating assigned to the orchard wholesaler/commercial fruit crops combination as a particularly egregious example. The IRA assigned a proximity rating of '1' to an

[813] AFWS, para. 607.

[814] AFWS, para. 611. Australia argues that given that New Zealand has not specifically challenged any other proximity rating in the IRA, it is precluded from making further claims at a later stage of proceedings.

event which is described in ambiguous terms: "orchard wholesaler waste *may* be dumped at a site within the premises or in landfills close to orchards. Before waste is finally disposed of, it *could* remain exposed to the elements" (emphasis added).[815]

2.576 As set out above in paragraphs 2.258 to 2.264, this proximity rating disregards ordinary orchard waste management practices. This is supported by the experts' responses. Dr Latorre considered this scenario so unlikely that the "possibility should be disregarded from the risk analysis."[816]

2.577 Dr Swinburne also identified "several factors that mitigate against the possibility that dumped infected fruit pose a hazard to nearby orchards".[817]

2.578 Further, as the IRA[818] and Australia's first written submission make clear,[819] the rating also presupposes that a proportion of New Zealand exports would be in bulk bins requiring repacking at orchard wholesalers. For the reasons outlined at paragraph 2.40, this assumption is not supported by the realities of New Zealand's apple trade.

2.579 Mere assertion does not constitute a sufficient scientific basis for the conclusions arrived at, as required for a valid risk assessment within the meaning of Article 5.1.

(ii) Exposure

2.580 In its first written submission, New Zealand demonstrated that the IRA's analysis of exposure was not sufficiently supported by scientific evidence, given that not all latently infected fruit would rot and produce spores; mummified fruit would not develop perithecia and ascospores in Australian conditions; spores would not disperse effectively from discarded fruit to susceptible hosts; and the climatic

[815] IRA, p. 130.

[816] Latorre RPQ, Q 89, p. 30.

[817] Swinburne RPQ, Q 89, p. 15.

[818] The packing of New Zealand fruit from bulk bins and/or the repacking of boxes of New Zealand fruit would bring packing house workers and host trees (apples and pears) in close proximity to both New Zealand apples and apple waste. IRA, p. 131.

[819] AFWS, paras. 609-610.

conditions in Australia are not suitable for fruit infection to occur. These points are confirmed by the experts' responses to Panel questions.[820]

2.581 Australia's attempted rebuttal relies on evidence that relates to infection from tree to tree in the orchard in the northern hemisphere – not from a discarded New Zealand apple on the ground in Australia, unverifiable assertions about what the IRA team did or did not consider, and new evidence, including the deeply flawed BRS climate analysis. None of these arguments cure the inadequacies of the IRA's original analysis or provide sufficient scientific support for the IRA's conclusions.

a. No evidence to support IRA's assessment of latent infections in New Zealand

2.582 Australia begins its rebuttal of New Zealand's first written submission with the assertion that "there is no doubt that some latently infected apples will arrive in Australia".[821] However, as the discussion regarding the importation steps above indicates, there is in fact significant doubt (which Australia has failed to rebut) regarding the likelihood of latently infected apples being imported from New Zealand. For the reasons outlined earlier at paragraphs 2.138 to 2.147 and 2.152 to 2.156, the fact that Australia can only point to the Ivess letter in support merely serves to underline the lack of sufficient scientific evidence underpinning its contention.

b. No scientific evidence all latently infected fruit would rot and produce spores

2.583 Even if Australia's flawed argumentation concerning the probability of entry via latently infected New Zealand apple fruit were to be accepted, in its first written submission, New Zealand demonstrated that not all latently infected fruit would develop rot symptoms and accordingly would not produce spores. Moreover, even if rot symptoms were to develop, not all rots will produce spores.

[820] NZFWS, paras. 4.78-4.92, 4.302-4.317.

[821] AFWS, para. 613.

2.584 In its first written submission, Australia states that there is "no reason why rotting fruit coming out of cold storage would not produce spores".[822] Although Australia, in its comments on New Zealand's comments on the experts' replies,[823] now attempts to resile from this statement, Australia's first written submission is clear. Australia presents development of symptoms and sporulation simply as a question of time and opportunity:

> In an infected fruit…the fungus is within the host tissue and it has the potential to resume growth at any time *given suitable conditions*. For example, if an infected fruit sits on a waste dump for long periods, it is likely that at some stage there would be appropriate conditions for the fungus to grow. (Emphasis added.)[824]

2.585 Australia's argument is not supported by the scientific evidence.

2.586 First, not all infections produce symptoms. Biggs 1995 demonstrated for the fungal fruit rot pathogens *B. dothidea* and *C. acutatum* a general biological principle that not all infected fruit produce symptoms.

2.587 In its first written submission, Australia dismisses the Biggs study as "not entirely relevant"[825] on the basis that it did not specifically study *N. galligena*. However, that view would disallow any biological interpretation that did not arise from studies of *N. galligena*. It is of note that Australia is selective in its dismissal of Biggs as the IRA is content to rely at other points of its analysis on studies which examined fungal pathogens other than *N. galligena* (for example the IRA's reliance on Holmes 1993[826]).

2.588 Second, individual apples which have been discarded on the ground will most likely decompose or be consumed by animals before the latent infection has a chance to develop. Australia argues that there are 'real world examples' to show that spore production on rotting apples occurred without the apples being consumed by

---

[822] AFWS, para. 621.

[823] ACNZCER, para 36.

[824] AFWS, para. 620.

[825] AFWS, paras. 596, 620.

[826] **Exhibit AUS-59**, AFWS, para. 589.

animals first.[827] However, the 'real world' examples cited are examples of fruit rots developing in apples on trees in the orchard,[828] not on discarded fruit in a waste dump.

2.589 Third, infected parts of the apple may be eaten by consumers before the rot has developed. Australia exhibits the Puia *et al.* 2004 paper which showed that *N. galligena* was isolated from the locules of rotten fruit, in an attempt to show that the cores of fruit which had been consumed and then discarded could still be infected.[829] However, infection will not always be present in the locules of fruit. Indeed, as Australia's first written submission makes clear, infection may occur from the fruit's surface inwards, through scab lesions or wounds caused by insects.[830] A fruit may therefore be partially consumed (including the infected portion of the fruit) before the infection has reached the locules. Moreover, Australia's first written submission fails to engage with the argument made in New Zealand's first written submission that the IRA simply assumed that all latently infected fruit would be discarded as waste, and did not make any allowance for the fact that in some cases only cores would be discarded as a factor reducing risk.

2.590 Fourth, although Australia's first written submission simply asserts that "under Australian conditions, conidia and ascospores would be produced",[831] the IRA does not provide the necessary evidence to show that the conditions in Australia would be suitable for sporulation. Dr Latorre states that "[t]he available information demonstrating that mature, asymptomatic apples (infected or latently infected) can readily sporulate under the Australian environment is not provided."[832]

2.591 In particular, the IRA did not consider the requirements for sporulation of wetness or high relative humidity (RH) from discarded apple fruit in the field in

[827] AFWS, para. 640.

[828] Dillon-Weston, **Exhibit NZ-60**, clearly states that the mummies were found *on trees*, AFWS, para. 640 also refers to McCartney (**Exhibit NZ-10**) as a 'real world' example, however, McCartney showed that naturally infected apples, partially buried in moist sphagnum peat and *left exposed to daylight in a 40 degree (F) glass door refrigerator*, developed perithecia with immature asci.

[829] AFWS, para. 640.

[830] AFWS, para. 556, citing Swinburne 1975.

[831] AFWS, para 630.

[832] Latorre RPQ, Q 69, p. 19.

Australia. Dr Swinburne confirms that for rotted fruit (arising from latent infections) to produce spores and become infectious, fruit would have to experience high RH or wetness. He considers that "the importance of high humidity to conidia production has to be stressed…"[833] and that "[f]ruits which develop rots later within the retail chain in conditions with lower RH do not usually produce spores (personal observation) which conforms with the observations (eg. Wilson, 1966) for wood infections, that a period of leaf-wetness is required for conidia formation."[834] Further, with respect to the situation which Australia asserts accounts for the greatest risk for disease establishment (fruit discarded by consumers) Dr Swinburne states "[t]o become infectious units, discarded apples would require a period of 'leaf wetness' to develop spores. It is most unlikely that in the prevailing climate all rotted apples so discarded would become infectious units."[835]

2.592 Accordingly, contrary to the assertion in Australia's first written submission, there are many reasons why latently infected fruit removed from cold storage and discarded in a waste dump (or elsewhere) would not develop rots and spores.[836]

c. No scientific basis to support development of ascospores from latently infected fruit in Australia

2.593 As demonstrated in New Zealand's first written submission, there is no scientific basis for the supposition in the IRA that latently infected New Zealand apples will rot, mummify, develop perithecia and produce ascospores as a source of new infections in Australia.

2.594 Australia asserts that "rotting fruit can produce both conidia and perithecia with ascospores"[837] and argues that because the "New Zealand strain" of *N. galligena* is known to produce both conidia and ascospores (the latter forming on perithecia in

[833] Swinburne RPQ, Q 69, p. 11.

[834] Swinburne RPQ, Q 58, p. 8.

[835] Swinburne RPQ, Q 91, p. 16. See also Swinburne RPQ, Q 58, p. 8.

[836] Cf. AFWS para 621.

[837] AFWS, para 614.

August) there is “no reason why [ascospores] would not form on a discarded rotting fruit in Australia in August”.[838]

2.595 First, New Zealand rejects outright any attempt to identify a “New Zealand strain” of *N. galligena*. The proposition is without scientific basis - and Australia’s first written submission does not cite any evidence in support of the existence of such a strain.

2.596 Second, while perithecia producing ascospores have been reported on tree cankers, perithecia have never been reported on rotted fruit in New Zealand.[839]

2.597 In the Dillon-Weston study, on which Australia relies,[840] only 3 out of 700 mummified fruit from a heavily infected orchard were found to have developed perithecia with ascospores.[841] However, as Dr Swinburne states in his replies to Panel questions, “[t]he formation of perithecia on fruit has been observed very rarely (Dillon-Western, 1927), and does not feature in any subsequent epidemiological study (Swinburne, 1975; CAB 2001). It is therefore most unlikely that ascospores would be formed or released from rotted fruit.”[842]

2.598 Dr Swinburne also states that it is “extremely unlikely that [rotted fruit] would produce perithecia, still less that ascospores would be released”[843] and that it “need not be considered further”.[844]

2.599 Dr Latorre confirms that “…there is not enough scientific [evidence] supporting the role of perithecia (ascospores), eventually developed on rotted fruits, on the overall epidemiology of European canker.”[845]

[838] AFWS, para. 614.

[839] Brook and Bailey, **Exhibit AUS-53.**

[840] AFWS, paras. 614 and 623.

[841] **Exhibit NZ-60**.

[842] Swinburne RPQ, Q 58, pp. 7-8.

[843] Swinburne RPQ, Q 69, p. 11.

[844] Swinburne, RPQ, Q 73, p. 12.

[845] Latorre RPQ, Q 70, p. 19.

2.600 Third, the conditions in which the mummified fruit produced perithecia and ascospores in the Dillon-Weston study are not the same as those relating to a discarded apple fruit in Australia. Those apples had mummified on the tree, in the orchard, over a European winter.[846]

2.601 By contrast, the climatic conditions in Australia's major apple growing regions, in particular the lack of rainfall, would likely delay ascospore development.[847] As discussed above at paras. 2.199 to 2.203, in some geographic areas, ascospores play no role in the development of the disease. In this regard, it is significant that during the Tasmanian outbreak no ascospores were ever discovered (either on mummified fruit or on wood cankers).[848] Australia's attempt to retrospectively invent an explanation for the possible absence of mature asci – a heterothallic strain[849] requiring a mating partner which was supposedly absent in Tasmania - cannot remedy the deficiencies in the IRA's analysis of this point.

2.602 The unsuitability of the Australian climate to ascospore development from mummified fruits is confirmed by Dr Swinburne: "This is a very rare occurrence and most unlikely to be found in the climates of NZ or Australia."[850] Accordingly, Dr Swinburne suggests that Braithwaite's speculation about rotten fruit transmitting infection based on European observations on the formation of ascospores on mummified fruit, should be "disregarded".[851]

2.603 Accordingly, for the reasons outlined above, and contrary to Australia's statement in its first written submission, there are in fact "many reasons" why ascospores would not "form on discarded rotting fruit in Australia in August".[852]

---

[846] **Exhibit NZ-60**, p. 5: in order to ascertain the prevalence of this fungus on the shrivelled fruits, seven hundred were collected **from the trees** and examined. See also Swinburne 1964, **Exhibit NZ-11**, p. 493: Such fruit, if left on the tree, become mummified, and perithecia are formed during the winter following infection.

[847] Munson, **Exhibit NZ-37**, Wessel, **Exhibit NZ-117**.

[848] Ransom, **Exhibit NZ-13**.

[849] AFWS, paras. 631- 632.

[850] Swinburne RPQ, Q 54, p. 6.

[851] Ibid.

[852] Cf. AFWS, para. 614.

2.604 Although Australia in its comments on the experts' replies to questions and comments on New Zealand's comments on the experts' replies now attempts to downplay the significance of the role of ascospores in relation to exposure, stating that the IRA team "were primarily concerned with conidia"[853,] this is not supported by a plain reading of the IRA (nor a reading of the Australian first written submission[854]). Australia selectively quotes from the IRA which states (in full, portions omitted by Australia italicised): "Fruit discarded into the environment could further rot, become mummified and develop viable fungal inoculum, conidia or perithecia that could initiate new infection although perithecia rarely develop on infected fruit in waste dumps."[855] It also states that "As the rot progresses, the fruit may become mummified followed by the development of perithecia in autumn, releasing ascospores in winter and spring".[856]

2.605 Australia now relies on the fact that conidia are the only spores expressly mentioned in the IRA Team's analysis of the various exposure groups.[857] In support, Australia quotes the only reference to conidia from the entire analysis of the exposure groups, as for the rest, the IRA's analysis uses only the generic term "spores".[858]

2.606 That the IRA was primarily concerned with conidia was clearly not apparent to Dr Swinburne who commented that "by stating 'a significant exposure factor for *N. galligena* is the fact that the fungus has a specific mechanism for spore dispersal' in the conclusion on p. 138, suggests the outcome [on exposure] was heavily reliant on the erroneous presumption that rotten fruit would release ascospores".[859]

2.607 Australia argues that Dr Swinburne's interpretation is not correct and points to the use of the phrase "specific mechanism for spore dispersal" (emphasis added) which it asserts shows that the IRA was concerned with conidia rather than ascospores

[853] ACER, paras. 180 and 182. ACNZCER, para. 39.

[854] AFWS is clear: "production of perithecia from rotted or mummified apples on the ground has been clearly demonstrated" (para. 623). "Under Australian conditions, conidia and ascospores would be produced" (para. 630).

[855] IRA, p. 135.

[856] IRA, p. 134.

[857] ACNZCER, para. 39.

[858] IRA, pp. 137-138.

[859] Swinburne RPQ, Q 84/85, p.14.

(which, Australia argues, are more accurately covered by the phrase "spore release").[860] However, New Zealand notes that the IRA frequently uses the term 'dispersal' in relation to ascospores throughout its consideration of 'exposure'. [861]

2.608 Accordingly, Australia's attempts to retrospectively rationalise the IRA's faulty conclusions on ascospores cannot be supported.

d. No scientific evidence to support dispersal from infected fruit to new host

2.609 As demonstrated in New Zealand's first written submission, even if a latently infected fruit were to rot and develop spores, sufficient quantities of spores are unlikely to be dispersed from a single discarded apple on the ground or in a waste dump to a host.

2.610 While Australia argues in its first written submission that "it is well accepted that spores are dispersed by rain splash and wind" and that "many studies discuss this dispersal mechanism within orchards",[862] this fails to engage with the key point made in New Zealand's first written submission that all the evidence of dispersal followed by infection cited in the IRA and in Australia's first written submission[863] comes from cankers on a tree – not from a single discarded apple on the ground or in a compost heap.

2.611 Moreover, Australia fails to take into account that in all dispersal there is a very steeply declining dispersal gradient of numbers of spores from the source of release. Common sense dictates that this gradient will be far steeper from a point source on the ground (for example a single discarded apple) than from a canker on a tree.

[860] ACNZCER, para. 40.

[861] For example, the IRA states that "*N. galligena* produces two types of spores: aerially *dispersed* ascospores and water-*splashed* conidia….", and that "ascospores…are better adapted to long-distance *dispersal* than conidia" (emphasis added), IRA, p. 135.

[862] AFWS, para. 615, and see also paras. 622-623.

[863] AFWS, paras. 615, 622-623, 636.

2.612 This is confirmed by the experts. Dr Swinburne states that "[t]he dispersal distances for rain splashed conidia quoted in the literature referred to in Australia's IRA… refer to conidia released from tree cankers above ground level. For a fruit rotting on the ground it is reasonable to expect that the distances would be smaller, as argued in the NZ FWS."[864] In addition, Dr Swinburne notes that "[i]t must be evident that for splash dispersal to operate from a rotted apple on the ground the lesion has to be facing upwards; thus subject to further chance."[865]

2.613 Dr Latorre also agrees with the statement in New Zealand's first written submission that "dispersal for any significant distance is unlikely to occur when ascospores are produced by perithecia on an apple on the ground where they are less likely to become airborne".[866] While Australia speculates in its first written submission that ascospores "are likely to be dispersed from mummified apples on the ground"[867] it provides no evidence to support this. In any event, as set out above, the likelihood of ascospores being produced from mummified fruit in Australia has been dismissed by the experts.

2.614 Australia now claims that the IRA team agreed that dispersal "by a few metres" was all that would be required in order for a rotting apple in a waste dump at an orchard wholesaler or in a backyard compost heap to transfer to a susceptible host.[868] However, this assumption is not evident from a reading of the IRA, and certainly no evidence is provided for the conclusion that 'a few metres' will be the likely distance between the rotten fruit and the susceptible host.[869]

---

[864] Swinburne RPQ, Q 73, p. 12

[865] Swinburne RPQ, Q 73, p. 12.

[866] Latorre RPQ, Q 73, p. 21.

[867] AFWS, para. 623.

[868] AFWS, para. 636, ACER, para. 184.

[869] In its assessment of proximity, the IRA simply assumes in relation to consumers near household and garden plants that "pome fruit trees and other hosts are commonly located in some back gardens throughout Southern Australia and apple waste disposed of in compost may be in *close proximity* to these plants" (p. 132). In its assessment of proximity of orchard wholesalers near to commercial fruit crops, the IRA asserts that "all orchard wholesalers would be in *close proximity* to commercial fruit crops" (p. 130).

2.615 Australia also asserts birds and insects are potential agents to transfer the spores from infected fruit.[870] However, there is no evidence that this has ever occurred. The citations provided in Australia's first written submission are to Agrios[871] and Butler[872] which merely speculate that spread is "perhaps" by birds and insects but cite no scientific evidence in support of that proposition. Both Drs Swinburne and Latorre confirm in their replies to Panel questions that there is no scientific evidence of birds or insects being involved in the dispersal of *N. galligena*.[873] Dr Latorre states that "these considerations are not acceptable and would not be legitimate according to the standards of the scientific community."[874] Accordingly, there is no scientific basis for placing any weight on birds and insects as potential vectors for the dispersal of spores.

e. Australian climate is not suitable for infection

2.616 Even if spores were to be dispersed onto a host, New Zealand's first written submission showed that the Australian climate is not suitable for European canker infection to occur. While Australia in its comments on New Zealand comments on expert replies emphasises the IRA's acknowledgement of the importance of climatic conditions for disease development,[875] the point made by New Zealand in its first written submission, and confirmed by the experts' responses, is that the IRA's analysis of those 'critical' climatic conditions was flawed.

2.617 In response, Australia argues that New Zealand's climatic analysis is too narrow[876] and that the potential distribution of European canker in Australia covers a much larger area than suggested. However, for the reasons set out at paragraphs 2.168

[870] AFWS, paras. 615, 635-636. IRA, pp. 136-138. Under the exposure group 'wild and amenity plants', the IRA states that "[b]irds commonly feeding at waste disposal sites could transfer spores from infected/infested apple cores to branches of susceptible hosts in the immediate surrounds where they could gain entry through wounds".

[871] **Exhibit AUS-38**.

[872] **Exhibit AUS-60**.

[873] Swinburne RPQ, Q 88, pp .14., Latorre RPQ, Q 88, p. 30.

[874] Latorre RPQ, Q 88, p. 30 See also Drs Cooke and McCracken (**Exhibit AUS-78**) who, in their responses to questions from the IRA team (2003), said that they were "not aware of any evidence that insects have a significant role in dispersal", p. 8.

[875] ACNZCER, para 42.

[876] AFWS, paras. 616, 627-628.

to 2.185, Australia neither demonstrates that the Beresford and Kim parameters are too restrictive nor shows that the New Zealand analysis under-predicts the incidence of European canker. Indeed, in its own "modelling", Australia shows that only by over-predicting the incidence of European canker risk can the conclusions of the IRA be sustained. The flaws in the BRS report are effectively already conceded by Australia, given that Australia has now indicated the need to produce its third report on climate, to be appended to its second written submission.

f. No correlation between the scientific evidence and the probability values for exposure

2.618 As pointed out in New Zealand's first written submission, there is no objective relationship between the scientific data cited in the IRA and the overall probability values ascribed to exposure. This is particularly evident in relation to the threshold number of spores required for infection and the IRA's analysis of host susceptibility.

2.619 With respect to the number of spores required for infection, in its first written submission, Australia argues that New Zealand has misrepresented the threshold infection figure of 1000 conidia.[877] Australia now attempts to place weight on those studies cited in the IRA which support the idea that lower numbers of spores may initiate infection.[878]

2.620 However, those studies cited in the IRA which show infection may occur with a lower number of spores all occurred under optimal laboratory conditions. By contrast, in experiments conducted in the field, Dubin and English 1974 found that "extremely high inoculum levels can be observed during the infection period".[879] This is consistent with the finding in Latorre 2002, cited in the IRA,[880] that European canker is more aggressive in areas where "abundant" ascospores are produced during leaf fall.

[877] AFWS, para. 642.

[878] McCracken **Exhibit AUS-77**, Cooke **Exhibit AUS-78**, and Dubin and English, **Exhibit AUS-67**.

[879] **Exhibit AUS-67**, p. 1203.

[880] IRA, p. 136.

2.621 Equally, as pointed out in New Zealand's first written submission, in relation to host plant susceptibility, the IRA cited Wilson 1966 who found that leaf scars (the most likely sites of infection on apple trees) remained susceptible for 28 days, without explicitly factoring in the highly artificial conditions in which the study was performed.[881] The fact that Wilson kept the trees wet for 72 hours before placing them in optimum temperature for growth of the fungus was identified by Dubin and English 1974[882] as the likely explanation for the difference between the results of Wilson and Crowdy 1952. Crowdy found that in the field leaf scars became much less susceptible after one hour and highly resistant after 48 hours.[883] As Dr Swinburne states in his replies to Panel questions "[a]ll studies made under field conditions conclude that leaf scars are susceptible only for a few hours after leaf fall (reviewed in Swinburne 1975), leading to the conclusion that the growth cabinets used by Wilson lead to conditions not normally encountered in nature."[884]

2.622 New Zealand does not infer, as Australia's first written submission implies,[885] that laboratory studies of pathogens are irrelevant to conducting a risk assessment, but it considers, as the panel found in *Japan – Apples (Article 21.5 – US)*, that weight should not be placed on studies which are too far removed from natural conditions.[886]

2.623 Australia simply asserts that the IRA Team considered the differences in circumstances, including whether particular studies were conducted under laboratory conditions.[887] However, any such weighting is not transparent. In fact, the IRA simply arrives at an overall figure for exposure for each of the utility points and exposure groups, without attributing probability values to various factors (e.g. required

[881] IRA, p. 136, Wilson **Exhibit NZ-64**.

[882] **Exhibit AUS-67**.

[883] **Exhibit AUS-67**, p. 1202. Dubin and English showed that after 10 days, only 5% of leaf scars were still susceptible to conidial infection and none were susceptible thereafter.

[884] Swinburne RPQ, Q 73, p. 12.

[885] AFWS, para. 638.

[886] Panel Report, *Japan – Apples (Article 21.5 – US)*, para. 8.65.

[887] AFWS, para. 638.

inoculum dose, host plant susceptibility) and without expressly weighing the various scientific literature cited.

2.624 The lack of transparency is confirmed by the experts in their responses. Dr Latorre considered that "…it is difficult to judge the likelihood assigned to each parameter…it is not clear how Australia's IRA relates the inoculum dose necessary for infection and the probability of exposure to susceptible host plants."[888]

2.625 Dr Sgrillo states that "[t]he quantitative data regarding the inoculum dose necessary for an *N. galligena* infection to occur, cited by IRA, were not used by the IRA Team, at least in a direct way. The minimum and maximum parameters elected for the Exposure are not directly derived from the source data….the IRA Team does not [explain] how the available data were used."[889]

2.626 In the absence of any objective and transparent relationship between the evidence and the numbers arrived at, the IRA's analysis can hardly be described as "objectively justifiable".

g. The IRA did not consider three-way interaction between pathogen, host and climate

2.627 In its first written submission,[890] and responses to Panel questions,[891] Australia also criticises New Zealand for failing to consider the three key factors which must be present for new infections to occur: pathogen (sufficient inoculum) a susceptible host and conducive climatic conditions.

2.628 New Zealand agrees that all three of these factors need to be present for infection to occur and has dealt with all of these aspects comprehensively in its first written submission.[892] However, the issue is not whether New Zealand considered all three elements. Rather, the issue is that *the IRA* failed to consider the three-way simultaneous interaction between these factors, each of which would be required to

[888] Latorre RPQ, Q 85, p. 27.

[889] Sgrillo RPQ, Q 85, p. 16.

[890] AFWS, para. 532.

[891] ARPQ, Q 77.

[892] NZFWS, paras. 4.78-4.86, 4.312-4.314, and 4.318-4.319

align in order for new infections to occur following the entry of the pathogen into Australia.

2.629 The IRA does not make clear whether or how it considered the likelihood of a rotten apple being discarded, turned upright, in proximity of a few metres from a host which is shedding leaves, and all at a time when there is sufficient rain for spore production, release, and infection.

2.630 Australia's reference in its comments on expert replies to a "sequence of events"[893] rather than a simultaneous interaction between the various factors continues to overlook this issue.

2.631 The weakness of the IRA's analysis of exposure is confirmed by the experts.

2.632 Dr Swinburne observes that "[t]he 'exposure value' quoted, assuming it is credible to deduce such a factor, seems to make assumptions regarding the year-round availability of infection sites, and that all discarded apples discharge spores all year, which are not correct."[894]

2.633 Dr Latorre states that "[a]nalysis of the climate conditions in the potential entrance areas is discussed only briefly….Weather information for the entrance periods would allow experts to assess the probability that mature fruit carrying latent infections will develop symptoms, sporulate, liberate the inoculum and spread it to nearby hosts. …Fruit importation (and inoculum availability) could occur when leaf scars are not present, reducing the probability of establishment and spread to zero".[895]

2.634 In its comments on the experts' replies, Australia insists on the year-round availability of infection sites, relying on pruning cuts and other injuries.[896] Dr Latorre also acknowledges those infection sites, but confirms that leaf scars in autumn (May/June in the Southern Hemisphere) are the most common.[897] There is no analysis in the IRA about the relative likelihood of the availability or susceptibility of the

[893] ACER, paras. 176-179.

[894] Swinburne RPQ, Q 84/85, p. 14.

[895] Latorre RPQ, Q 58, pp. 13-14.

[896] ACER, para. 169.

[897] Latorre RPQ, Q 58, p. 14.

various alternative infection sites noted in the IRA. Moreover, in support of its assumption on the year round availability of infection sites, the IRA relies on Dr Swinburne, who in the context of this dispute has labelled the IRA's assumption in this regard "not correct".[898]

h. Conclusion on exposure

2.635 While Australia's first written submission states that "the important point is that the IRA Team provided a justification for all of the exposure values",[899] the real point, confirmed in the experts' responses, is that the purported 'justification' was not supported by sufficient scientific evidence. In other words, the IRA's reasoning was not transparent, objective or coherent.

<u>(iii) Probability of establishment and spread</u>

2.636 As demonstrated in New Zealand's first written submission, the IRA's assessment of the probability of establishment and spread is not sufficiently supported by the scientific evidence relied upon. Instead, Australia misinterpreted relevant scientific literature about the climatic conditions associated with European canker establishment and speculated about establishment on alternative hosts and spread, contrary to Australia's own experience during the Tasmanian outbreak.[900]

2.637 Australia argues that New Zealand's claims are "superficial" and do not "seriously address the issues raised in the comprehensive discussion of establishment and spread of *N. galligena* in the Final IRA."[901] Despite the rhetoric, Australia's first written submission fails to provide any substantive rebuttal to New Zealand's detailed arguments on establishment and spread.

a. No scientific basis for Australia's assessment of climate

2.638 A key issue in assessing the likelihood of establishment and spread is the suitability of Australia's climate. As Dr Latorre sets out in his replies to Panel

[898] Swinburne RPQ, Q 84/85, p. 14.

[899] AFWS, para. 643.

[900] NZFWS, paras. 4.87-4.94, 4.318-4.325.

[901] AFWS, para. 646.

questions: "climatic conditions in Australia's apple-producing regions must be suitable to disease establishment and spread, otherwise the likelihood of establishment and spread would be zero and the risk analysis should end at this point".[902]

2.639 The IRA dealt with this crucial issue in three short paragraphs.[903] As demonstrated in New Zealand's comprehensive response, including an annex containing "An Analysis of Climate Requirements for Establishment of European Canker",[904] the IRA's cursory treatment of this issue is not supported by the scientific evidence.

2.640 New Zealand's position on the inadequacy of the IRA's climate analysis, in particular its reliance on mean annual rainfall as a predictor of European canker risk, is confirmed by the experts' responses. Dr Latorre states that "[i]t should not be assumed that any area where the rainfalls are close to, or exceed 1000mm annually, are necessarily prone to European canker development…"[905] He also discounts Grove 1990, on which the IRA relies:[906] "[Grove's] generalization stating that areas where average annual rainfall is greater than 1,000 mm favour establishment of European canker should not be interpreted as a threshold for the establishment of this apple disease".[907]

2.641 Dr Swinburne found that "[t]otal annual rainfall is an unsatisfactory measure of infection risk, but is relied upon heavily in the IRA and in the arguments presented in Annex 2 of Australia's FWS…"[908] and in addition that "…mean annual rainfall/temperature data alone will be misleading in predicting the possibility that *N. galligena* could become established in any new region."[909]

---

[902] Latorre RPQ, Q 66, p. 17.

[903] IRA, p. 140.

[904] NZFWS, Annex 3, pp. 218-240.

[905] Latorre RPQ, Q 58, p. 13.

[906] IRA, p. 140.

[907] Latorre RPQ, Q 72, p. 20. New Zealand also notes that the reference to Grove 1990 is to a short (11 paragraphs) literature review of the disease and its control in the Compendium on Apple and Pear Diseases published by the American Phytopathological Society. Grove did not actually study European canker.

[908] Swinburne RPQ, Q 72, p. 11.

[909] Swinburne RPQ, Q 56, p. 7.

2.642 Rather, the experts confirm that it is necessary to include duration and seasonal distribution of rainfall during the year, which the IRA did not take into account. Dr Swinburne commented that "[t]he essential weakness of the approach in the IRA is that it assumes that inoculum (spores) for infection is always available, and all that is required is a suitable period (hours of leaf wetness within given temperature limits) for infection to occur. The major flaw in this argument is the assumption that regions can be compared on the basis of annual rainfall, without regard to rainfall patterns…for [an area with a pronounced dry season] data relating only to simple 'infection periods' would greatly overestimate the risk of disease establishment."[910]

2.643 Moreover, as outlined above at paragraphs 2.179 to 2.185, the alternative climate analysis Australia has subsequently produced in an attempt to bolster the IRA's treatment of the issue, is seriously flawed. Australia now signals its intention to produce a third climate analysis. However, no amount of revision can remedy the deficiencies of the IRA's climate analysis.

2.644 As demonstrated in New Zealand's first written submission, based on the Beresford and Kim analysis of both the literature and available climate data, the Australian climate is not suitable for European canker establishment. The only Australian apple-growing areas that possibly have a suitable climate are parts of Western Australia (an area outside the scope of this dispute) and Northern Tasmania (and then only for certain months in the year).

2.645 Australia dismisses New Zealand's position as to the general climatic unsuitability of Australia as having "no merit"[911] and argues, based on its own flawed modelling, that there are a large number of areas in Australia, in addition to Tasmania which are conducive to European canker. As set out above, the experts' responses are consistent with the New Zealand analysis of Australian climatic conditions. Dr Swinburne agrees with the New Zealand position when he states that "…the fact that canker has only been seen in Tasmania and that western Tasmania has a higher number of days of rainfall (> 1mm) than mainland Australia is striking...Thus it is

[910] Swinburne RPQ, Q 66, p. 10. See also Q 72, p. 11.

[911] AFWS, para. 659.

difficult to escape the conclusion that the climate of fruit growing regions of mainland Australia are not conducive to the development of an epidemic of this disease."[912]

2.646 Moreover, as demonstrated in New Zealand's first written submission, the fact that European canker is known to have been present in Northern Tasmania for an extended period in the mid-twentieth century, and remained untreated over a number of years, yet failed to spread through Tasmania – let alone to the mainland – suggests that, if anything, the Beresford and Kim analysis over-predicts the risk of European canker.[913]

2.647 Australia attempts to attribute the limited scope of the Tasmania outbreak to a "range of reasons",[914] in particular the eradication programme and the absence of ascospores which it now speculates was due to a unique heterothallic strain of *N. galligena*.

2.648 While New Zealand does not, as Australia's first written submission suggests,[915] consider the eradication programme "irrelevant", the point which Australia continues to miss is that the published literature relating to the Tasmanian outbreak[916] shows that the disease was likely present for a considerable time prior to the commencement of the eradication programme, yet the disease failed to spread beyond the four affected orchards.

2.649 Moreover, as outlined earlier in this submission at paragraphs 2.192 to 2.198, the attempt to attribute the lack of spread of *N. galligena* during the Tasmanian outbreak to a "unique strain of *N. galligena* that required another mating type for reproduction"[917] is not supported by the scientific evidence. Rather the failure of ascospores to develop was likely due to unfavourable climatic conditions, a point supported by the expert responses. Australia's belated and novel attempt to explain

[912] Swinburne RPQ, Q 58, pp. 7-8.

[913] NZFWS, Annex 3.

[914] AFWS, paras. 660-670, and see also para. 890.

[915] AFWS, para. 663.

[916] **Exhibit NZ-13**.

[917] AFWS, para. 664.

away the limited spread of the disease during a known outbreak cannot, and does not, remedy the inadequacies of the IRA's original evaluation of establishment and spread.

b. No scientific basis for the IRA's speculation about alternative hosts

2.650 In its first written submission, New Zealand pointed out that the IRA relied on research from the United Kingdom, Northern Europe and Nova Scotia relating to the presence of European canker on northern hemisphere hardwood forest trees (for example, Beech, Birch, Oak, Elm and Maple) in support of its assessment of the likelihood of establishment and spread of European canker, without considering the climatic differences which made such data irrelevant to the Australian context.[918]

2.651 Australia argues the IRA Team had "no option but to consider studies from other countries with the disease when assessing establishment and spread" and that "in exercising its judgement, the IRA Team took into account differences in circumstances".[919] First, although Australia asserts in its first written submission asserts that the IRA took into account those differences, there is no indication in the IRA itself that such factors were considered or whether and how they influenced its conclusions. The IRA simply asserts that "Australia has areas with similar environments to these countries".[920] Second, it is important to emphasise that while New Zealand does not object to the use of overseas research where relevant, the point is that when the climatic differences are considered, the research relied on in the IRA in relation to alternative hosts becomes irrelevant. In relying on evidence that was irrelevant, the IRA's reasoning was neither objective nor coherent.

2.652 Australia asserts that "North America, New Zealand, Northern Europe, the United Kingdom and Australia all have similar temperate climate regions and common plant species that are hosts to *N. galligena*", suggesting that "[g]iven time and opportunity" European canker could establish on these hosts.[921] As set out above at paragraphs 2.162 to 2.185, New Zealand rejects Australia's assertion of climatic

[918] NZFWS, paras. 4.318-4.320.

[919] AFWS, para. 649

[920] IRA, p. 141.

[921] AFWS, para. 650.

similarity with regions in the world with a known incidence of European canker. This position has been confirmed by the experts' responses.

2.653 In addition, Australia's assertion that with the existence of common plant species, infection by *N. galligena* will occur at some stage is inconsistent with real world experience. Beech, Birch, Oak and Elm (alternative hosts identified by the IRA) are common in New Zealand regions such as Auckland and Waikato which are comparatively more suitable for the European canker.[922] Equally, there are plantings of willows, white willows and cherries in New Zealand (plant species identified by the BRS climate paper as potential hosts).[923] Nonetheless, despite the presence of the pathogen in New Zealand for more than 100 years and the unrestricted movement of apple fruit around the country (that is to say, the coincidence of both 'time' and 'opportunity' in the sense used in Australia's first written submission), there is no evidence of *N. galligena* occurring on these alternative hosts in New Zealand.

2.654 Australia points to the fact that the fungus has been collected from kowhai, loquat and coprosma in New Zealand.[924] However, while the pathogen has been recorded as a mycological curiosity, it has not been recorded as a disease problem on these plants. Australia also alleges that *N. galligena* causes considerable damage to other hosts in private gardens in New Zealand, with reference to Atkinson 1971.[925] However, the only records of disease symptoms at the time the article was written relate to domestic apple trees, not alternative hosts.[926] Moreover, Australia's attempt to create the impression that the fungus is a disease problem for other hosts in New Zealand contradicts the explicit conclusion in the IRA that "there is no evidence that the disease is well established on other hosts in New Zealand".[927] It appears that, in seeking to bolster the IRA's insufficiently supported conclusions, Australia is forced to rely on arguments that the IRA itself rejected.

---

[922] Landcare research NZ, available at: http://floraseries.landcareresearch.co.nz/pages/index.aspx

[923] Ibid.

[924] AFWS, para. 650.

[925] AFWS, paras. 650, 653, 693.

[926] Landcare research NZ, available at: http://nzfungi.landcareresearch.co.nz/html/mycology.asp?ID=

[927] IRA, p. 123.

2.655 Finally, as pointed out in New Zealand's first written submission, the fixation with alternative hosts is not supported by the most relevant evidence of all, namely the fact that European canker did not spread to alternative hosts in Spreyton, Tasmania, despite the disease being present in apple orchards, undetected for almost twenty years,[928] ample "time and opportunity" for spread to occur. Although Australia attempts, once again, to attribute this failure to "a combination of factors",[929] as outlined above, these other factors have no basis in the scientific evidence.

c. Summary on probability of establishment and spread

2.656 Apart from the likelihood of spread to wild and amenity plants, all of the scenarios for establishment and spread were assessed by the IRA team as having a "moderate" or "high" likelihood of occurring.[930] The IRA's conclusions are to be contrasted with Dr Latorre's statement that "…these events have a likelihood of occurring different from zero but still extremely low".[931] Moreover, Dr Latorre points out that "these values [for establishment and spread] have not been validated locally"[932] and describes the IRA's conclusions in relation to establishment and spread as "not entirely convincing".[933]

2.657 As set out in New Zealand's first written submission, and confirmed by the experts' responses, the IRA's reasoning was neither coherent nor objectively justifiable. Relying primarily on a flawed climate paper and a new theory about a Tasmanian strain of *N. galligena*, Australia now seeks to bolster the IRA's reasoning. However, the arguments presented in Australia's first written submission cannot change the fact that the conclusions in the IRA simply do not find sufficient scientific support in the scientific evidence relied upon.[934]

[928] Ransom, **Exhibit NZ-13**.

[929] AFWS, para. 655

[930] IRA, Table 34, p. 144.

[931] Latorre RPQ, Q 69, p. 19.

[932] Ibid.

[933] Latorre RPQ, Q 58, pp. 13.

[934] Appellate Body Report, *Canada – Continued Suspension*, para. 591.

d. Conclusion on probability of entry, establishment and spread

2.658 The IRA assesses the overall probability of entry, establishment and spread as low. As New Zealand has pointed out above at paragraphs 2.157, this is to be contrasted with the history of the international trade in apples, in which the long distance spread of the disease through the movement of apple fruit has never been demonstrated, as supported by the responses of the third parties.

2.659 The experts' responses confirm that the IRA's overall conclusion on PEES is not supported by sufficient scientific evidence. Specifically, Dr Latorre comments that:

> "Australia considers PPEES low. However, there is a general perception that PPEES is extremely low or negligible in other apple-producing countries. Data provided by Australia to support their conclusion appear to be insufficient. For instance, data to validate the probability of *N. galligena* entrance via asymptomatic fruits has not been provided; similarly, data supporting the probability of establishment and spread were not presented. [935]

2.660 Moreover, Dr Latorre continues:

> "The long experience of other exporting countries where European canker is present (e.g., Chile, United States) suggests that the probability that asymptomatic fruits carrying latent infection may introduce *N. galligena* into a new area is negligible (extremely rare), rather than low. This probability would increase if apples were harvested from infected orchards located in areas with high summer rainfalls. Therefore, the risk of long-distance disease spread by infected fruits (fruits with latent infection or visible symptoms of the disease) should be considered extremely low or negligible until sufficient experimental evidence is provided to [negate] this conclusion."[936]

2.661 The significance of even a minor adjustment to PEES should not be overlooked. Had the IRA assessed the PEES as "very low" rather than "low", (even if the IRA's exaggerated assessment of consequences had remained the same –

[935] Latorre RPQ, Q 51, p. 8.

[936] Latorre RPQ, Q 51, p. 8.

"moderate"), the unrestricted risk would have met Australia's ALOP and therefore no measures would have been required.

(iv) Consequences

2.662 Australia also fails to rebut New Zealand's case that the Australian assessment of consequences as "moderate" is not based on scientific evidence. As Dr Latorre stated in his replies to Panel questions: "On the basis of reports in the literature and the experience of other apple-producing countries, the conclusion arrived at by IRA with regard to the overall consequence rating (E, moderate) is overestimated"[937] and that "[b]ased on the knowledge of European canker, and according to the general experience observed in other apple exporting countries where European canker is present, considering the consequences impact as "E" is not credible…".[938]

2.663 The IRA's vast overestimation of consequences is significant because it is only when the probability of entry, establishment and spread is combined with the consequences that the unrestricted risk exceeds Australia's setting of the ALOP requiring the implementation of measures.[939]

2.664 As set out in New Zealand's first written submission, the flaws in the IRA's analysis of consequences mirror many of the flaws identified in respect of the IRA's consideration of establishment and spread. In particular, the IRA's assessment of consequences failed to take into account the climatic conditions required for European canker establishment, a conclusion which is confirmed by the experts' responses to Panel questions. In addition, the IRA speculates without scientific evidence about the role of alternative hosts in European canker establishment and spread in Australia. Australia fails to present any arguments to refute New Zealand's position in this regard.

[937] Latorre RPQ, Q 60, p. 14.

[938] Latorre RPQ, Q 86, p. 28.

[939] IRA, Table 37, p. 150. See also IRA, Table 11, p. 41.

a. No scientific evidence to support the IRA's assessment of direct consequences on plant life or health

2.665 As New Zealand's first written submission demonstrates, the IRA's analysis of direct impact on plant life or health is based on unsupported assumptions about climatic similarity between Australia and areas of the world with a known incidence of European canker.[940] This is confirmed by Dr Swinburne who states that "The overall consequence rating of 'E' (moderate) can only be justified if the assumption that climatic conditions in the fruit producing regions of mainland Australia are conducive to the rapid spread of canker from a point source (discarded rotted apples) across a district. As discussed in Q58 & 66,[941] and in light of the limited spread experienced in Tasmania, it seems unlikely that this could occur."[942] Dr Latorre also states that the overall rating of moderate is overestimated because "this conclusion [that 40% of Australian commercial fruit-growing areas are conducive to infection] was based on annual rainfalls, without any analysis of the climatic conditions during the critical period (eg. leaf fall during autumn) with regard to the host trees for infection."[943]

2.666 Australia argues that the New Zealand climate analysis is too narrow and puts forward its own modelling in an attempt to show a much wider potential distribution of European canker.[944] However, as set out above at paragraphs 2.168 to 2.185, Australia does not demonstrate any errors in the climatic indicators identified by Beresford and Kim. Moreover, Australia's own climate study is seriously flawed, as evidenced by its incorrect prediction of climatic risk of European canker in New Zealand regions. In its comments on the experts' replies, Australia now states that it will present further detailed climate analysis together with its second written

[940] NZFWS, paras. 4.326-4.327.

[941] Question 58 stated: "Please comment on whether the conclusions in Australia's IRA as to the establishment and spread of European canker are objective and credible on the basis of the available scientific evidence? Are they based on respected and qualified scientific sources?" Question 66 stated: "Please comment on whether research relating to European canker in Europe and North America relied upon by Australia's IRA is relevant to the climatic conditions for the entry, establishment or spread of the disease in Australia…"

[942] Swinburne RPQ, Q 60, p. 8.

[943] Latorre RPQ, Q 60, p. 14.

[944] AFWS, para. 681.

submission.[945] However this post facto climate analysis cannot remedy the deficiencies in the IRA's original climate analysis, nor redress the impact of that flawed analysis on the IRA's assessment of consequences.

2.667 Australia devotes a good deal of attention to showing that European canker has had "serious impacts"[946] on plant life or health where it has become established as a disease problem. However, in making these assertions Australia misses the point that Australia's apple growing regions are not climatically conducive to European canker. Accordingly, even if European canker were to establish in Australia, any impacts would be significantly reduced. This is in fact reinforced by the publications exhibited with Australia's first written submission and cited in Australia's comments on the experts' replies to questions. The Hawkes Bay Emergency Management Group publication referred to by Australia merely states that European canker "can cause severe damage and production losses".[947] But the key point is that in Hawkes Bay, where conditions are typically hot and dry, it has not had these consequences.

2.668 Equally, the Hortwatch publication cited by Australia acknowledges that "once established" European canker can be a damaging disease of apples, but goes on to state that "[f]ortunately, it is not established in Hawke's Bay, Wairarapa and drier parts of the South Island…".[948] It is of note that the Hortwatch publication also confirms that the spread of European canker out of the Auckland area "has been through movement of infected nursery trees or graftwood" - not the movement of apple fruit.[949]

2.669 Dr Latorre also states that the IRA's estimate of storage losses (10-60% of stored fruit crop) is only possible "in highly susceptible apple varieties that are inadequately managed…a phenomenon that has been observed only in areas with extremely favourable environments and under high inoculum pressure."[950] He considers that "[o]n the basis of the climate analysis presented, weather in Australia is

[945] ACER, para. 189.

[946] AFWS, paras. 682, 684.

[947] **Exhibit AUS-82**.

[948] **Exhibit AUS-83**.

[949] Ibid.

[950] Latorre RPQ, Q 60, p. 15.

… not highly favourable for disease development (fruit infection phase) in summer months”.[951]

2.670 In its first written submission, Australia argues that the IRA Team had “no option”[952] but to draw on the experiences of other countries with the disease given that Australia is currently free from *N. galligena*. This is to be contrasted with the argument now raised in Australia’s comments on the experts’ replies that it was not appropriate for the experts to refer to the “general experience observed in other apple exporting countries where European canker is present”, noting that Australia is currently free from the disease.[953] In that regard, Australia notes in its comments on experts’ replies that “the consequences assessment in the Final IRA report must be appropriate to Australia’s circumstances, not the circumstances of other apple producing countries”.[954]

2.671 Not only is the Australian position continually evolving, but the position now expressed in the Australian comments on experts’ replies is surprising given that this is exactly the criticism of the IRA’s assessment of consequences made by New Zealand in its first written submission and confirmed by the experts, namely that the IRA failed to assess consequences in the context of Australian circumstances, specifically Australia’s unfavourable climatic conditions.

2.672 In any event, the expert responses undermine the credibility of the IRA’s assessment of the impact of European canker on plant life or health, even in areas where European canker is well-established. Dr Latorre states that European canker has proved economically important in Chile (where the disease is well-established), primarily because of the fungicide applications necessary each year to prevent infections, nevertheless “European canker has never limited the Chilean commercial production….”[955] Moreover, Dr Latorre clarifies that “although European canker is often classified as one of the most economically damaging diseases of apple, this is a

[951] Latorre RPQ, Q 86, p. 29.

[952] AFWS, para. 682.

[953] ACER, paras. 191 and 200.

[954] Ibid.

[955] Latorre RPQ, Q 60, p. 14.

relative concept….it cannot be interpreted as being a devastating disease limiting apple production at districts or local levels”.[956]

2.673 Dr Latorre also states that the IRA’s assessment that that the “main economic impact of the disease results from the destruction or removal of whole trees or whole orchards”[957] is to be contrasted with the reality that “removal of whole orchards of bearing trees is extremely rare, if it ever happens”.[958] This is confirmed by other scientific publications which confirm that removal of the cankered wood rather than removal of the trees is the more usual practice for control of the disease.[959] In Australia’s comments on the experts’ replies to questions, Australia asserts, “it is not uncommon for eradication activities to include removal of trees”,[960] using the example of the Australian response to an outbreak of citrus canker. However, in New Zealand’s view, the bacterial disease citrus canker, which has a much faster potential rate of spread than European canker, is not an appropriate comparison. Moreover, as pointed out in New Zealand’s comments on Australia’s comments, this was not the eradication method employed by Australia in relation to the Tasmanian outbreak, where cankered limbs and only occasional whole trees of highly susceptible varieties, but not whole orchard blocks, were removed.[961] In any event, the IRA implied that the removal of whole orchard blocks was common practice in other countries where European canker was present. This implication is clearly misleading.

2.674 Overall, Dr Latorre concludes that the “E” score for impact of European canker on plant life or health “is unreal”.[962] Dr Swinburne concludes that, given the climatic conditions in Australia, “a consequence rating ‘C’ would be more appropriate for the impact on plant health. This would be the worst case scenario”.[963] While in its comments on experts’ replies to questions, Australia argues that it is not the role of

[956] Latorre RPQ, Q 86, p. 28.

[957] IRA, p. 146.

[958] Latorre RPQ, Q 60, p. 14.

[959] Swinburne, **Exhibit NZ-9**, p. 792.

[960] ACER, para. 193.

[961] Ransom, **Exhibit NZ-13.** NZCACER, para. 139.

[962] Latorre RPQ, Q 86, p. 29.

[963] Swinburne RPQ, Q 60, p. 9.

experts to undertake a de novo review,[964] the clear implication of Dr Swinburne's and Dr Latorre's comments is that the conclusion in the IRA as to the impact on plant life or health does not find sufficient support in the evidence relied on. Such an assessment is clearly within the role of the experts as set out in *Canada – Continued Suspension*, on which the Panel is entitled to rely.[965]

b. No scientific evidence to support IRA's assessment of other environmental effects

2.675 Australia continues to emphasise, with reference to the experiences in Northern Europe and the United States, the role of "other host species"[966] or "popular varieties"[967] in terms of the impacts on plant life and health[968] discussed above and other environmental impacts in Australia.[969] Australia also makes reference to this in its comments on the experts' replies to Panel questions.[970] However, as set out in New Zealand's first written submission,[971] assuming that the disease will establish and cause disease symptoms on those other hosts present in Australia simply because they are there, fails to take into account the role of climate.

2.676 Moreover, as explained above at paragraphs 2.650 to 2.655, the contention cannot be sustained in light of Australia's own experience in Tasmania as well as the experience in New Zealand where the disease has failed to establish on other hosts. Once again, Australia attempts to explain away the Tasmanian example by relying on a number of reasons, none of which finds support in scientific evidence.[972] Equally, Australia's attempt[973] to portray the disease as having a significant impact on alternative hosts in New Zealand stands in sharp contrast to the assessment in the IRA

[964] ACER, paras. 188, 197.

[965] Appellate Body Report, *Canada – Continued Suspension*, para. 592.

[966] AFWS, para. 685.

[967] AFWS, para. 683.

[968] AFWS, paras. 683, 685.

[969] AFWS, para. 693.

[970] ACER, para. 204.

[971] NZFWS, para. 4.327.

[972] AFWS, paras. 690-693. See also paras 2.186 to 2.204 above.

[973] AFWS, para. 693.

which concluded that "there is no evidence that the disease is well established on other hosts in New Zealand".[974] Once more, Australia's efforts to support the IRA's insufficiently supported conclusions, lead it to propose arguments the IRA itself rejected.

c. No scientific evidence to support IRA's assessment of costs of control or eradication

2.677 As set out in New Zealand's first written submission, the IRA's assessment of the costs of control and eradication of an outbreak of European canker was not based on scientific evidence. Dr Latorre states that "[c]ontrol of European canker would be unlikely to be too high, physically and economically"[975] and confirms that the IRA's rating for this factor appears "too high".[976]

2.678 As demonstrated in New Zealand's first written submission, given climatic conditions in Australia, any outbreak of European canker is likely to be highly localised. This is confirmed in the expert responses. Dr Latorre states that "[t]he rate of disease progress is commonly low, which implies that eventual outbreaks of European canker must be localized, facilitating control and eradication."[977] He refers to the Tasmanian outbreak to support his position: "The information provided in relation to Spreyton supports the hypothesis of a very slow spread occurred that would make it possible to eradicate *N. galligena*."[978]

2.679 Australia rejects the contention that any outbreaks would be localised on the basis of their assertion that the Beresford and Kim analysis under-predicts the likely incidence of European canker. As set out above at paragraphs 2.168 to 2.185, Australia's criticisms of the Beresford and Kim analysis are unfounded. Dr Swinburne confirms that Australia "invokes the Tasmanian experience as evidence that the disease can establish elsewhere on the mainland, and cites the difficulties of

[974] IRA, p. 123.

[975] Latorre RPQ, Q 87, p. 29.

[976] Latorre RPQ, Q 87, p. 29.

[977] Latorre RPQ, Q 87, p. 29. See also Q 86, p. 28 ("even under highly-prone environmental conditions, disease progress rate would be low rather than high. Therefore it would be very unlikely that *N. galligena* could attack a high proportion of the apple population in a single growing season.").

[978] Latorre RPQ, Q 59, p. 14.

eradication there as a guide to the economic impact that would result if it did so. The weakness of any predictive model based solely on annual rainfall has already been discussed…The Beresford and Kim model….predicts that Tasmanian districts have a climate which is only marginally congenial for canker, thus explaining the duration of the outbreak".[979]

2.680 New Zealand's first written submission also pointed to the role of routine treatments for other apple diseases such as apple scab in controlling European canker. This is supported by Dr Latorre who states that "[c]ontrol strategies for other apple diseases (e.g., apple scab, powdery mildew) would help to control European canker."[980]

2.681 Australia states that "notwithstanding routine orchard controls for apple scab in New Zealand, European canker is still spreading."[981] New Zealand rejects the implication that European canker is "still spreading" in New Zealand, and Australia provides no basis for this assertion.

d. No scientific evidence to support IRA's assessment of impact on international trade

2.682 As demonstrated in New Zealand's first written submission, the IRA's assessment of the indirect impact on international trade fails to take into account the fact that the presence of European canker in New Zealand is not a barrier to New Zealand apples entering markets other than that of Australia. This is supported by Dr Latorre's responses to Panel questions.[982] New Zealand notes that its export markets for apples include almost all of Australia's export markets as well as numerous additional markets.[983]

[979] Swinburne RPQ, Q 90, p. 16.

[980] Latorre RPQ, Q 87, p. 29.

[981] AFWS, para. 700.

[982] Latorre RPQ, Q 87, p. 29.

[983] New Zealand notes that in its response to Panel question 79, New Zealand stated that New Zealand shared and exceeded all Australian export markets. In fact, New Zealand exports to more markets than Australia, which includes the vast majority of the current Australian markets. A table showing the relative export markets is attached as Annex 3.

2.683 The fact that European canker has not affected New Zealand's trade is not surprising given that trade in mature apple fruit is not a pathway for the transmission of European canker. In its first written submission, Australia argues that many of New Zealand's major export markets already have European canker.[984] As set out above at paragraphs 2.160 2.161, New Zealand also exports significant quantities of apples to Asian markets such as Chinese Taipei where there has been no known outbreak of European canker for 32 years, and to Thailand, Bangladesh, Viet Nam, Papua New Guinea, Malaysia and the Philippines. Despite the presence of a domestic apple industry (in the case of Chinese Taipei), and some of the potential alternative hosts identified in the IRA in the mountainous regions of those countries, no outbreak of European canker has been recorded.[985]

e. No scientific basis for IRA's assessment of indirect consequences on communities

2.684 Australia continues to engage in speculation about the potential impacts of an outbreak on tourism based on a hypothesis about the ability of European canker to spread to Melbourne's elm tree population.[986] As set out in New Zealand's first written submission, this is based on the same flawed supposition about the ability of European canker to establish on alternative hosts, rather than on any respectable scientific evidence. Accordingly, the IRA's assessment of impact on communities is not supported by the scientific evidence relied on.

f. Conclusion on consequences

2.685 Simply reiterating unsupported arguments about climatic similarity and alternative hosts is not sufficient to rebut the New Zealand first written submission which showed that the IRA's assessment of consequences overestimated the impacts of European canker in Australia and was not sufficiently supported by the evidence relied upon.[987] Moreover, the experts' responses confirm that Australia's assertions

---

[984] AFWS, para. 705.

[985] Global Biodiversity Information Facility Data Portal, available at: http://www.gbif.org/

[986] AFWS, para. 716.

[987] Appellate Body Report, *Canada – Continued Suspension*, para 5.91.

concerning the consequences of European canker establishment and spread in Australia do not find sufficient support in the scientific evidence.

(c) Conclusion under Article 5.1

2.686 As New Zealand's first written submission demonstrated, the evaluation in the IRA of the likelihood of entry, establishment and spread of European canker was not an evaluation of likelihood in terms of the definition of "risk assessment" in the *SPS Agreement*. Australia failed to present arguments which show otherwise. Australia has therefore failed to comply with its obligations under Article 5.1 of the *SPS Agreement*.

5. Apple leafcurling midge

2.687 In its first written submission New Zealand established that the IRA has failed to evaluate the likelihood of entry, establishment and spread of ALCM in relation to imports of mature, symptomless apples from New Zealand.

2.688 New Zealand has demonstrated that the IRA's assessment of risk with respect to ALCM is not objectively justifiable. The reasoning contained in the IRA is not objective or coherent, and its conclusions are not supported by sufficient scientific evidence.[988] Rather, Australia merely speculates on the possibility of entry, establishment or spread, with the result that its 'risk assessment' does not conform to Australia's obligations under Article 5.1.[989]

2.689 The IRA's failures to properly evaluate the likelihood of entry, establishment and spread of ALCM are confirmed by the experts. Indeed, Professor Cross states that the IRA's assessment of the risk related to the entry, establishment and spread of ALCM is so flawed that it needs to be "recalculated".[990] He specifically recommends that the risk be re-assessed having regard to the key factors that the IRA ignored,

[988] Appellate Body Report, *Canada – Continued Suspension*, paras. 590-591.

[989] NZFWS, para. 4.366

[990] Cross RPQ, Q 120, p. 21.

including viability, parasitism, the timing of adult emergence and the mode of trade.[991]

2.690 In its first written submission and responses to questions, Australia attempts to rebut New Zealand's case by claiming that:

a. The IRA's conclusions on ALCM entry and establishment took into account viability of ALCM cocoons on New Zealand apples;

b. Rogers *et al.* 2006 does not constitute valid, representative scientific evidence on the issue of the viability of ALCM cocoons on New Zealand apples;

c. The IRA's conclusions about the likelihood of contamination by ALCM during picking and transport have a scientific basis;

d. The IRA's conclusions about the likelihood of ALCM surviving minimum on-arrival border procedures have a scientific basis;

e. The IRA's conclusions about the likelihood of ALCM establishment took into account key aspects of ALCM biology and normal trade practices;

f. That the IRA's conclusions about the likelihood of ALCM spread took into account climatic issues; and

g. The IRA's conclusions about the likely consequences of ALCM did not need to take into account more recent scientific literature on the significance of the pest in New Zealand.

2.691 As New Zealand will demonstrate below, none of these arguments withstand scrutiny.

[991] Cross RPQ, Q 120, pp. 21-22.

(a) The IRA's conclusions on the likelihood that clean fruit are infested with ALCM have no scientific basis

2.692 As explained above at paragraphs 2.223 to 2.226, the fact that the IRA did not take into account the proportion of cocoons with viable ALCM in its assessment of the likelihood of ALCM entry and establishment is obvious from the text of the IRA. In respect of importation step 2 (the likelihood that picked fruit is infested with ALCM),[992] the IRA states that its estimate is "…based on the evidence that contamination rates for pupae or larvae of ALCM range from 1-2% to 11.5%".[993] As explained above, the data cited is from Tomkins *et al.* 1994 – a study described by Professor Cross as "old and inadequate"[994] – which found that in several heavily infested New Zealand orchards,[995] the percentage of apples with ALCM cocoons ranged from 0-11.5%.[996] However, Tomkins *et al.* 1994 also found, like Rogers *et al.* 2006, a high level of empty cocoons. Yet the only figure used in the IRA's quantitative assessment is the data from Tomkins addressing the percentage of apples with cocoons. The Tomkins *et al.* 1994 data on the rate of empty cocoons, and that from Rogers *et al.* 2006, Shaw *et al.* 2005 and Todd 1959 on the rate of non-viable cocoons was ignored. Indeed, Australia now admits that: "the maximum and minimum ends of the distribution selected by the IRA Team *reflect the Tomkins' figures*" [emphasis added].[997] Australia's further suggestion that it used the triangular distribution to reflect cocoon viability lacks credibility and is dealt with further below.

2.693 The failure to factor in cocoon viability was not limited to importation step 2. Nowhere in the IRA's assessment of the likelihood of entry or establishment is the issue of the viability of cocoons taken into account. Yet Professor Cross has stated that viability is of "…crucial importance…in calculating risks…"[998] Had the IRA taken into account the scientific evidence on the low level of viable cocoons, the

[992] Which would have been the appropriate place for the IRA to factor in viability and occupancy because it estimates the likelihood that picked fruit is infested with ALCM cocoons.

[993] IRA, p. 160.

[994] Cross RPQ, Q 109, p. 17.

[995] Surveyed before IFP measures were in place.

[996] **Exhibit NZ-43**: p 347.

[997] ARPQ, Q 88, p. 72.

[998] Cross RPQ, Q 97, p. 8.

IRA's calculation of the probability of entry, establishment and spread of ALCM results would have been significantly different.

2.694 In its first written submission, Australia claims that New Zealand has not shown how this flaw would have led to a different outcome.[999] New Zealand did not do so because it is impossible, based on the information presented in the IRA, to calculate the impact of including viability in the IRA's risk assessment model for ALCM. This is because the IRA's estimates of the partial probabilities of entry, establishment and spread for ALCM, are not transparent or based on objective, evidence-based calculations. However, a crude estimation of the effect of factoring in viability to the IRA's calculations can be obtained by multiplying the IRA's estimate of the probability of entry, establishment and spread, based on the August 2005 data, by 25% (the percentage of occupied cocoons with viable ALCM). This, on its own, reduces the overall probability from 0.51 to 0.13, bringing the overall annual unrestricted risk below Australia's ALOP.[1000]

2.695 In its first written submission and responses to the Panel's written questions, Australia responds to New Zealand's claims about the IRA's failure with respect to viability, by asserting that the IRA did in fact take into account viability because it: (i) mentioned the relevant scientific studies in its qualitative analysis; and/or (ii) applied a triangular distribution to importation step 2; and/or (iii) used the August 2005 data in its calculations of the likelihood of ALCM establishment. However, as explained below, each assertion is baseless.

(i) <u>The fact that the IRA mentioned the relevant studies does not mean that it factored viability into its conclusions</u>

2.696 Australia claims that the mere mention in the IRA's qualitative assessment of the relevant scientific studies on viability of cocoons, demonstrates that it took these issues into account. Specifically, Australia asserts that: "…it is clear that the IRA Team did take into account information suggesting that a certain proportion of ALCM

[999] AFWS, para. 727.

[1000] The figure of 0.13 would translate into a qualitative description of "low" for the probability of entry, establishment and spread. This is clear from p 43 of the IRA, Table 12, where "low" translates into a range of 0.05 to 0.3. When combined with the low consequence assessment, this produces an unrestricted annual risk of "Very Low" and thus meets Australia's ALOP.

cocoons would not contain viable insects…the IRA Team referred [in its assessment of importation step 2] to a number of sources of evidence in this regard, including Tomkins *et al.* (1994), Rogers *et al.* (2006), Lowe (1993) and HortResearch (MAFNZ, 2005)."[1001]

2.697 However, mentioning a study and actually factoring its results into a quantitative assessment of likelihood are two very different things. The IRA only went as far as the former. Indeed, the fact that Australia was clearly aware of the scientific evidence on the low viability of cocoons, specifically noting it in its qualitative analysis, makes the IRA's failure to factor viability into its quantitative analysis even more extraordinary.

2.698 The failure of the IRA to factor cocoon viability into its conclusion for importation step 2 is explicitly confirmed by the expert responses. Professor Cross concludes "[t]he work of Rogers et al (2006) on cocoon occupancy and viability is cited in Australia's IRA importation step 2 analysis, but then it doesn't appear to have been taken into account when fixing the probability values in the summary analysis of importation step 2."[1002]

<u>(ii) The fact that the IRA applied a triangular distribution to importation step 2 does not mean that Australia took viability into account</u>

2.699 Australia also claims in its first written submission and responses to the Panel's written questions that the IRA factored in the viability of cocoons through its use of a triangular distribution. It asserts that: "the IRA Team decided to use a triangular distribution for Importation step 2, which factored in the relatively low viability rate of cocoons by skewing the distribution towards the lower likelihood end and thereby giving less weight to the maximum value".[1003]

[1001] ARPQ, Q 88, p. 72. It is not clear why Australia refers to HortResearch (MAFNZ, 2005) in this regards as that paper does not deal with the issue of viability. It deals only with fruit infestation levels.

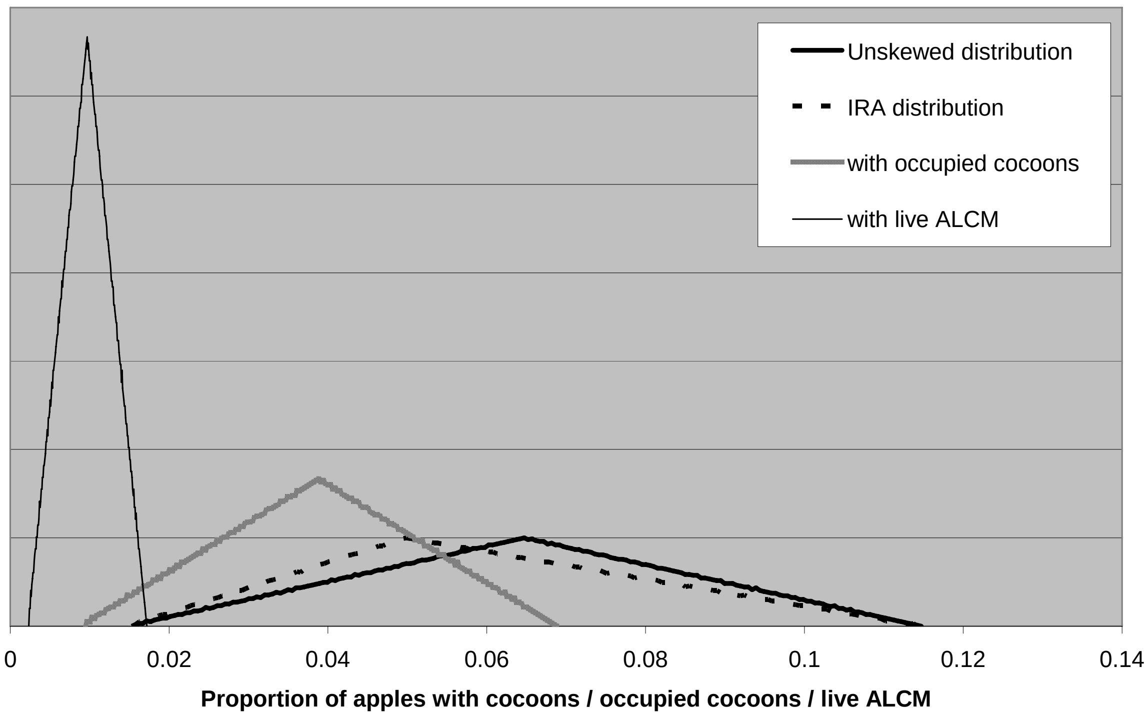
[1002] Cross RPQ, Q 109, p. 17.

[1003] AFWS, para. 729 and ARPQ, Q 88, pp. 72 to 73 which states: "The most likely value of 5% chosen by the IRA Team [for imp step 2] reflects the fact that a large proportion of cocoons (around 60%) may not contain viable ALCM, as indicated by the Tomkins *et al.* (1994) paper. By using a triangular distribution for Importation step 2, much greater weight was placed on the most likely value, compared to the minimum and maximum ends."

2.700 However, the IRA suggests nothing to indicate this. To the contrary, the IRA makes very clear that the choice of distribution was governed solely on the basis of the quantity of scientific information available.[1004] This is confirmed by Australia in its first written submission.[1005]

2.701 The fact that the triangular distribution did not factor in viability is clear from Figure 1 below. This shows a comparison of (i) an unskewed triangular distribution with minimum and maximum values as used in the IRA for importation step 2; (ii) the skewed triangular distribution actually used in the IRA for importation step 2; (iii) the unskewed distribution multiplied by a 60% occupancy rate (Rogers *et al.* 2006); and (iv) the unskewed distribution multiplied by a 60% occupancy rate and 25% viability rate (Rogers *et al.* 2006).

Figure 1 – Impact of viability and occupancy on the distribution for importation step 2



[1004] IRA, p. 42. The IRA states that a triangular distribution was used when "information (for example, literature and expert opinion) on the most likely value was available".

[1005] AFWS, para. 304 states: "Where the IRA Team believed it had sufficient information to identify a most likely value in an interval, it used a triangular distribution, represented by a minimum value, a maximum value and a most likely value. Where the IRA Team considered it had insufficient information to identify the most likely value in an interval, it adopted a uniform distribution, using a minimum value and a maximum value."

2.702 The effect of skewing the triangular distribution for importation step 2 was to shift the distribution to the left slightly, resulting in an expected value for the distribution of 6%, rather than 6.5%. However, just taking into account the data on occupancy from Rogers *et al.* 2006 shifts the distribution substantially to the left, resulting in an expected value for the distribution of 3.9%. Taking into account the Rogers *et al.* 2006 data on viability shifts the distribution even further, to an expected value for the distribution of 1% – approximately one-sixth of the expected value of the IRA distribution.

2.703 This significant proportional reduction resulting when viability is taken into account is explicitly confirmed by Professor Cross who notes that: "[i]f only 25% of cocoons contain viable ALCM then the values [for importation step 2] should be 4 times smaller."[1006] Whatever value of viability was used, it should have shifted the entire distribution. However, application of a slightly skewed triangular distribution did not change the range of values, it simply re-weighted the values within that existing range. Thus, skewing the midpoint of the triangular distribution for importation step 2 did not, contrary to Australia's claim, factor in viability. On this point too, Australia has not rebutted New Zealand's case.

(iii) <u>The fact that the IRA used the August 2005 data in its calculations of the likelihood of entry and establishment did not mean that Australia took into account viability</u>

2.704 Finally, Australia claims that that its use of New Zealand's August 2005 data "…take[s] into account New Zealand's arguments as to the low viability rate of ALCM on New Zealand apples."[1007] This claim was first made in Australia's written responses to Panel questions. It does not appear in Australia's first written submission or the IRA. Indeed, as explained above, the IRA never equates the August 2005 data with viability. And nor should it, because the August 2005 data does not relate to viable cocoons, and thus could not have factored in viability.[1008] As noted by Professor Cross the August 2005 data only "…gives the frequency of occurrence

[1006] Cross RPQ, Q 109, p. 17.

[1007] ARPQ, Q 88, p. 71.

[1008] The August 2005 data relates to the presence of occupied cocoons, and thus could not have factored in viability.

of occupied cocoons"[1009] meaning that "[t]he actual infestation rate of viable cocoons would be substantively lower as a significant proportion of occupied cocoons are not viable."[1010]

2.705 Accordingly, Australia's claim in this regard is entirely misplaced, demonstrating its lack of understanding of the issue of viability and the nature of the August 2005 data.

(b) Rogers et al. 2006 constitutes valid, representative scientific evidence on the issue of the viability of ALCM cocoons on New Zealand apples

2.706 In its first written submission and responses to the Panel's questions, Australia attempts to excuse the IRA's failings with respect to viability, by arguing that: (i) New Zealand has misinterpreted the findings of Rogers *et al.* 2006; (ii) the Rogers *et al.* 2006 methodology is flawed; and (iii) the findings of Rogers *et al.* 2006 are not representative of the overall viability rate of cocoons on New Zealand apples.

2.707 All of these arguments are designed to excuse the IRA's failure to factor cocoon viability into its conclusions. By attempting to discredit the scientific evidence on viability, Australia is trying to justify *ex post facto* the IRA's failure to take Rogers *et al.* 2006 into account. This is clear from the statement in Australia's responses to the Panel's questions that the "confusion" arising from the alleged "errors" with Rogers *et al.* 2006 "…supports Australia's view that it was appropriate for the IRA Team to place greater weight on the published and peer-reviewed results of Tomkins *et al.* 2004."[1011] However, the key point is that the IRA's conclusions failed to make any allowance for cocoon viability. No amount of quibbling about the precise percentages changes that fact. In any event, as demonstrated below, Australia's criticisms relating to Rogers *et al.* 2006 are misguided.

[1009] Cross RPQ, Q 99, p. 9.

[1010] Cross RPQ, Q 99, p. 9.

[1011] ARPQ, Q 87, p. 70.

(i) New Zealand has correctly interpreted the findings of Rogers *et al.* 2006

2.708 Australia asserts that New Zealand has misinterpreted the findings of Rogers *et al.* 2006.[1012] Australia's claim in this regard has evolved over time. In its first written submission Australia claimed that, on the basis of Rogers *et al.* 2006, the overall percentage of viable cocoons should be 25%, and not, as New Zealand asserts, 15%.[1013] Then, in its responses to the Panel's questions, it claimed it should be 19%.[1014]

2.709 Australia's fixation with figures is misplaced; whether the overall viability rate of cocoons is 15%, 19% or 25%, the fact remains that the number of New Zealand apples with viable ALCM is extremely low. This is a fact explicitly confirmed by the experts. Professor Cross states that "a significant proportion of occupied cocoons are not viable."[1015] The IRA failed to reflect this "significant" factor in its conclusions.

2.710 In addition, Australia's views on the correct percentages are misplaced. Australia's first claim that the figure should be 25% was based solely on Australia's assertion that the mortality rate of cocoons as assessed by the authors of Rogers *et al.* 2006 was limited to those cocoons that were occupied. However, as clarified in New Zealand's oral statement at the first substantive meeting with the Parties, the mortality rate assessed by the authors was in respect of all cocoons (i.e. both occupied and unoccupied cocoons).[1016] As a result, Australia's claim that the proportion of all cocoons with live ALCM is 25% is incorrect.

[1012] AFWS, paras. 731-736 and ARPQ, paras. 87, pp. 67-70.

[1013] Specifically, Australia claimed that New Zealand had misinterpreted the results in Rogers *et al.* 2006 on the proportion of cocoons on New Zealand apples containing viable ALCM (AFWS, para. 731). It claims that the assessment of the mortality rate of cocoons that was conducted by the authors was limited to those cocoons that were *occupied*. Thus it claims that 25% of the *total* number of cocoons found in the sample of apples contained viable ALCM – not 15% as New Zealand claims: AFWS, para. 731.

[1014] ARPQ, para. 87, p. 70.

[1015] Cross RPQ, Q 99, p. 9.

[1016] New Zealand's oral statement at the first substantive meeting of the parties, para 67. As confirmed by **Exhibit NZ-102** the assessment of the mortality rate of cocoons that was conducted by the authors related to all cocoons, both occupied and unoccupied.

2.711 Australia's second claim, that the figure should be 19%, is based on its assertion that the Rogers *et al.* 2006 raw data included a second occupancy figure, which it claims should be used to calculate the overall viability rate.[1017] However, contrary to Australia's assertions New Zealand's method (which results in the overall figure of 15%) is consistent with the scientific evidence on cocoon viability.[1018]

2.712 Accordingly, Australia's claims in respect of New Zealand's interpretation and use of the Rogers *et al.* 2006 findings have no basis. Whatever the actual percentage of viable cocoons, there is no escaping the fact that the scientific evidence indicates that there is a very low level of viable cocoons on New Zealand apples. As confirmed by the expert responses, Australia did not take this into account in any way in the IRA[1019] and, as a result, the IRA's conclusions are not supported by the scientific evidence.

(ii) The Rogers *et al.* 2006 methodology is sound

2.713 Australia's various claims about the alleged "errors" with the Rogers *et al.* 2006 methodology also have no basis. Notably, no claims of this sort appear in the IRA. To the contrary, the IRA cites Rogers *et al.* 2006 in support of a number of propositions[1020] (but not viability) without questioning its methodology at any stage.

2.714 First, Australia alleges that some insects examined in the study may have been mistakenly categorised as dead, which could have lead to the authors

[1017] Specifically Australia alleges that, by using the occupancy figure (of 40%) from the first study, in combination with the mortality figure (of 75%) from the second study, New Zealand "us[ed] the data selectively": (ARPQ, Q 89, p 69). It claims that, instead, New Zealand should have used the occupancy figure (of 24%) from the second study to come up with an overall viability figure of 19%.

[1018] As noted by Australia, using the occupancy figure of 40% (40% empty, 60% occupied), gives a viability rate of 15%. The second way, using the occupancy rate of 24% (24% empty, 76% occupied), gives a rate of 19%. Given there are two different occupancy figures, both viability figures are technically correct. However, of those two figures, that used by New Zealand is consistent with the scientific literature on this issue. Studies have reported values for percentage of cocoons occupied ranging from 37% (Tomkins *et al.* 1994) to 60% (Rogers *et al.* 2006) to 76% (Rogers *et. al* 2006). Rogers *et. al* 2006 found that the percentage of occupied cocoons with live ALCM is 25%. Thus, the range of estimates for the percentage of all cocoons with live ALCM ranges from 9.3% (37% x 25%) to 15% (60% x 25%) to 19% (76% x 25%). 40% empty, the figure used by New Zealand in its calculations, is the middle estimate in that range.

[1019] Cross RPQ, Q 109, p. 17.

[1020] See for example IRA, pp. 159 and 160.

underestimating the number of viable cocoons.[1021] Australia bases this claim on its assertion that if an insect inside a cocoon was in the pupal stage, prodding it with a needle would not necessarily result in any movement, even if it was alive.[1022] However, Rogers *et al.* 2006 clearly states that: "many of the dissected ALCM cocoons contained prepupae that were shrivelled and obviously dead,"[1023] meaning that most dead ALCM were obvious, and the prodding of the ALCM was not the main indicator of mortality status. Indeed, Professor Cross's comments indicate that any accuracy problems associated with the use of a prodding test would have resulted in the overall mortality being *underestimated*. Professor Cross explicitly notes that had the authors carried out the testing in the way Australia suggests "…it could well be found that mortality is considerably higher than established by examination and prodding."[1024] Thus, Australia's arguments in this regard indicate that the overall rate of viable cocoons is likely to be even less than what is reported in Rogers *et al*. 2006.

2.715 Next, Australia criticises the use of percentages in Rogers *et al.* 2006, rather than raw data.[1025] However, scientific data is commonly presented in summary form. Raw data is seldom provided and percentages are universally accepted. It is therefore difficult to understand Australia's complaint or point in this regard.

2.716 Then, Australia claims that a small spreadsheet error from the raw data (which was found and corrected by the authors of the study before the letter from Dr Rogers, which explains the discrepancy between the raw data attached to the study and the raw data attached to that letter) should discredit all the figures in the study.[1026] But, this error has little or no impact on the overall results of the study.[1027] It is thus difficult to understand how it could call the soundness of the data into question. Given the error has little or no impact, Australia's claim is of no consequence.

[1021] AFWS, para. 733.

[1022] AFWS, para. 733.

[1023] **Exhibit NZ-17**, p. 3.

[1024] Cross RPQ, Q 97, p. 7.

[1025] ARPQ, Q 87, p. 70.

[1026] ARPQ, Q 87, p. 70.

[1027] The error slightly increased the average mortality level of all cocoons from 56.9 (the correct figure which is presented in **Exhibit NZ-102**) to 58.9. However, it does not affect the conclusion of the research which was that "nearly 60% of all cocoons contained dead ALCM": Rogers *et al.* 2006, p. 3 (**Exhibit NZ-17**).

<u>(iii) Rogers *et al.* 2006 is representative of the viability of cocoons on New Zealand apples</u>

2.717 Finally, in a further attempt to justify its failings, Australia claims that the findings of Rogers *et al.* 2006 are not representative of the whole of New Zealand.[1028] The basis for this claim is Australia's assertion that the data from that study relates to only one variety of apple, from only one season and one location. But, as explained above, the findings of Rogers *et al.* 2006 are representative. This is most obvious from the fact that the data is consistent with all the other scientific evidence on occupancy and mortality levels.[1029] Indeed, as acknowledged by Australia,[1030] the authors of Rogers *et al.* 2006 stated that their findings were "representative of viability or otherwise of cocoons found on unwashed New Zealand apples."[1031]

2.718 Australia's attack on Rogers *et al.* 2006 is designed to justify the fact that the IRA inexcusably ignored the findings of that study. However, none of Australia's claims have any basis. And in any event, as explained above, none of its claims change the key issue in this dispute – that is, the IRA's complete failure to take into account the important issue of cocoon viability.

(c) The IRA's conclusions about the likelihood of contamination by ALCM during picking and transport have no scientific basis

2.719 As explained in New Zealand's first written submission, the IRA's conclusions about the likelihood of contamination of apples with ALCM during picking and transport[1032] have no scientific basis.[1033]

2.720 In its first written submission, Australia claims that the IRA's conclusion that approximately 1 in 39 apples will become contaminated by ALCM during picking and

[1028] ARPQ, Q 87, p. 68.

[1029] Similar conclusions to those in Rogers *et al.* 2006 on the high level of non-viable cocoons caused by parasitism are found across the literature, including in Tomkins *et al.* 1994 (**Exhibit NZ-43)** Shaw *et al.* 2005 (**Exhibit NZ-16)** and Todd 1959 (**Exhibit NZ-44**). See paras 4.107 to 4.111 of NZFWS.

[1030] AFWS, para. 732.

[1031] **Exhibit NZ-17**, p 3

[1032] IRA, p. 161.

[1033] NZFWS, paras. 4.339-4.343.

transport is valid.[1034] The basis for this claim is Australia's assertion that: "pickers [brushing] against leaves or branches of other parts of trees which may sometimes harbour ALCM leaf rolls, occasionally causing ALCM larva to fall from elsewhere on the tree into a picking bag or bins on the ground".[1035] This, however, is an entirely new risk scenario, and one that directly contradicts what is in the IRA. The IRA states that its conclusions in respect of contamination (importation step 7) were: "Based on the information that the contamination only occurs when infested leaves are picked…" (emphasis added).[1036] The IRA says nothing about "pickers brushing against leaves" being an area of concern.

2.721 In his responses Dr Sgrillo notes this disconnect between the IRA and Australia's first written submission, commenting that while the IRA claims that contamination may occur when infested leaves are picked during harvest along with the fruit, "Australia subsequently informed that their main concern is not what is explained in the IRA, but the leaves that could be picked."[1037] He also notes that: "The IRA Team does not explain which mechanism was considered to choose the values of the parameters of the distribution. The conclusions of the IRA need further justification."[1038]

2.722 In any event, notwithstanding the fact that this scenario is not considered by the IRA, the likelihood of contamination occurring as a result of pickers brushing against leaves is negligible. Leafrolls that contain ALCM larva are tightly bound rolls of thickened leaf tissue designed to protect the developing larvae. Larvae are not able to exit such leafrolls until the leaf is softened by rain.[1039] As the IRA itself states ALCM larva will be "trapped in dried leaf rolls" not able to complete development until "rain softens the leaf roll sufficiently to allow mature larvae to escape".[1040] Thus accidental brushing is highly unlikely to dislodge larvae. And even if it could, any

[1034] AFWS, para. 742.

[1035] AFWS, para. 742.

[1036] IRA, p. 161.

[1037] Sgrillo RPQ, Q 111, p. 20.

[1038] Sgrillo RPQ, Q 111, p. 20.

[1039] **Exhibit NZ-18**, p 37.

[1040] IRA, p. 158.

immature larvae exiting a leafroll prematurely would die because larvae are host specific and can only complete their development in tightly rolled apple leaves.[1041] As acknowledged by the IRA, "ALCM larvae would not persist inside the packing house, because there are no immature apple leaves to feed on".[1042]

2.723 Finally, even if mature larvae could be accidentally brushed into a picking bin, it would not survive long enough to contaminate the apples in that bin – an ALCM larva is small, soft-bodied and worm-like, and would be quickly crushed if it fell in a bin full of apple fruit. It is therefore not surprising that the IRA did not to take this risk scenario into account. Indeed, Professor Cross confirms that, if ALCM larva were to fall into a harvest bin, while that would contaminate the bin, it would not result in the contamination of the apples inside the bin.[1043] And, in any event, as noted in New Zealand's comments on the experts' responses to Panel questions, contamination of harvest bins is not relevant to the likelihood of importation of ALCM because harvest bins are never used to export apple fruit.[1044]

2.724 Thus, contrary to Australia's assertions, the scientific evidence indicates that the likelihood of contamination of New Zealand apples during packing and transport is negligible – it is an event which will almost certainly not occur.[1045] The only conceivable source of contamination, infested leaves mistakenly harvested with apples,[1046] have never been observed to be infested with ALCM eggs. As noted by Dr Deckers: "leafy stipules are not the type of leaves that are infected by the ALCM".[1047] Only the new unfurling leaves situated at branch tips, well away from the parts of the tree where fruit development occurs, would be likely to be infested with ALCM. And, even if these leaves were harvested, they too would be unlikely to be a source of contamination.[1048] By the time of harvest most new leaf growth on apple trees has

---

[1041] **Exhibit NZ-18**, pp. 37 and 38.

[1042] IRA, p. 163.

[1043] Cross RPQ, Q 101, pp. 10-11.

[1044] NZCER, para. 155.

[1045] NZFWS, paras. 4.112-4.115.

[1046] IRA, p. 161.

[1047] Deckers RPQ 101, p 34.

[1048] Australia argues that there could be sufficient late growth leaf flushes at harvest for there to still be some infested leaves available: AFWS, para. 744. However, while leaf flushes between midterminated and ALCM infestation levels are thus very low.[1049] This is specifically confirmed by Professor Cross who notes that: "…at harvest these leaves and leafy stipules are old and unlikely to be infested with ALCM".[1050]

2.725 Thus, the IRA's conclusion that contamination would occur on average for 1 out of 39 apples has no scientific basis. Indeed, in the context of the IRA's per apple methodology and its prediction of 150 million apples traded per year, this equates to approximately 1.7 million apples per year being contaminated in this way.[1051] Put this alongside the fact that there is no scientific evidence that such contamination has occurred or could occur, and that, to the contrary, the scientific evidence indicates that the likelihood of such an event is negligible, and it is clear that the IRA's conclusions have no basis in science.

2.726 Indeed, the fact that there is no scientific support for the IRA's conclusions on importation step 3 is specifically confirmed by the experts. Professor Cross states that "[t]he values given in the IRA Importation step 3 (page 161) for the likelihood that clean fruit is contaminated by apple leaf curling midge during picking and transport to the packing house is given as Uniform (10^{-3}, 5 x 10^{-2}). The basis for these estimates is unclear."[1052] Dr Deckers also confirms that his view is that "[t]here is not sufficient scientific evidence for this step in the IRA importation step 3."[1053] Finally, Dr Sgrillo also confirms that, in respect of importation step 3, "[t]he quantitative data available do not guarantee that the parameters established describe the true population".[1054]

summer and harvest are possible, the shoots they produce are weak with relatively few leaves, which are small in size (Todd 1956: 867). Thus, they do not have the potential to have any major effect on infestation levels. The fact is that by harvest the majority of apple trees in New Zealand would have few unfurling leaves capable of ALCM infestation (Barnes 1948: 37).

[1049] Shaw *et al.* 2005: 309, Todd 1959: 867 and Barnes 1948.

[1050] Cross RPQ, Q 101, p. 10.

[1051] For ALCM, only two of the ten pathways described in Table 4, p. 24, of the IRA are relevant. These are pathway 1 and pathway 6. Importation step 3 contributes to Pathway 6. Following the methodology and using an annual volume of 150 million apples, pathway 6 accounts for 1.7 million infested apples in the IRA, which is 28% of the total probability of entry (4.1%) in the Australian ALCM import model.

[1052] Cross RPQ, Q 101, p. 11.

[1053] Deckers RPQ, Q 111, p. 37.

[1054] Sgrillo RPQ, Q 111, p. 20.

(d) The IRA's conclusions about the likelihood of ALCM surviving minimum on-arrival border procedures have no scientific basis

2.727 As explained in New Zealand's first written submission, the IRA's conclusions about the likelihood of ALCM surviving minimum on-arrival border procedures[1055] also have no scientific basis because the IRA failed to take into account the effect of AQIS inspection at the border.[1056] Taking into account the AQIS 600-unit inspection approximately halves the likelihood of apples with a cocoon entering Australia.[1057]

2.728 In its first written submission, Australia claims that taking account of AQIS border inspection measures was not necessary because the IRA was assessing unrestricted risk.[1058] But, the importation step in question was one which the IRA itself said factored in "on-arrival minimum border procedures".[1059] Since all fruit and vegetables imported into Australia are subject to AQIS inspection, this is an "on-arrival minimum border procedure" that had to be taken into account. Calculating a full risk assessment on the basis of conditions that would never occur only serves to artificially inflate the numbers. Indeed, this is consistent with ISPM 11 which expressly provides that pest risk assessments should include an estimation of the likelihood that "the pest will go undetected during inspection or survive other existing phytosanitary procedures."[1060]

2.729 In its comments on the expert responses to question 113, Australia appears to accept that such an inspection is part of standard AQIS procedures[1061] and shifts to a new argument, claiming instead that there will be no 600-unit inspection by AQIS

[1055] Importation step 8 - the likelihood that ALCM survives and remains with fruit after on-arrival minimum border procedures.

[1056] NZFWS, paras. 4.346 to 4.349.

[1057] NZFWS, para. 4.346.

[1058] AFWS, para. 751.

[1059] IRA, p. 165.

[1060] **Exhibit NZ-124**: International Standards for Phytosanitary Measures No. 11 (2004) "Pest Risk Analysis for Quarantine Pests including Analyais of Environmental Risks and Living Modified Organisms" para 2.2.1.4.

[1061] ACER, para. 249.

"because the consignments are to be pre-cleared in New Zealand."[1062] First, New Zealand notes that, as acknowledged by both the experts[1063] and by Australia itself,[1064] the IRA is unclear on the relationship between pre-clearance and the procedures to be applied to New Zealand apple fruit.[1065] More importantly, however, New Zealand notes that even if "consignments are to be pre-cleared in New Zealand" as Australia now suggests, that would not change the fact that New Zealand apples would be subject to a 600-unit AQIS inspection – the key issue in dispute. Indeed, the location of the inspection is a secondary matter. The key point is that, contrary to Australia's claims, standard practice involves a 600-unit inspection carried out by AQIS on each export consignment of New Zealand apples, after the fruit has passed a 600-unit inspection conducted by MAF. New Zealand notes that Australia itself defines "preclearance" as: "An AQIS quarantine inspection arrangement performed in the country of origin prior to export, which is equivalent in all intents and purposes to the quarantine inspection performed on goods on arrival in Australia".[1066] Here too, the IRA's conclusion has no scientific basis.

(e) The IRA's conclusions in respect of the overall probability of importation of ALCM have no scientific basis

2.730 As explained in New Zealand's first written submission, as a result of the IRA's failure to take into account viability, the likelihood of contamination and the August 2005 data, the IRA estimates of the overall infestation rate for ALCM are not sufficiently supported by scientific evidence. This is expressly confirmed by the experts. Indeed, Professor Cross indicates that the IRA's overall estimate of the likelihood of entry of ALCM is so flawed that it should be discarded. He states that "[t]he first estimate [the IRA's own assessment of the overall infestation rate] should be discarded as the risk estimates at critical importation steps are subject to large

[1062] ACER, para. 249.

[1063] Experts' RPQ, Q 4.

[1064] See AFWS, para. 151 and ARPQ, Qs 47 and 48, pp. 36 – 37 where Australia acknowledges that "elements of the [IRA sections dealing with the relationship between audits and requirements for pre-clearance] require clarification."

[1065] IRA, p. 314

[1066] **Exhibit NZ-125:** "AQIS Requirements for Offshore Pre-clearance Inspection of Fresh Fruit and Vegetables" (June 2000), p. 4.

uncertainties because they are based on inadequate old published data."[1067] He goes on to note that the "IRA should use the August 2005 end point inspection data provided in table 40 of its IRA and discard steps 2 & 3 of its 8 step importation analysis. Step 2 relies on old and inadequate published data and the August 2005 data appears to be of much better quality being recent and based on large sample sizes over 4 years…The risk values in step 3 of the IRA appear to be guesses. Australia does not appear to have challenged the quality of the August 2005 data but continues to give the old estimates based on much poorer quality data to which it has given equal weight. The most likely value of 5×10^{-2} for importation step 2 results in a 38.5 fold higher estimation of the most likely risk value for the August 2005 data (most likely 1.3×10^{-3})."[1068]

2.731 In its comments on the expert responses, Australia appears to accept Professor Cross's conclusion that the IRA's analysis of the likelihood of ALCM entry is flawed and should be discarded.[1069] It also appears to accept that the IRA's assessment of the likelihood of ALCM establishment and spread should have been based exclusively on the August 2005 data.[1070] Indeed, Australia's only response to the numerous flaws identified by the experts with respect to the IRA's estimate of the likelihood of ALCM entry is its concession that the IRA's eight step analysis of the likelihood of ALCM entry is irrelevant, because the IRA also considered the August 2005 data in its further analysis of entry, establishment and spread.[1071]

2.732 Australia's readiness to jettison a significant part of its risk assessment at this stage in the dispute is striking. Its admission that its analysis of likelihood was faulty – indeed involving a very significant overestimation of the risks – calls into question the validity of the entire risk assessment with respect to ALCM. The IRA's estimate of the likelihood of ALCM entry was so far removed from what is indicated by the scientific evidence that the Panel should have no confidence in the IRA's subsequent assessment of the likelihood of ALCM establishment and spread. It should also give

[1067] Cross RPQ, Q 99, p. 9.

[1068] Cross RPQ, Q 108, p. 16.

[1069] ACER, paras. 243, 246, 247 and 252

[1070] See for example ACER, paras. 226, 231, 243, 246 and 252.

[1071] ACER, para. 247.

the Panel pause when considering the probabilities assigned with respect to the other pests at issue.

(f) The IRA's conclusions in respect of the likelihood of ALCM establishment have no scientific basis

2.733 As explained in New Zealand's first written submission, there are a number of reasons why the IRA's conclusions in respect of the likelihood of ALCM establishment have no scientific basis.[1072] First, as explained above, the IRA failed to factor in viability. Second, there is no scientific basis for two of the IRA's key assumptions in respect of ALCM's biology: that ALCM flying distances are up to 200m and that ALCM emergence would occur immediately after apples are taken out of cold storage. There is also no scientific basis for the IRA's assumptions about the effect of normal trade practices on the risk.

(i) Lack of scientific basis for the IRA's conclusions in respect of ALCM flying distances

2.734 The IRA assumed that mated female ALCM could fly up to 200m.[1073] That the IRA relied on a flying range of 200m is confirmed by the experts[1074] and acknowledged by Australia in its first written submission.[1075] However, as explained above under Article 2.2, there is no scientific basis for such a conclusion. The expert responses explicitly confirm this.[1076]

2.735 The IRA's incorrect conclusion about ALCM female flight range had important consequences for its assessment of the likelihood of ALCM establishment. The IRA makes clear that the primary pathway for ALCM establishment involves

[1072] NZFWS, paras. 4.350 to 4.363.

[1073] While the IRA is not transparent about how it factored ALCM female flight into its calculations (the IRA does not define the term "near" the criterion used by the IRA in its assessment of the proportion of utility points near enough to host plants for egg laying to occur), it appeared to assume that ALCM female flight could be up to 200m (See AFWS, paras. 803 and 804 and the IRA, p. 168).

[1074] Cross RPQ, Q 94, p. 3 and Q 103, p. 12.

[1075] AFWS, para. 803 and **Exhibit AUS-66.**

[1076] Cross RPQ, Q 94, p. 3 and Q 103, p. 12.

apples at orchard wholesalers.[1077] Indeed, the proximity of these orchard wholesalers to commercial apple fruit was assigned a probability value of 1 in the IRA.[1078] This means that the IRA assumed that "all" orchard wholesalers would be within ALCM female flying distance (according to Australia, 200 metres) of commercial apple crops. Indeed, the IRA specifically acknowledges that its conclusions on the issue of proximity "reflect the mobility of the pest".[1079] However, because the scientific evidence does not support a flight range of 200 metres, the IRA's conclusion with respect to the issue of proximity that "all" orchard wholesalers are within flying distance of commercial crops is not valid and a key aspect of the primary pathway is thus seriously undermined.

2.736 In its first written submission Australia attempts to downplay the importance of this aspect of the science by claiming that "the IRA Team did not place much weight on [the 200m] figure."[1080] This is, of course, an unsubstantiated and unverifiable assertion about what the IRA team did behind the scenes, and is not reflected in the IRA report itself. Moreover, in the very next paragraph in its first written submission Australia contradicts itself by stating that "the IRA Team reasoned that it is also likely that some of the shoot infestations up to 200 meters were caused by immigrants from the adjacent infected orchard block."[1081]

2.737 In addition, in its first written submission Australia confirmed that not "all" orchard packing houses will be within 30-50 metres of commercial apple trees.[1082] Therefore, if Australia used this 30-50 metre figure in its assessment of proximity, the conclusion that "all" orchard wholesalers are near enough to commercial apple crops to be within ALCM-flight range is an over-estimate. This suggests either that Australia, in its first written submission, has admitted to an error in its IRA, or that the inaccurate 200 metre flight range must have been used as a basis for the IRA's

---

[1077] See footnote 313 above.

[1078] IRA, p. 168.

[1079] IRA, p. 167.

[1080] AFWS, para. 803.

[1081] AFWS, para. 804.

[1082] AFWS, para. 808.

conclusion that a proximity value of "1" for orchard wholesalers and commercial fruit was appropriate.

2.738 Finally, in respect of Australia's claim that, "[i]n any event, a flight range of 30-50 meters for a mated female ALCM would be ample in many cases between an orchard packing house co-located with an apple orchard",[1083] New Zealand notes that, even if this were true (which New Zealand disputes below), it is clear that 30-50 metres would not suffice in every case for all orchard wholesalers. Yet in ascribing the value of 1 to the relevant proximity rating, this is what the IRA assumed. Australia's statement confirms that this was an overestimate.

2.739 Moreover, it is simply not true that 30-50 metres would suffice in light of the sequence of events required for ALCM establishment. As already explained, ALCM emergence would not occur until apples are removed from cold storage and left outside uncovered. But, because of Australian best practice guidelines for apple growers on the disposal of fruit (which, as explained above, set out guidelines recommending that agricultural waste be destroyed and disposed of at least 100 metres away from orchards[1084]), apples disposed of as waste by orchard wholesalers (the only scenario where large numbers of apples could be left outside and uncovered) would not be left in a condition conducive to ALCM establishment. Thus, not only are the IRA's conclusions not supported by any scientific evidence, there is also no basis for Australia's assertion that "a flight range of 30-50 meters for a mated female ALCM would be ample in many cases between an orchard packing house co-located with an apple orchard."[1085]

2.740 In its comments on the expert responses, Australia claims that the scientific uncertainty surrounding female ALCM flight range excuse the IRA's failures in this regard.[1086] Australia also makes much of Professor Cross's statement that "Australia's IRA with respect to [the issue of ALCM flight] was objective and plausible and relied on what little real evidence there was, but the available evidence

[1083] AFWS, para. 808.

[1084] See paras. 2.260 to 2.263.

[1085] AFWS, para. 808.

[1086] ACER, para. 215

was insufficient for a scientifically sound assessment."[1087] However, New Zealand recalls that the key question under Article 5.1 is whether conclusions in a risk assessment are sufficiently supported by the scientific evidence. Indeed, the statements of Professor Cross confirming that the IRA's conclusion that female ALCM flight range is up to 200m is not supported by scientific evidence provide clear assistance to the Panel in making this assessment.[1088] It is not clear from Professor Cross's statement that he appreciated the significance of this conclusion to the IRA's assessment that all orchard wholesalers and sufficiently proximate to commercial apple crops (which, in turn, is the primary pathway considered in the IRA).

<u>(ii) No scientific basis for the IRA's conclusions in respect of the timing of ALCM adult emergence</u>

2.741 As explained above, the IRA's conclusions were based on the assumption that all ALCM present on New Zealand apples would simultaneously emerge as soon as the apples were removed from cold storage.[1089] The IRA, however, provides no explanation of the basis for this assumption. In its first written submission Australia tries to provide the explanation that the IRA failed to provide.[1090] It is notable that in doing so it provides no cross references back to the text of the IRA, but instead offers explanations not contained in the IRA. New Zealand recalls that the obligation under Article 5.1 is to ensure that the conclusions in an IRA are supported by sufficient scientific evidence, not to justify measures in the context of dispute settlement. In any event, the *ex post-facto* explanations of the IRA's treatment of this issue contained in Australia's first written submission are not, themselves, supported by the scientific evidence.

2.742 Specifically, the explanation that Australia provides in support of the IRA's assumption is that some ALCM entering Australia would be fully developed pupae which, upon being taken out of cold storage, would not require any development

[1087] Cross RPQ, Q 94(iii), p. 3. See also ACER, paras. 219 -223, pp. 64-65.

[1088] This is in line with the statement of the Appellate Body regarding the appropriate role of experts in *Canada – Continued Suspension*, para. 592.

[1089] IRA, p. 171

[1090] AFWS, paras. 796-797.

time.[1091] However, in order for the IRA's conclusion to be valid, *all* ALCM present on New Zealand apples would have to be fully developed pupae which, upon being taken out of cold storage, would not require any development time. This is not supported by the scientific evidence. As explained above, the expert responses confirm that the scientific evidence indicates that emergence of viable individuals would occur over a prolonged period of time (in some cases as long as one year) and not, as the IRA assumed, simultaneously after removal from cold storage.[1092]

2.743 The IRA's incorrect assumptions about the timing of adult emergence had important consequences for the IRA's assessment of the likelihood of ALCM establishment. Its failure to take into account in its analysis the prolonged timeframe for emergence resulted in a gross overestimate of the risk. Indeed, as explained by Professor Cross, prolonged emergence of adults "*substantially decreases* the chances of a male and female emerging within the time frame of a few days which is required for successful mating,"[1093] which "*substantially reduce*[s]" the risk of ALCM establishment.[1094] (Emphasis added.) Professor Cross explicitly confirms that this important factor was not taken into account by Australia in its assessment of risk.[1095] Indeed, as explained above, the prolonged emergence of ALCM adults effectively removes any chance of the sequence of events required for ALCM establishment in Australia occurring (for ALCM mating to occur, simultaneous emergence of adults is required).[1096]

2.744 In its comments on the expert responses, Australia disputes Professor Cross's claim, asserting that the IRA did take into account the prolonged period of emergence of viable insects. In support, Australia sets out in full page 171 of the IRA, and claims that the extract makes clear that "the IRA Team fully appreciated the many uncertainties and small likelihoods associated with the potential of ALCM to establish

[1091] AFWS, paras. 796-797.

[1092] Cross RPQ, Q 94 (i), pp. 1-2.

[1093] Cross RPQ, Q 102, p. 11.

[1094] Cross RPQ, Q 94 (i), p. 2.

[1095] Cross RPQ, Q 94 (i), pp. 1-2.

[1096] The prolonged period of adult emergence means that male and female ALCM from cocoons on individual apples would never have time to find each other and mate during their very short life span. For this to happen there would need to be near simultaneous emergence.

in Australia."[1097] However, all page 171 says on this issue is: "…adults could emerge from the pupal stage after the apples have been taken out of cold storage, or wherever the cold chain is broken, such as at unpacking and repacking facilities or retailers and during the transportation of purchased apples from retailers to households or with fruit that is dumped".[1098] Nowhere in this extract, or anywhere else in the IRA for that matter, is the issue of the timeframe required for ALCM emergence mentioned, let alone the issue of staggered emergence of ALCM, or the fact that emergence will occur over a prolonged period. Surely if these important issues were taken into account in the IRA, as Australia claims, they would have been discussed, and reflected in the IRA's conclusions.[1099] They were not. Thus, Australia's claims have no basis.

2.745 Finally, in its comments on the expert responses, Australia attempts to make much of Professor Cross' statement that "[u]nless evidence to the contrary is produced, Australia's IRA relating to this issue was objective and credible and relied on limited scientific information available".[1100] However, New Zealand has established that the conclusions in the IRA did not factor in the timeframe for ALCM emergence. New Zealand is not required to provide any additional evidence on this aspect of the IRA's analysis, given the significant implications this failure has on the IRA's assessment of risk. In New Zealand's view it is clear that the IRA's conclusions in this regard are not supported by sufficient scientific evidence.

2.746 Indeed, immediately after the words stressed by Australia, Professor Cross continued, "[h]owever, an important point is that longer period of adult emergence would substantially reduce the likelihood of small numbers if individuals in a consignment emerging within a few days of each other and being to mate and lay eggs to start an infestation".[1101] Crucially, Professor Cross went on to state that "[t]he risk

[1097] ACER, paras. 256-257.

[1098] IRA, p. 171.

[1099] Had the IRA taken into account the prolonged timeframe for ALCM emergence, it would have included the percentage of viable ALCM that would emerge within the relevant timeframe for ALCM mating. This analysis would have been applied to the data in table 43 of the IRA, and would have had the overall effect of reducing the number of live ALCM available to start a population.

[1100] ACER, para. 219 and Cross RPQ, Q 94 (i), p. 2.

[1101] Cross RPQ, Q 94 (i), p. 2.

of establishment is thus substantially reduced and this important factor has not been taken into account in the IRA".[1102] In light of this it is clear that Professor Cross's replies on this issue seriously undermine the credibility of the IRA's assessment of risk, which was a significant overestimate of the risk.

(g) Lack of scientific basis for the IRA's assumptions about normal trade practices

2.747 As explained above at paragraphs 2.253 to 2.256, the IRA failed to take into account the likely mode of trade of New Zealand apples, and failed to focus its analysis on waste apple.

<u>(i) The IRA failed to take into account mode of trade</u>

2.748 As explained in New Zealand's first written submission, the IRA failed to take into account the important fact that the vast majority of New Zealand apple exports to Australia would be in retail ready packaging.[1103]

2.749 While Australia has made various flawed arguments that New Zealand apples would not be retail ready, they are all largely irrelevant because the IRA itself clearly accepted the likelihood that the majority of New Zealand apples would be exported to Australia in a retail ready condition. This is clear from the two mode of trade scenarios used by the IRA in its assessment of the likelihood of establishment.[1104] The first scenario assumed that the majority of apples would be exported in a retail ready condition, resulting in the numbers of fruit going to orchard wholesalers being very low. The second assumed that the majority of apples would be exported in bulk bins, resulting in the numbers of fruit going to orchard wholesalers being relatively high.

2.750 As explained above, the IRA specifically acknowledges that orchard wholesalers are the only utility point likely to be in close enough proximity to apple trees for ALCM egg laying to occur.[1105] Thus, the logical inference is that the two

[1102] Cross RPQ, Q 102, p. 11.

[1103] NZFWS, para. 4.128 and NZRPQ, Q 10, paras. 18-19.

[1104] IRA p 171 - 172

[1105] See footnote 313 above.

scenarios should result in very different estimates of the likelihood of ALCM establishment (if orchard wholesalers are taken out of the equation, as per the first scenario, then, as noted by Professor Cross,[1106] the risk is effectively removed).

2.751 However, despite the IRA elaborating on these two different mode of trade scenarios, it failed to actually factor them into its conclusions on the likelihood of entry, establishment and spread – thereby failing to take this important issue into account in its overall risk estimate. Notably, with the other two pests at issue, separate overall calculations for each mode of trade scenario were presented in the IRA.[1107] However, inexplicably, in the case of ALCM no such method was used – the IRA simply presented one calculation for the overall likelihood of entry, establishment and spread, seemingly treating the two disparate scenarios as irrelevant.[1108] At no point does the IRA provide any explanation as to why it has used this different methodology for ALCM.

2.752 The IRA's failing in this regard had important consequences. As explained above, had the IRA presented calculations for the overall likelihood of entry, establishment and spread for each of the two scenarios, the overall likelihood for the retail ready scenario would have been below Australia's ALOP.[1109] This is because retail ready apples would not require repacking, which would effectively remove any likelihood of large numbers of apples being close enough to apple trees to be within ALCM female flight range – a key prerequisite to ALCM establishment.

2.753 The IRA's failure to take into account that the majority of New Zealand apples would be retail ready allowed it to grossly overestimate the likelihood of ALCM establishment. There is thus no scientific basis for the IRA's conclusions.

[1106] Cross RPQ 98 p 8.

[1107] For European canker see IRA, p. 97, Table 21 and for fire blight see IRA p. 145, Table 35.

[1108] IRA, p. 183.

[1109] This is clear from the fact that scenario 1 assumes that almost all (95-99.9%) New Zealand apples would be exported in a retail ready condition, meaning that virtually none would need to go to orchard wholesalers for repacking. Reducing the values of the partial probabilities for entry, establishment and spread for orchard wholesalers in Tables 44 and 45 of the IRA to "negligible" to reflect this, results in a median value for the probability of entry, establishment and spread of 1.2% instead of 73% in Table 46 and 1.1% instead of 51% in Table 47. These values correspond to an overall probability of entry, establishment and spread of "Very Low", which, when combined with the low consequence estimate, results in a "very low" value for unrestricted risk, below Australia's ALOP.

<u>(ii) The IRA failed to take into account the issue of waste management</u>

2.754 Finally, as explained above, the IRA failed to take into account the fact that Australian agricultural waste practices mean that New Zealand apples would never be left in a condition conducive to ALCM establishment. Thus, even if New Zealand apples were not exported in a retail ready condition and did go to orchard wholesalers, there would still be no opportunity for ALCM establishment.

2.755 Because cold storage is essential to maintaining the shelf life of fruit, only waste apples are likely to be left outside of cold storage, outdoors and uncovered – the scenario required for ALCM emergence and mating to occur. However, the IRA did not take into account the crucial issue of waste management and its effect on the likelihood of ALCM emergence. Instead, it simply assumed that ALCM emergence could occur at "any point in Australia to which [New Zealand apples] are distributed and not only from apples that are dumped as waste".[1110] However, as the expert responses confirm, how fruit waste is handled in Australia should have been key to the assessment of the likelihood of ALCM establishment. Professor Cross notes that "…the way that waste fruit is handled at the 7 orchard wholesalers is of crucial importance…The risk would be considerably reduced, perhaps eliminated, if the fruit were enclosed so the midge adults could not escape."[1111]

2.756 As explained above in paragraphs 2.260 to 2.261, the procedures set out in Australia's nation-wide best practices for apple and pear growers preclude entirely any opportunity for ALCM emergence and mating.[1112] Indeed, the expert responses also indicate that fruit waste in Australia would be unlikely to be left in a condition conducive to ALCM emergence, mating or egg laying. Both Dr Deckers and Dr Latorre note that orchard wholesalers would not leave fruit waste uncovered.[1113]

2.757 Had the IRA correctly focused on the issue of waste, this would have had a big impact on its calculations of the likelihood of ALCM establishment. In its calculations of the likelihood of fire blight and European canker entry, establishment

[1110] AFWS, para. 759.

[1111] Cross RPQ, Q 121, p. 22

[1112] See paras. 2.260 to 2.264 above.

[1113] Deckers RPQ, Q 121, p. 40 and Latorre RPQ, Q 89, p. 30.

and spread, the IRA took into account that only approximately 0.05% of apples arriving at orchard wholesalers would be discarded as waste.[1114] Using this figure, and the scientific evidence indicating that only 25% of occupied cocoons on New Zealand apples would contain viable ALCM, for there to be any chance of mating occurring, the number of apples that would need to be sent to a single wholesaler in order for enough apples to be disposed of as waste for ALCM mating to occur (ignoring the issue of the timeframe for adult emergence – which itself precludes any likelihood of establishment) would be in the region of 39 million.[1115]

2.758 Australia failed to factor any of this into its assessment of the risk of ALCM establishment. Thus, its conclusions have no scientific basis and accordingly Australia's measures are maintained without sufficient scientific evidence.

2.759 As explained in New Zealand's first written submission, for there to be any likelihood of ALCM establishment many thousands of fruit would need to be left uncovered, outside of cold storage, outdoors, in one place, at the same time, within 30m to 50m of apple trees at a time of year when they have new leaves unfurling. However, given the factors identified above, the likelihood of this occurring is negligible - it is a cumulative sequence of events that will almost certainly not occur. The IRA's failure to take into account these factors means that the Panel can have no confidence in the IRA's assessment of risk.

2.760 The expert responses confirm the IRA's failures to take into account the various key issues identified above, including viability, the mode of trade and the timeframe for adult emergence.[1116] Indeed, Professor Cross concludes that the IRA's assessment of the risk related to the entry, establishment and spread of ALCM is so flawed that it needs to be "recalculated".[1117] He specifically recommends that the risk of ALCM entry and establishment be re-assessed having regard to the key factors that

[1114] IRA, pp. 26 to 27 specifies that waste at orchard wholesalers is P3 (0.0005).

[1115] As explained below in paragraph 2.902, the effect of a 600 unit sample inspection would be that only 0.015% of New Zealand apples entering Australia would have viable cocoons. If only 0.05% of these are discarded as waste, then the proportion of New Zealand apples with viable ALCM and discarded as waste is 0.015% x 0.05% or approximately 7.7×10^{-8}. This equates to approximately 1 in 13 million apples. To get 3 viable cocoons (minimum required for ALCM mating), approximately 39 million apples would be required.

[1116] Cross RPQ, Q 104, pp. 12-15 and Q 120, pp. 21-22.

[1117] Cross RPQ, Q 120, pp. 21-22.

the IRA ignored, including viability, parasitism, the timing of adult emergence and the mode of trade, correctly identifying that, if these important factors are taken into account, the unrestricted risk might well be within Australia's ALOP.[1118]

(h) Lack of scientific basis for the IRA's conclusions about the likelihood of ALCM spread

2.761 As explained in New Zealand's first written submission and responses to Panel questions, there is also no scientific basis for the IRA's conclusions in respect of the likelihood of ALCM spread, because the IRA failed to factor in climatic issues.[1119]

2.762 The IRA did not deal with the important issue of climate, and the conditions necessary for ALCM survival, at all. Instead, it simply assumed that: "ALCM has spread all over New Zealand since its accidental introduction in about 1950. There are similar environments in Australia that would be suitable for its spread."[1120] This is the only mention of climatic issues related to ALCM in the IRA assessment of the likelihood of ALCM spread in Australia.

2.763 In its first written submission Australia tries to maintain that the IRA did take into account climatic issues.[1121] But all it can point to as evidence of this is the single reference quoted above. However, an assertion that there are similar climates in Australia to those in New Zealand does not, by any measure, constitute a proper analysis of climatic factors necessary for ALCM survival.

2.764 The IRA's failures in that regard are confirmed by the expert responses. Professor Cross states that: "[a] weakness in the IRA is that Australia failed to quantify (or at least delimit) the geographic range and range of conditions which are necessary for establishment and spread of ALCM, both in terms of temperature and rainfall and their seasonal occurrence. The geographic and climatic limits were not

[1118] Cross RPQ, Q 120, pp. 21-22.

[1119] NZFWS, paras. 4.364-4.366 and NZRPQ, paras. 190-192.

[1120] IRA, p. 177.

[1121] AFWS, para. 812.

established."[1122] Indeed, in his responses Professor Cross confirms what the IRA ignored – that ALCM needs specific climatic conditions to survive.[1123]

2.765 Professor Cross also confirms that the IRA could have, and should have, used the evidence relating to the current distribution of ALCM to establish the climatic boundary conditions necessary for its existence.[1124] Had it done so, Professor Cross confirms that the IRA would have found that the only area of Australia likely to have a climate conducive to ALCM survival is south of 38° latitude which includes the extreme southern tip of south-east Australia and the whole of Tasmania.[1125] Professor Cross goes on to note, however, that the "[c]limatic conditions in SE Australia, which have been exceptionally hot and dry, have been quite unsuitable for ALCM survival."[1126] Thus, in Professor Cross's view, it appears that the only area prone to establishment of ALCM is Tasmania.

2.766 The IRA's failure to take into account climate issues allowed it to overestimate the likelihood of ALCM spread in Australia.[1127] Indeed, if the only area conducive to ALCM establishment is Tasmania then this greatly reduces the likelihood of ALCM establishment and spread. As a result of the IRA's failures to take into account climate, the IRA's conclusions in respect of the likelihood of ALCM spread have no scientific basis.

2.767 Notwithstanding this key omission in the IRA's analysis of the likelihood of ALCM spread, Professor Cross's view that the IRA was objective and credible is based on the fact that the IRA did not conclude that ALCM would spread to all areas of Australia. But there is a difference between ALCM not spreading to all areas in Australia, and the climate being unsuitable for spread in most of Australia. The fact that the IRA did not assume that ALCM would spread to all areas of Australia does not change the fact that the IRA ignored the crucial issue of climate completely in its

[1122] Cross RPQ, Q 117, p. 20.

[1123] Cross RPQ, Q 94 (v), pp. 4-5 and Q 117, p. 20.

[1124] Cross RPQ, Q 94 (v), pp. 4-5 and Q 117, p. 20.

[1125] Cross RPQ, Q 94 (v), pp. 4-5.

[1126] Cross RPQ, Q 94 (v), p. 4.

[1127] NZRPQ, para. 192.

analysis. As a result the IRA's conclusions significantly overestimates the likelihood of establishment and spread in Australia.

(i) Lack of scientific basis for the IRA's conclusions about consequences

2.768 As noted in New Zealand's first written submission and responses to the Panel's written questions, the IRA's analysis overstates the likely consequences of ALCM in a number of areas.[1128] This is explicitly confirmed by Professor Cross who concludes that two of the IRA's "D" ratings should be reduced.[1129]

<u>(i) Plant life or health – direct impact</u>

2.769 The IRA gives an impact score of "D" for the direct impact on plant life and health.[1130] However, as explained in New Zealand's first written submission and responses to the Panel's questions, this rating is exaggerated. New Zealand's position on this is confirmed by Professor Cross who notes, with respect to the IRA's conclusion on this point that: "…in my view ["C"] would be more appropriate."[1131]

2.770 As explained in New Zealand's first written submission, the IRA's conclusions on this point were based entirely on out of date data which pre-dates the introduction of New Zealand's Integrated Fruit Production (IFP) program.[1132] In addition, the IRA's conclusions failed to take into account that ALCM is an important pest only of nursery stock and young trees.

2.771 In its first written submission, Australia claims that "New Zealand has failed to provide any actual evidence that New Zealand growers would assign different impact rankings in respect of ALCM today compared to those ascertained by Smith

[1128] NZFWS, paras. 4.367-4.378 and NZRPQ, paras. 207-212.

[1129] Cross RPQ, Q 96, p. 6.

[1130] IRA, pp. 184-185.

[1131] Cross RPQ, Q 96, p. 6.

[1132] As noted in NZRPQ, Q 86 (p. 69), Australia relies only on literature that pre-dates the introduction of the IFP program in the 1990s. Smith and Chapman 1995 was based on a small survey of 30 growers in Nelson in the mid-1990s at a time when that region had some ALCM control difficulties before the IFP programme was introduced. In addition, the Horticulture and Food Research Institute of New Zealand Limited BugKey website, referred to by Australia, was established in 1999 but has not been updated since. The two "other sources" referred to by Australia, justifying its use of Smith and Chapman 1995 (AFWS, para. 829), both also pre-date the IFP program in New Zealand (IRA, p. 184).

and Chapman"[1133] and that "New Zealand continues to have problems with high levels of ALCM…even since the introduction of the [IFP] programme."[1134] However, Professor Cross's comments indicate the contrary. Indeed, he confirms New Zealand's position that the pest status of ALCM in New Zealand has reduced significantly since the introduction the IFP program, resulting in ALCM being only an important pest for young trees.[1135] In those circumstances, the impact rankings in Smith and Chapman 1995 have no relevance to current conditions.

2.772 Professor Cross's comments also confirm that the New Zealand experience with ALCM "…mirrors the European experience where most growers live with ALCM without apparently suffering serious losses and seldom make treatments in newly planted orchards to control it."[1136] Dr Deckers also confirms this, noting: "The problem of an ALCM infection in an apple orchard is not considered in Europe as a major problem, but more as a secondary parasite that makes some damage on the leaves without interfering too much with the productivity of the fruit trees."[1137]

2.773 In its first written submission, Australia tries to justify the IRA's reliance on outdated data by claiming that, if ALCM established and spread in Australia, the situation would be similar, not to the current situation in New Zealand with regards to ALCM, but to the situation as it was when ALCM first arrived in New Zealand.[1138] However, as New Zealand has already explained, Australia's claim has no basis. There is now a significant body of readily available research on the management of ALCM, and as a result the correct comparator for Australia is the current situation in New Zealand.[1139]

2.774 Finally, in its first written submission Australia tries to argue that the consequences for young trees were what the IRA team was focused on.[1140] However,

[1133] AFWS, para. 830.

[1134] AFWS, para. 832.

[1135] Cross RPQ, Q 96, p. 6 and Q 119, p. 21.

[1136] Cross RPQ, Q 96, p. 6.

[1137] Deckers RPQ, Q 96, p. 36.

[1138] AFWS, paras. 831 and 834-842.

[1139] NZRPQ, para. 210.

[1140] AFWS, para. 833.

again, this is a *post-facto* re-writing of the IRA. Nowhere in the IRA is this important fact even acknowledged. This is confirmed by Professor Cross who states that: "Australia's IRA part B page 185 does not indicate that ALCM is only likely to be a significant pest problem in nurseries and young trees in orchards that are establishing and was deficient in this respect as pointed out by NZ in para 4.371 of its FWS."[1141]

(ii) Indirect impact – control or eradication

2.775 The IRA gave an impact score of "D" for the indirect impact on control and eradication.[1142] As noted in New Zealand's first written submission, the IRA's assessment in this regard is exaggerated. New Zealand's position is confirmed by Professor Cross who concludes that: "a C rating would be more objective and credible" for the indirect impact of control or eradication.[1143]

2.776 In its first written submission, Australia defends its D rating on the basis that the IRA was correct to assume that establishment of ALCM in Australia would increase the use of insecticides, which would in turn lead to increased costs to producers.[1144] The IRA provided no basis for these propositions. The only piece of evidence Australia is now able to point to in support is a website of the Horticulture and Food Research Institute of New Zealand Limited.[1145] However, that website has not been updated since 1999, and is not a relevant or reliable source of information on this point.[1146] Indeed, the expert responses explicitly confirm New Zealand's position that the likelihood of increased use of insecticides is very low. Professor Cross states that "…where invasive outbreaks of ALCM have occurred in other countries, the grower response has not been to treat established orchards with insecticides."[1147] He also notes that in countries where ALCM is present and the climate is favourable: "growers generally pay limited attention to [ALCM] and live with it as a minor

[1141] Cross RPQ, Q 119, p. 21.

[1142] IRA, p. 185.

[1143] Cross RPQ, Q 96, p. 6.

[1144] AFWS, paras. 840-841.

[1145] AFWS, para. 841.

[1146] Indeed, it is hard to understand why Australia would need to refer to this website given that the NZ IFP Manual (**Exhibit NZ-45**) makes clear the low level of insecticide usage in New Zealand.

[1147] Cross RPQ, Q 119, p. 21.

irritation and do not apply insecticides."[1148] Professor Cross also confirms that even if establishment of ALCM in Australia did lead to an increased use of insecticides "…this would probably be confined to nurseries and possibly young trees…" and so would only lead to "…marginally increased costs to producers".[1149]

2.777 Australia also tries to defend the IRA's inflated score by claiming that the IRA was correct to ignore biological control factors for ALCM. Specifically, Australia asserts that: "…it was not possible for the IRA Team to assess the degree to which these potential predators present in Australia would prove effective against ALCM under Australian conditions".[1150] Australia also now claims that the main control agent of ALCM, the parasitoid wasp Platygaster demades, is not present in Australia and has a restricted degree of effectiveness.[1151] These are factors that were not dealt with in the IRA and so again constitute an attempt by Australia to re-write the IRA. And in any event, the expert responses indicate the contrary – that biological control factors are an important consideration in respect of the likely consequences of ALCM establishment in Australia. Professor Cross points out that: "Several of the important natural enemy groups [of ALCM] occur in Australia" and notes that while Platygaster demades is absent from Australia, "[i]f the ALCM established in Australia, its impact could be mitigated by introduction of Platygaster demades."[1152] It would seem hard for Australia to defend the IRA's failures in respect of biological control issues in such circumstances.

<u>(iii) Indirect impact of ALCM on domestic trade or industry</u>

2.778 The IRA gives an impact score of "D" for impact on domestic trade or industry.[1153] As noted in New Zealand's first written submission, the IRA's assessment in this regard is exaggerated.

[1148] Cross RPQ, Q 96, p. 6.

[1149] Cross RPQ, Q 119, p. 21.

[1150] AFWS, para. 844.

[1151] AFWS, paras. 845-846.

[1152] Cross RPQ, Q 96, p. 6.

[1153] IRA, p. 186.

2.779 As noted in New Zealand's first written submission, there is no basis for the IRA's assumptions that the presence of ALCM on commercial fruit could result in "fruit skin being distorted by bumps" and "outright rejection of imperfect fruit".[1154] Professor Cross confirms New Zealand's position that cosmetic damage to fruit in New Zealand from ALCM is very rare. He notes that the "effects of ALCM infestation on skin finish or fruit quality are rare. The type of damage reported from New Zealand [has] not been reported from elsewhere and is extraordinary".[1155] The comments of Dr Deckers also support such a conclusion. He notes that while there is potential for leaf damage from ALCM, ALCM does not usually interfere with the rest of the fruit tree.[1156]

2.780 Professor Cross has also confirmed a key fact that the IRA ignored - that large parts of Australia do not have a climate suitable to ALCM survival.[1157] Thus, the likelihood of interstate spread of ALCM in Australia would be negligible. A "D" rating simply has no scientific basis.

<u>(iv) Indirect impact of ALCM on international trade</u>

2.781 The IRA gives this a score of "D" for the indirect impact on international trade on the basis that the presence of ALCM on harvested fruit "can lead to the rejection of fruit for pre-clearance export".[1158] However, as explained in New Zealand's first written submission, the presence of ALCM in New Zealand has no major impact on apple exports.[1159] New Zealand regularly exports to markets free of the pest with only the standard 600 unit sample being required. As explained in the third party submission of the United States, the Californian regulatory programme referred to by Australia in its first written submission[1160] is not relevant because it is not designed to detect ALCM, but a different pest altogether.[1161] Indeed, New

[1154] NZFWS, para. 4.374, referring to IRA, p. 186.

[1155] Cross RPQ, Q 96, p. 7.

[1156] Deckers RPQ, Q 96, p. 32.

[1157] Cross RPQ, Q 94 (v) pp. 4-5 and Q 117, p. 20

[1158] IRA, p. 186.

[1159] NZFWS, para. 4.376.

[1160] US TPS, para. 48 and US RPQ, Q 9, para. 8.

[1161] NZRPQ, Q 140, para. 294.

Zealand apple consignments have never been rejected because of the presence of ALCM.[1162] Australia's claim that "New Zealand fruit may be rejected for pre-clearance export to Japan if found to be infested with ALCM"[1163] is wrong. Japan treats ALCM as any quarantine pest and simply requires that consignments be fumigated if ALCM is detected during normal standard phytosanitary inspection. Again, there is thus no basis for Australia's "D" rating.

(v) Impact across Australia

2.782 Finally, in its first written submission, Australia claims that climatic issues and in particular the distribution pattern of ALCM in the US are not relevant to its consequences analysis.[1164] However, this is directly contradicted by the views of Professor Cross who confirms that "a weakness in the IRA is that Australia failed to quantify (or at least delimit) the geographic range and range of conditions which are necessary for establishment and spread of ALCM, both in terms of temperature and rainfall and their seasonal occurrence. The geographic and climatic limits were not established."[1165]

2.783 Professor Cross also confirms the relevance of the distribution pattern of ALCM in the US noting that: "The current distribution of ALCM could have been used [in the IRA] to establish climatic conditions that are especially favourable to ALCM and climatic boundary conditions for its existence. A climatic analysis would also have given a better assessment of the likely impact of ALCM in different areas of Australia."[1166] The IRA's failure to take into account the fact that most of Australia would not have a climate suitable for ALCM establishment contributed to its overestimation of the likely consequences.

[1162] While some consignments have been fumigated, none have been re-shipped or destroyed.

[1163] AFWS, paras. 848-849.

[1164] AFWS, para. 836.

[1165] Cross RPQ, Q 117, p. 20.

[1166] Cross RPQ, Q 94 (v), p. 4.

(vi) Conclusion on consequences

2.784 As explained above, Professor Cross explicitly confirms New Zealand's position that two of the IRA's impact scores are "exaggerated". He also casts doubt on a number of the other impact scores assigned by the IRA. However, he suggests that because "re-categorisation" of the two impact scores he explicitly identifies as exaggerated "would not result in a change in the rating of the overall consequences as 'low'", that "the conclusion of Australia's analysis was objective and credible."[1167] However, the fact that Professor Cross's view is that the IRA clearly overestimated two of the key consequences criteria indicates that its analysis is not sufficiently supported by the scientific evidence. And indeed, as explained above, it was not just two of the key criteria that were overestimated. New Zealand's position, which is supported by the experts,[1168] is that the IRA's impact scores for four of the criteria are overestimated, meaning that the overall consequences should be reduced from "low" to "very low". This would, even on the basis of the IRA's faulty assessment of the likelihood of entry, establishment and spread, bring the overall risk to "very low", which is within Australia's ALOP.

6. Measures that might be applied

2.785 In its first written submission, New Zealand demonstrated that the IRA failed to evaluate the likelihood of entry, establishment and spread "according to the SPS measures which might be applied" within the meaning of 5.1 and the definition of a "risk assessment" under Annex A of the *SPS Agreement*. Rather, without analysis, the IRA simply stated that certain measures should be applied. In addition, the IRA team failed to consider an alternative measure proposed by New Zealand.

2.786 Australia's arguments in response rely on its flawed principal/ancillary distinction together with a misreading of the relevant case law.

[1167] Cross RPQ, Q 96, p. 7.

[1168] In addition to explicitly confirming that two of the IRA's key criteria were overestimated, the expert responses confirm that the IRA's assessment of consequences failed to take into account that large parts of Australia do not have a climate that is suitable for ALCM: Cross RPQ, Q 96, p. 7. They also confirm that the IRA's assessment of the impact on domestic trade or industry is not based on sufficient scientific evidence: Cross RPQ, Q 96, p. 7 and Deckers RPQ, Q 96, p. 32.

(a) Australia's principal v ancillary distinction is without basis

2.787 In its first written submission, Australia does not deny that it failed to evaluate risk according to the particular measures identified by New Zealand (measures 4, 7, 8, 11, 15, 16, 17).[1169] Instead Australia's rebuttal turns entirely on the contention that these are not "SPS measures". According to Australia only "principal measures" which "actively reduce" risk are "SPS measures", and therefore principal measures are the only ones that need to be evaluated under the third requirement of Article 5.1.[1170] Australia suggests that the measures identified by New Zealand in the context of this claim are "ancillary measures" that do not "actually reduce risks themselves."[1171] Australia claims that because of this distinction it was not under an obligation to evaluate such measures.

2.788 For the reasons set out at paragraphs 2.1 to 2.17, the distinction drawn by Australia between principal and ancillary measures is without basis. Both types of measures are "applied to protect" against risks or damage arising from entry, establishment or spread of pests and therefore meet the definition of "SPS measures" under Annex A, paragraph 1 of the *SPS Agreement*. Accordingly, all the measures identified by New Zealand are subject to the obligation to evaluate risk according to the SPS measures which might be applied.

2.789 Given that Australia has not contested the IRA's lack of evaluation with respect to these measures, it has failed to rebut New Zealand's case of a breach of the third element of Article 5.1.

(b) Australian reasoning not supported by case law

2.790 In support of its arguments, Australia relies on the Appellate Body decision in *Australia – Salmon* and the Panel decision in *Australia – Salmon (Article 21.5 - Canada)*.

[1169] These are the numbers used by the Panel during the first Panel hearing and have not been adjusted to take into account the fact that measure 12 is no longer in dispute between the parties.

[1170] AFWS, para. 859.

[1171] AFWS, para. 859.

2.791 First, Australia argues that "the Appellate Body's reasoning is limited to whether principal risk reduction measures are evaluated in a sufficiently substantial way in a risk assessment".[1172] Australia places weight on the alleged focus of the Appellate Body on risk reduction measures which were evaluated for their effectiveness in reducing "total risk".[1173]

2.792 However, it is simply not correct to say that the Appellate Body was focussed on total risk. The 1996 Final Report considered by the Appellate Body in that case included a large number of different measures for each of the 24 diseases of concern - as well as the quarantine policy options considered to reduce the 'total risk' associated with all the diseases of concern. The Appellate Body found neither the Final Report's evaluation for the disease-specific measures nor its evaluation of total risk reduction measures sufficient in terms of Article 5.1.[1174] There is nothing in the Appellate Body's analysis to support Australia's distinction between "principal" and "ancillary" measures.

2.793 Second, in its responses to Panel questions, Australia now attempts to argue that New Zealand's argument is more appropriately dealt with by a Panel when it analyses whether SPS measures are "based on" a valid risk assessment (which it notes New Zealand does not explicitly contest). Australia relies on dicta from *Australia – Salmon (Article 21.5 – Canada)* which found that the link between the risk assessment, the measures finally selected and the necessity to use these measures in order to achieve the ALOP could not be read into the definition of a risk assessment under paragraph 4 of Annex A.[1175]

2.794 However, New Zealand's claim is not focused on the relationship between the IRA and the measures finally selected; it is focused on the evaluation (or lack thereof) in the IRA itself. The task for the Panel, therefore, is not to determine whether there is a rational relationship between the measures finally selected and the assessment of risk (i.e. whether the measures are "based on" the risk assessment); but

[1172] AFWS, para. 858.

[1173] AFWS, para. 857.

[1174] Appellate Body Report, *Australia – Salmon*, paras. 132-133.

[1175] Panel Report, *Australia – Salmon (Article 21.5 – Canada)*, para. 7.68.

rather, to objectively assess whether the IRA contains an evaluation of the effect of the measures it recommends. In New Zealand's view, the IRA failed to evaluate the relative effectiveness of many of the measures that the IRA itself recommends.

2.795 Indeed, as noted above, Australia has not actually argued that the IRA did undertake such an evaluation. It relies solely on the argument that it was not obliged to make an evaluation with respect to so-called "ancillary" measures. For the reasons noted, this view is mistaken and finds no support in the Appellate Body and panel rulings in the *Salmon* case.

(c) "Ancillary measures" must be evaluated

2.796 In any event, the approach of the panel in *Japan – Apples* indicates that even where some requirements are not treated as individual SPS measures in their own right, they are still subject to the obligation in Article 5.1. In that case the panel decided to treat a number of requirements relating to the export of apples from the United States to Japan as elements of a single SPS measure. Drawing on the Appellate Body report in *Australia – Salmon*, the panel nonetheless found (upheld on appeal) that Japan had failed to satisfy the third limb of the 5.1 test because:

> …no attempt is made to assess the relative effectiveness of the various individual requirements applied, and the assessment appears to be based on the assumption from the outset that all these measures would apply cumulatively. In our view, however, an assessment according to the SPS measures that might be applied suggests that it would not be sufficient where a number of distinct measures are considered to simply draw a general conclusion on their overall combined efficiency without any analysis of their relative effectiveness and whether and why all of them in combination are required in order to reduce or eliminate the possibility of entry, establishment or spread of the disease.[1176]

2.797 As in *Japan – Apples*, the relative effectiveness and whether and why all of the different measures in combination are required in order to reduce or eliminate the possibility of entry, establishment or spread for each of the three pests was simply not undertaken by the IRA Team in this case. Accordingly, even on Australia's limited

[1176] Panel Report, *Japan – Apples*, para. 8.288, Appellate Body Report, *Japan – Apples*, para. 209.

interpretation of an SPS measure, Australia has failed to comply with its obligation under Article 5.1.

(d) Australia failed to evaluate a particular measure proposed by New Zealand

2.798 In addition, in its first written submission, New Zealand pointed out that Australia has failed to evaluate a measure specifically put forward by New Zealand, namely to consider the impact on the likelihood of entry, establishment and spread if imports were restricted to 'retail ready' apples.[1177]

2.799 In response Australia claims that "[t]he *SPS Agreement* does not impose any obligation to evaluate any measures proposed by an exporting country".[1178] Similarly, in its responses to Panel questions[1179] Australia points to the statement by the panel in *Australia – Salmon (Article 21.5 – Canada)* that there is no obligation to assess, "all possible measures (of which there could be a very great number)".[1180] However, this is clearly different from a requirement to evaluate risk according to measures that have been specifically and reasonably identified by the country seeking access. This was a point endorsed by the European Communities in its third party responses to questions:

> The European Communities imagines that, typically, the alternative measures proposed by other Members would fall into that category of measures which might be applied and that, potentially, could reduce the risks of concern to a level that would meet the WTO Member's ALOP. In such cases, it appears fair to assume that the WTO Member concerned would duly take into account the proposed measures. Although it cannot be excluded that, in some instances, another Member could suggest alternative measures which, on their face, appear so unreasonable or outlandish that they do not warrant any in depth consideration or examination – that eventuality would appear to be largely hypothetical.[1181]

[1177] NZFWS, paras. 4.397-4.399.

[1178] AFWS, para. 873.

[1179] ARPQ, Q 149.

[1180] Panel Report, *Australia-Salmon (Article 21.5 – Canada)*, para. 7.70.

[1181] ECRPQ, para. 16.

2.800 In New Zealand's view, Australia's refusal to consider a specific and reasonable measure identified by New Zealand is a breach of the requirement to evaluate risk according the SPS measures which might be applied.

2.801 In its first written submission, Australia claims on the basis of *Japan – Apples* that in order to show a breach of the third element of Article 5.1, New Zealand must show that the IRA team's evaluation was limited to a specific set of pre-determined measures or to those already in place.[1182] While it is true that on the facts of that case Japan had failed to consider measures other than those measures already in place, this does not suggest that the obligation in Article 5.1 is limited to such circumstances.[1183] In the present case, the IRA Team had a number of measures in mind, some of which it evaluated, to the exclusion of a specific and reasonable alternative proposed by New Zealand.

2.802 Finally, New Zealand is not attempting to dictate, as Australia implies, the measures that Australia must adopt. In that regard, Australia's reliance in its responses to Panel questions on the dicta from *EC – Biotech Products* that "a given risk assessment may well support a range of possible measures. Within this range, a member is at liberty to choose the one [measure] which provides the best protection of human health and/or environment",[1184] does not address the point at issue. New Zealand's position is that under Article 5.1 and Annex A, Australia was obliged to evaluate the retail ready measure against the risk as assessed, which it acknowledges it did not do. As such, Australia does not meet the requirements of a risk assessment within the meaning of Article 5.1, as defined in Annex A, paragraph 4 of the *SPS Agreement*. Accordingly, there is no valid risk assessment to support the "range of possible measures" referred to in *EC – Biotech*.

2.803 For the reasons outlined above Australia has failed to rebut New Zealand's case of a violation of Article 5.1.

[1182] AFWS para. 860, referring to Appellate Body Report, *Japan – Apples*, para. 208.

[1183] Appellate Body Report, *Japan – Apples*, paras. 207-209.

[1184] ARPQ, Q 149, p. 125, citing Panel Report, *EC – Biotech*, para. 7.1525.

H. ARTICLE 5.2

2.804 In its first written submission, New Zealand pointed out that the words "take into account" in Article 5.2 carry an obligation to genuinely consider the factors listed, to the extent they are relevant to a risk assessment, and that in its risk assessment Australia has failed to take into account various matters in breach of this obligation.[1185] In response, in its first written submission, Australia accepted that Article 5.2 carries an obligation to "consider" the factors listed in that Article,[1186] but criticised New Zealand's interpretation of the obligation under Article 5.2 (genuine consideration) as "not grounded in the text of the *SPS Agreement*".[1187] New Zealand has set out the textual basis for its interpretation of Article 5.2 in its response to the Panel's question 121. Australia considers that it had no obligation to give genuine consideration to available scientific evidence, or the other matters listed in Article 5.2.[1188]

2.805 Australia considers that New Zealand is attempting "to convert Article 5.2 into an obligation that Australia and the IRA Team should have effectively agreed with New Zealand's own view of the relevant technical factors listed in the provision."[1189] New Zealand is not arguing that "genuine consideration" requires Australia to agree with New Zealand's view of those matters, or requires Australia to have given more weight to certain matters, or that Article 5.2 prescribes a particular result.[1190] Rather, New Zealand's argument under Article 5.2 relates to matters to which New Zealand considers Australia has failed to give any genuine consideration.

[1185] Article 5.2 of the *SPS Agreement* provides "In the assessment of risk, Members shall take into account available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; prevalence of specific diseases or pests; existence of pest- or disease-free areas; relevant ecological and environmental conditions; and quarantine or other treatment."

[1186] AFWS, para. 885. This argument is also supported by Appellate Body Report, *Canada – Continued Suspension*, para. 503**.**

[1187] AFWS, para. 879.

[1188] ARPQ, Qs 119, 120.

[1189] AFWS, para. 879. ARPQ, Q 119, p. 95.

[1190] ARPQ, Qs 119, 120.

2.806 New Zealand has set out a range of matters that Australia has failed to take into account in its first written submission.[1191] Australia has failed to rebut New Zealand's arguments in relation to these matters. The specific matters New Zealand considers Australia failed to take into account are as follows.

1. Australia failed to take into account available scientific evidence that mature apples do not provide a pathway for the introduction of fire blight

2.807 Australia claims to have "considered a wide range of scientific material from many sources in its fire blight risk assessment, many of which were also considered by the Panel in the *Japan – Apples* dispute."[1192] Australia says in its first written submission that "[s]ome of [the fire blight] references [taken into account by the IRA team] supported the conclusion that the pathway was unlikely to be completed. Others supported a contrasting view."[1193] There is, however, no credible or defensible scientific explanation of the phenomenon that Australia asserts exists (the introduction of fire blight via mature, symptomless apples) and to which Australia's measures purport to be a response. Not only is there no scientific evidence supporting the completion of a pathway (and none is offered by Australia), there is considerable scientific evidence supporting the opposite conclusion, that no such pathway has ever been completed or could be completed. Australia has failed to genuinely consider both the lack of evidence supporting its pathway hypothesis and the evidence indicating that no pathway exists. Rather, Australia's hypothetical pathway risk analysis is an elaborate construct, aimed at drawing attention away from the overwhelming body of evidence contradicting Australia's risk assessment.

2.808 Australia concedes in its first written submission[1194] that the IRA omitted to make any mention of the *Japan – Apples* findings. These findings comprehensively gathered and analysed all the relevant scientific evidence available on fire blight and its spread. The panel in *Japan – Apples* engaged in consultations with scientific experts, from whom it obtained expert advice, which was then recorded in the panel

[1191] NZFWS, paras. 4.412-4.427.

[1192] AFWS, para. 886.

[1193] AFWS, para. 886.

[1194] AFWS, para. 885.

reports. The conclusion of the panel was that the risk that mature, symptomless apple fruit be a vector for the entry, establishment or spread of fire blight within Japan is negligible, even if the fruit is infested with epiphytic *E. amylovora*. Given that Australia was considering exactly the same pest and pathway, it is remarkable that the IRA completely ignores the compilation and analysis of the available scientific evidence provided in the *Japan – Apples* reports. Australia's failure to take consider the findings in *Japan – Apples* is a clear indication that it did not give genuine consideration to the manifest lack of scientific evidence that mature, symptomless apples serve as a pathway for the transmission of fire blight.

2. Australia failed to take into account available scientific evidence concerning the Tasmanian outbreak of European canker

2.809 Australia failed to take into account scientific evidence concerning the outbreak of European canker in Tasmania. In particular, despite the unrestricted movement of apple fruit, European canker failed to spread from the four affected orchards. New Zealand has provided evidence that significant volumes of Spreyton apples were sold throughout Tasmania and other Australian states, and exported internationally during the European canker outbreak.[1195] This evidence directly contradicts the IRA which speculates that "[i]t is possible …there was no significant movement of fruit out of that area."[1196] Australia concedes this evidence was not taken into account in its risk assessment.[1197]

3. Australia failed to take into account relevant processes and production methods concerning retail-ready packaged apples

2.810 As discussed above at paragraphs 2.252 to 2.256, Australia has failed to rebut New Zealand's case that Australia failed to take into account that New Zealand apples would be retail ready. At paras. 2.257 to 2.263 above, New Zealand notes that Australia failed to take into account that agricultural waste would not be left in a condition conducive to ALCM establishment.

[1195] NZFWS, Table 4, p. 249.

[1196] IRA, p. 155.

[1197] AFWS, fn 1131.

4. Australia failed to take into account relevant inspection, sampling and testing methods in relation to ALCM

2.811 Australia concedes that its importation step 8 for ALCM does not take into account the existence of a 600 fruit inspection by AQIS.[1198] As discussed above in paragraphs 2.727 to 2.729. taking into account the AQIS 600-unit inspection approximately halves the likelihood of apples with a cocoon on them entering Australia.[1199] New Zealand understands that the 600-unit inspection is a part of Australia's minimum on-arrival border procedure for all fresh fruit and vegetables. It should therefore have been taken into account in importation step 8.

5. Australia failed to take into account the prevalence of the pest in relation to ALCM

2.812 Furthermore, as pointed out above at paragraphs 2.223 to 2.263, Australia failed, in its assessment of the risk of entry and establishment of ALCM, to take into account that the scientific evidence indicates that the great majority of cocoons on New Zealand apples are not viable.[1200]

2.813 Australia responded in its first written submission that it "clearly evaluated the evidence on viability of ALCM cocoons".[1201] However, as confirmed by Professor Cross, Australia has not taken into account such evidence in assessing the likelihood that apples will be infested with viable ALCM.[1202] This is clear from Australia's calculation of the likelihood that apples will be infested with ALCM cocoons (importation step 2), which, as explained, ignores viability.

6. Australia failed to take into account environmental conditions

2.814 Australia failed to take into account whether environmental conditions in Australia would be suitable for the establishment and spread of European canker. In Annex 4 of its first written submission, New Zealand provided the analysis that the

[1198] AFWS, para. 902.

[1199] NZFWS, para. 4.346.

[1200] NZFWS, para. 4.423.

[1201] AFWS, para. 904.

[1202] Cross RPQ, Q 109, p. 17.

IRA lacked. This analysis, based on information that would have been readily available to the IRA team, showed that, contrary to what is suggested by the IRA, the Australian climate in the main apple-growing regions is substantially different from those parts of the world where European canker is known to exist. New Zealand's position on the IRA's lack of climate analysis and its flawed conclusions on the conduciveness of the Australian climate to European canker is confirmed by the experts' responses as described at paras. 2.638 to 2.661 above. Australia has responded to New Zealand's climate paper with its own climate paper, which as New Zealand has pointed out is seriously flawed.[1203] But the fact that Australia waited until its first written submission to provide any climate analysis demonstrates that climate was not appropriately taken into account in the IRA itself. Australia now proposes to put forward a second additional climate paper in a further effort to remedy the IRA's shortcomings. In New Zealand's view, this is simply additional evidence of the IRA's failure to take into account the impact of climatic conditions on the likelihood of establishment and spread of European canker in Australia.

2.815 The IRA also failed to take into account climatic conditions in its assessment of the likelihood of ALCM spread (see paragraphs 2.761 to 2.767 above).

7. Australia has not rebutted New Zealand's case that Australia breached Article 5.2

2.816 Australia has failed to provide any convincing arguments as to why the obligation in Article 5.2 of the *SPS Agreement* to take into account various matters should not involve an obligation to genuinely consider those matters. Nor, in its first written submission or responses to the Panel's questions, has Australia rebutted the examples offered by New Zealand of matters that Australia failed to take into account in its risk assessment.

I. ARTICLE 5.5

2.817 Article 5.5 requires that each WTO Member avoid arbitrary or unjustifiable distinctions in the levels of protection it considers to be appropriate in different

[1203] AFWS, Annex 2.

situations, if such distinctions result in discrimination or a disguised restriction on international trade. In its first written submission, New Zealand showed how differences in the way Australia treats the similar risks associated with Japanese Nashi pears and New Zealand apples constitutes a breach of Article 5.5. Australia's arguments in response are flawed. In the following sections, New Zealand will rebut Australia's assertions and show that: Australia misinterprets Article 5.5 in two key ways; the situations identified by New Zealand are comparable; the levels of protection applied show arbitrary or unjustified distinctions; and these distinctions result in discrimination or a disguised restriction on trade.

1. Australia misinterprets Article 5.5

2.818 Australia has incorrectly interpreted the scope and application of Article 5.5 in two respects. First, Australia claims that New Zealand faces a "heavy evidentiary burden" in the circumstances of this case. Second, Australia suggests that in order to assess compliance with Article 5.5 it is only permissible to compare "current" situations.

2.819 As regards the first point, Australia claims that New Zealand faces a "heavy evidentiary burden"[1204] in establishing a "de facto" distinction in the ALOP being applied. Australia bases this on the fact that Australia's ALOP is expressly articulated as "providing a high level of [SPS] protection, aimed at reducing risk to a very low level but not to zero".[1205] Australia does not explain why a heavier burden is appropriate in these circumstances or how this standard might differ from the usual requirement set out in *US – Wool Shirts and Blouses*.[1206] Nor does Australia cite any jurisprudence in support of its position.

2.820 It is notable that Australia's stated ALOP is generic in nature. It applies not just to New Zealand apples and Japanese nashi pears but to all fruit (and indeed, to all biosecurity risks) from all countries in the world.[1207] It is not clear to New Zealand why, under Article 5.5, Australia should benefit from a 'super-presumption' of

[1204] AFWS, para. 979.

[1205] *Import Risk Analysis Handbook*, p. 5, **Exhibit AUS-10**.

[1206] Appellate Body Report, *US – Wool Shirts and Blouses*, p. 14. NZFWS, paras. 4.1-4.7.

[1207] *Import Risk Analysis Handbook,* **Exhibit AUS-10**.

consistency, which can be refuted only by the 'weightiest' of evidence, simply because it has articulated a generic ALOP. To follow the logic of Australia's argument would be to encourage WTO Members to adopt very general statements of their ALOP so as to avoid effective review under Article 5.5.

2.821 In New Zealand's view, reference to a "heavier burden" must be seen as a purely rhetorical device on the part of Australia. The normal rules of burden of proof articulated in *US – Wool Shirts and Blouses* apply to the Panel's consideration of New Zealand's claim under Article 5.5.

2.822 The second error Australia makes in interpreting Article 5.5 is its suggestion that situations must be "current" in order to be compared. In Australia's view, it is not possible to compare a current situation with a past situation "for the simple reason that plant health status of Members changes over time, as do trade volumes and risk management procedures".[1208]

2.823 While it is true that plant health status, trade volumes, and risk management practices may change over time, unless the ALOP also changes, then it is entirely appropriate to consider past situations as evidence of an ongoing breach of Article 5.5. Indeed, in New Zealand's view the ALOP is best ascertained by considering the measures in light of the risk as it existed at the time the measures were adopted. It is precisely those circumstances that existed at the time the comparator risk assessment was carried out that are most relevant to determining whether differences in ALOP are currently being applied. A subsequent drop off in trade or eradication of a pest does not change the ALOP being applied.

2.824 Evidence of an ongoing breach can, therefore, be legitimately found in the circumstances that existed at the time that the risk was assessed. Australia's efforts to deny the relevancy of such evidence should be rejected.[1209] Moreover, Australia

[1208] AFWS, para. 991.

[1209] The relevance of previous decisions is confirmed by the *SPS Committee Guidelines to further the Practical Implementation of Article 5.5* (G/SPS/15, pp. 3-4), which states: "A.4. To avoid arbitrary or unjustifiable differences in the level of protection a Member considers to be appropriate in different situations, a Member should compare any proposed decision on the level of protection in a particular situation with the level it has previously considered or is considering to be appropriate in situations which contain sufficient common elements so as to render them comparable with regard to human life or health, to animal life or health, or to plant life or health. It can be useful to compare a cannot use subsequent changes in underlying trade conditions or pest status as evidence of changes in the ALOP. New Zealand will return to these points in detail below.

2.825 As a result of its flawed interpretation of Article 5.5, Australia has failed to rebut key aspects of New Zealand's argument as set out in New Zealand's first written submission.

2. First element: import of Japanese nashi pears and New Zealand apples are comparable situations

2.826 In New Zealand's view the focus under the first element of Article 5.5 should be on determining whether the two situations are 'comparable' in the sense that they involve the 'same or similar disease' or the 'same or similar biological or economic consequences'. It does not require, as Australia's first written submission implies, an in depth analysis of the risk of entry, establishment and spread and of consequences. Rather, it is a threshold question aimed at establishing whether the different situations have sufficient common elements to be comparable.

2.827 By focusing solely on the question of "risk" Australia has failed to respond specifically to New Zealand's arguments under the first element. Australia proceeds on the assumption that it is necessary to establish the same or similar risks of entry, establishment and spread of the diseases in question. However the jurisprudence is clear that it is sufficient under the first element that the diseases are similar. New Zealand's first written submission established this.

2.828 The fact that Australia effectively skips this first step and jumps into a comparison of risks can perhaps be taken as an implicit acceptance that the diseases are sufficiently similar to warrant comparison under Article 5.5. Indeed, in the course of its assessment of risks posed by Japanese Erwinia Australia acknowledges that "Japanese Erwinia is a strain of bacterium similar and with similar symptoms to

proposed appropriate level of protection with previous decisions…to ensure that any differences in levels of protection applied in a similar situation are justifiable and would not result in discrimination or a disguised restriction on international trade."

Erwinia amylovora".[1210] This is consistent with the 1998 Final Import Risk Analysis of the New Zealand Request for the Access of Apples into Australia which accepted "trade in pears from Japan is broadly comparable to the [NZ] proposal in that it involves trade in a susceptible host product from a country with a disease similar to fire blight".[1211] Dr Paulin confirms that Japanese Erwinia and fire blight are "very similar but not identical, and the symptoms seem similar as well".[1212] Dr Deckers notes that "[t]here is a great similarity between the Japanese Erwinia associated with nashi pears and *Erwinia amylovora* on apples from New Zealand."[1213]

2.829 With respect to brown rot (caused by the pathogen *Monilinia fructigena*), in its first written submission Australia "accepts that European canker and brown rot are similar only to the extent that both are fungal diseases which can produce spores on fruit."[1214] Australia does not elaborate on any material differences in the two diseases however, focusing on differences in risk instead. The similarity of the diseases in question is sufficient to render Japanese Nashi pears and New Zealand apples comparable.

2.830 In addition, New Zealand's first written submission also established that the biological and economic consequences of the two diseases are similar. In light of the fact that, once again, Australia's response in its first written submission is in the context of an assessment of "risk", New Zealand will respond to Australia's arguments under the second element below.

3. Second element: levels of protection applied to Japanese nashi pears and New Zealand apples exhibit arbitrary or unjustifiable differences in their treatment of comparable situations

2.831 As New Zealand argued in its first written submission, despite the similar or higher risk profile of Japanese nashi pears when compared to New Zealand apples,

[1210] AFWS, para. 1000.

[1211] **Exhibit AUS-112**, *Final Import Risk Analysis of the NZ Request for the Access of Apples Into Australia* (December 1998), p. 27. The statement is made with reference to bacterial shoot blight (BSB), the disease name for Japanese Erwinia.

[1212] Paulin RPQ, Q 12, p. 9.

[1213] Deckers RPQ, Q 12, p. 6.

[1214] AFWS, para. 1001.

Australia applies less restrictive measures to their import. This difference in treatment of similar risks reflects differences in the levels of protection applied. Australia has failed to refute New Zealand's arguments.

(a) Nashi pears have comparable or higher risk profile

2.832 As set out in New Zealand's first written submission, nashi pears have a comparable or higher risk profile, both in terms of the likelihood of entry, establishment and spread of the two diseases and the associated biological and economic consequences.[1215]

<u>i. Japanese Erwinia</u>

2.833 Australia has never conducted an assessment of the "risk" of Japanese Erwinia associated with the import of Japanese Nashi pears. As a consequence, Australia applies no measures on Japanese nashi pears with respect to Japanese Erwinia. The complete absence of a risk assessment, and the corresponding absence of measures, for a disease similar to fire blight, is powerful evidence of a difference in the ALOP being applied [1216]

2.834 Australia responds by identifying three reasons why the risks associated with Japanese Erwinia might be considered lower than those associated with *Erwinia Amylovora*: the absence of Japanese Erwinia in export areas; the volume of trade in Nashi pears; and the lower biological and economic consequences. None of these withstand scrutiny.

a. Area freedom from Japanese Erwinia is not a measure

2.835 Australia suggests that "Australia has only ever imported Nashi pears from Tottori prefecture" which is claimed to be free of Japanese Erwinia, and that "import conditions are based on the assumption that pears would be sourced only from Tottori".[1217]

[1215] NZFWS, paras. 4.436-4.443.

[1216] NZFWS, para 4.439.

[1217] AFWS, para. 988, footnote 1240.

2.836 As an initial point, it appears from this statement that Australia is content to manage the risks associated with Japanese Erwinia on the basis of an "assumption" that pears would be sourced from a pest free area. This can be contrasted to the ALOP evident in the stringent measures applied to New Zealand apples. Secondly, while Tottori prefecture may be free of Japanese Erwinia, for the majority of the time that Japan has been authorised to export Nashi pears to Australia, Japanese Erwinia was present in other parts of Japan. Third, area freedom from Japanese Erwinia is not, and has never been, a requirement of exporting Nashi pears from Tottori prefecture. New Zealand will return to these points in more detail in discussing the "measures applied" below.

2.837 Australia further argues that Japan eradicated Japanese Erwinia from 2003, and that under Article 5.5 it is necessary to compare "current situations'.[1218] But as noted above, the pest status at the time the "comparable" risk is assessed is relevant in determining whether differences in ALOP are being applied. Japanese Erwinia was reported in Japan in 1972,[1219] and may have been present in Japan from the early 1900s.[1220] Eradication was not claimed until 2003.[1221] Despite this, the 1988 investigation by AQIS into the pest risk associated with the import of nashi pears did not include any assessment of the risks associated with Japanese Erwinia.[1222] Furthermore the 1989 Quarantine Circular Memorandum[1223] which set out the terms for trade in nashi pears from Japan to Australia did not contain any measures to deal with the risks posed by the disease. In New Zealand's view these facts are probative of differences in the ALOP being applied to Japanese Nashi pears.

[1218] AFWS, para. 991

[1219] Matsuura, **Exhibit NZ-67**. See also **Exhibit AUS-110**, MAF Japan "the bacterial shoot blight of pear was confirmed to break out on pear trees in a part of Hokkaido (located in the northern Japan) by Tanii et al (1976)." (p. 1)

[1220] New Zealand notes that symptoms attributed as fire blight caused by *Bacillus amylovorus* (an early name for *Erwinia amylovora*) were reported from Japan as early as 1902: Mizuno**,** A. Sato, S. Kawai, A. Takahashi, K. Nishiyama, K. Azegami, K. Ieki, H. Komamura, K. Review of alleged occurrence of fire blight in Japan. *Research Bulletin of the Plant Protection Service*, Japan. Yokohama Plant Protection Station, Ministry of Agriculture, Forestry and Fisheries, Yokohama, Japan: 2003. 39, 109-116. 38 **Exhibit NZ-126**.

[1221] **Exhibit AUS-110.**

[1222] **Exhibit AUS-109**, the diseases investigated by Dr P Kable on behalf of AQIS were brown rot, nashi pear scab, canker and fruit rot and black rot.

[1223] **Exhibit AUS-109**.

b. Volume of trade irrelevant to measures for Japanese pears

2.838 Australia argues that there "has been no trade in Japanese Nashi pears between Australia and Japan since 2003" and "reminds the Panel that to reasonably compare situations, those situations must be current."[1224] This is another example of Australia misinterpreting Article 5.5. If the volume of trade is relevant at all, the relevance lies in the volume of trade as predicated at the time the comparator risk assessment was conducted. Yet the 1988 investigation and measures imposed under the Quarantine Circular Memorandum made no assumptions about the potential volume of trade. Further, the risk management measures under the *Arrangement for the Shipment of Nashi Fruit from Japan to Australia* (2003 Arrangement)[1225] are not limited to specific volumes. There is nothing on the face of the Arrangement that indicates that at higher volumes, different measures would apply. Moreover, there is nothing preventing Japan from re-establishing trade at any time and at any volume on the basis of the measures set out under the present Arrangement. For these reasons, New Zealand does not consider the volume of trade, much less the current volume of trade, to be relevant in determining the ALOP applied to Japanese Nashi pears in this case.

c. Consequences associated with the establishment of Japanese Erwinia are comparable to those associated with fire blight

2.839 Finally, Australia suggests that the consequences associated with Japanese Erwinia are lower than those for fire blight. In its one-paragraph response to New Zealand's arguments in this regard, Australia suggests that the differences are "obvious" from the fact that "in the field Japanese Erwinia has only been recorded on pears."[1226] However, pears are a substantial industry in Australia (33% of total pipfruit production), producing 130,500 tonnes in the year 2007-2008.[1227] Further, the

[1224] AFWS, para. 997.

[1225] *Arrangement for the shipment of nashi fruit from Japan to Australia*, **Exhibit AUS-108**, p. 61.

[1226] AFWS, para. 1000.

[1227] Australian Bureau of Statistics, Agricultural Survey, Apples and Pears, 2007-2008 (**Exhibit NZ-127**), See also NZFWS, para. 4.438.

IRA indicates that yield reduction as a result of a fire blight outbreak may be more significant for the pear industry than the apple industry. [1228]

2.840 In New Zealand's view the associated economic and biological consequences of a Japanese Erwinia incursion are clearly similar to those of fire blight. Any differences are certainly not sufficient to justify an approach based on assumptions, the absence of a risk assessment, and the absence of any corresponding measures.

ii. Brown rot

2.841 Australia makes similar arguments in suggesting that the risks posed by brown rot are not similar to (i.e. are lesser than) the risks posed by European canker.

2.842 In terms of the biology of the disease, Dr Swinburne confirms the New Zealand position that *N. galligena* (European canker) has a lower risk profile than *M. fructigena* (brown rot): "[*M. fructigena*] can spread from fruit to fruit in bulk bins leading to 'nesting', and thus inoculum enhancement, which is not found with *N. galligena*. Rotted fruit almost invariably produce prolific numbers of conidia on sporodochia…The conidia are dispersed by wind alone and are thus not reliant on rain-fall. This contrasts with *N. galligena* in which spore production is relatively low and the spores are dispersed by rain splash …."[1229]

2.843 New Zealand also notes Australia's assessment in the context of the *Draft IRA Report – Fresh Apple Fruit from the People's Republic of China* (Draft IRA - China Apples), released in January 2009,[1230] which identified the risk associated with *M. fructigena* as higher than that associated with *N. galligena.*[1231]

[1228] IRA, p. 101.

[1229] Swinburne RPQ, Q 61, p. 9.

[1230] Draft Import Risk Analysis Report for Fresh Apples Fruit from the People's Republic of China, January 2009 (Draft IRA – China Apples), **Exhibit NZ-128.**

[1231] The probability of entry, establishment and spread for *M. fructigena* was assessed for Chinese apples as "high", and the overall unrestricted risk (both PEES and consequences) was assessed as "moderate": Draft IRA – China Apples, **Exhibit NZ-128,** p. 131. This is to be compared with the conclusions in respect of *N. galligena* (described in the Draft IRA – China Apples with the alternate name *N. Ditissima*), which was assessed in the Draft IRA – China Apples (consistent with the IRA for New Zealand apples) as "low" and "low" for PEES and overall unrestricted risk respectively.

2.844 Australia first argues that export areas in Tottori prefecture "are free from brown rot and [Japan] has procedures in place to maintain and verify freedom from the disease".[1232] In making this argument Australia is confusing the measures imposed to manage risks with the "unrestricted" level of risk.[1233] In fact, although the measures Australia applies to both Japanese Nashi pears and New Zealand apples effectively require the absence of pests in the export area, the difference in ALOP being applied is evidenced in the differences in the measures chosen to achieve this objective. As outlined in more detail below, the measures are considerably more onerous with respect to New Zealand apples.

2.845 Australia goes on to argue that current volumes of trade suggest that there is a different level of risk associated with Japanese Nashi pears. This argument should be rejected for the same reasons as those outlined above with respect to Japanese Erwinia.

2.846 Finally, Australia argues that the consequences of a brown rot incursion are lower than those for European canker.[1234] It is notable that the position taken by Australia in its first written submission expressly contradicts the position taken in the recently released Draft IRA – China Apples which assessed the consequences of the establishment of *M. fructigena* (brown rot) in Australia as "moderate".[1235] This is the same evaluation of consequences given to European canker under the IRA for New Zealand apples.[1236] Accordingly, to argue in the context of the present dispute that the consequences of brown rot establishing in Australia would be lower, lacks credibility.

2.847 In its first written submission, Australia selectively quotes from Jones and Aldwinkle 1990,[1237] which states that brown rot "rarely cause(s) economic losses of apple and pear" but overlooks the important qualification in the same article that "losses of 7-36% were reported in individual apple orchards in Europe" (a

[1232] AFWS, para. 992.

[1233] This is also evident in the responses of Dr Latorre and Dr Swinburne to Panel question 61.

[1234] AFWS, para. 1002.

[1235] Draft IRA – China Apples, **Exhibit NZ-128**, p. 133.

[1236] IRA, p. 150.

[1237] **Exhibit AUS-115**, p. 32.

qualification which is included in the Draft IRA – China Apples). Snowdon 1990 reported "serious losses in apple and pear fruits" caused by brown rot.[1238] Xu & Robinson 2000 also state that in the United Kingdom brown rot "leads to economic losses every year in the orchard and in store".[1239]

2.848 Further, as noted in New Zealand's first written submission, in addition to apple and pear, *M. fructigena* also causes fruit rot on other commercial fruit crops, in particular plum, peach, nectarine, apricot and quince.[1240] Dr Swinburne confirms that "[a]s stated in the NZ FWS, the host range of *M. fructigena*, including as it does fruit types of importance to Australia, also suggests that it poses a greater risk to commerce than *N. galligena*."[1241]

2.849 Australia also argues that New Zealand has failed to take into account Australia's particular circumstances, namely that the existing controls for other species of brown rot would also be effective in reducing the economic impact of *M. fructigena*.[1242] Once again, Australia's position is in contrast to that taken in the Draft IRA - China Apples. There is no mention in the Draft IRA – China Apples of the effectiveness of existing control measures for other species of brown rot in reducing the impact of *M. fructigena*.[1243]

2.850 This is not surprising given that the other species of brown rot referred to by Australia (*M. fructicola* and *M. laxa*) relate primarily to stone fruit.[1244] The controls applied to stone fruit trees would therefore not have any effect on the risk of infection of apple trees by *M. fructigena*.[1245]

[1238] **Exhibit NZ-99**, p. 180

[1239] Xu X-M and Robinson JD (2000) "Epidemiology of brown rot (*Monilinia fructigena*) in apple: infection of fruits by conidia", *Plant Pathology* 49: 201-206. **Exhibit NZ-129**, p. 201.

[1240] NZFWS, para. 442. See also Draft China IRA Report, **Exhibit NZ-128** p.130.

[1241] Swinburne RPQ, Q 61, p. 9.

[1242] AFWS, para. 1004, ARPQ, Q 131.

[1243] Cf. Draft China IRA, p. 130.

[1244] **Exhibit NZ-130**, CABI 2007, *Monilinia fructicola*; **Exhibit NZ-131**, CABI 2007, *Monilinia laxa*.

[1245] For example, the Victoria Department of Primary Industries (DPI) has a fact sheet for brown rot of stone fruit but no fact sheet for brown rot of apples: DPI Victoria, *Agriculture Notes, Brown Rot of Stone Fruits*, Jan 2006, (**Exhibit NZ-132**) The New South Wales (NSW) DPI recommends sprays for apples makes no reference to sprays for brown rot: NSW DPI Management

2.851 Australia also suggests that there are no comparable controls which would also be effective against European canker in Australia.[1246] This is in direct contrast with the finding in the IRA that "[c]ultural practices and chemical measures used to control apple scab…in most Australian apple-growing regions (except Western Australia) would assist in controlling European canker".[1247] Accordingly, existing controls could also be expected to reduce the impact of European canker were the disease to establish in Australia. Dr Latorre confirms that "[s]everal of the fungicides used to prevent apple scab (*V. inaequalis*) can also control European canker."[1248]

2.852 Overall, Dr Latorre confirms that for brown rot and European canker "the economic and biological impact on Australian agriculture, particularly for apple and pear production, would be similar"[1249] and he is critical of Australia's attempts in its first written submission to distinguish M. fructigena on the basis of consequences, describing them as "rather weak."[1250] In conclusion, the risks associated with Japanese Nashi pears arising from Japanese Erwinia and brown rot are comparable to or higher than the similar risks associated with New Zealand apples arising from *E. amylovora* and European canker. Australia's efforts to demonstrate otherwise should be rejected.

(b) Measures when assessed against risk show differences in the levels of protection applied

2.853 As noted, Australia's rebuttal under Article 5.5 is focused almost exclusively on showing that the risks associated with Nashi pears are less than the comparable risks associated with New Zealand apples. As a result Australia responds in only the most cursory fashion to New Zealand's arguments with respect to the significant differences in the measures applied. In doing so Australia has failed to rebut New Zealand's case.

Guide, *Orchard Plant Protection Guide for deciduous fruits in NSW 2008-2009* (18th ed.) (**Exhibit NZ-133**).

[1246] AFWS, para. 1004.

[1247] IRA, p. 148.

[1248] Latorre RPQ, Q 61, p. 15.

[1249] Latorre RPQ, Q 61, p. 15.

[1250] Latorre RPQ, Q 61, p. 15.

2.854 As set out in New Zealand's first written submission, despite the comparable risk profiles, Australia applies far less onerous measures to address the risks associated with the import of Japanese nashi pears. There are no measures specifically relating to Japanese Erwinia,[1251] and the requirements imposed in respect of brown rot are far less restrictive than those applied to European canker.[1252] These significant differences in treatment reflect differences in the levels of protection applied.

(i) No comparable pest risk analysis process for Japanese nashi pears

2.855 As an initial point, New Zealand notes that there has never been a comparable risk assessment process for Japanese Nashi pears. Australia points to the Quarantine Circular Memorandum as its pest risk analysis for the import of Japanese nashi pears.[1253] This four-page document followed two visits by Dr P Kable in 1988 (the 1988 investigation), reviewed for the first time in the 2003 Pome Fruit Petal Testing Review. This is to be contrasted with a three-volume, 1000+ page IRA for the import of apples from New Zealand, undertaken following an almost eight year process. In addition, in response to New Zealand's third request for access for its apples into the Australian market, an IRA for the import of New Zealand apples was finalised in 1998, an 84-page document that followed a three year process.[1254] The differences in the pest risk analysis processes themselves strongly indicate differences in the ALOP applied.

2.856 Further, as noted earlier, it is clear that there was never any assessment at all of the risk with respect to Japanese Erwinia in the 1988 investigation. The Quarantine Circular Memorandum states that "pest and disease records of nashi pears in Japan were requested and fully evaluated by plant pathologists/entomologists within AQIS. They determined that the main risk was the introduction with the fruit of the pathogens: - brown rot (*Monilinia fructigena*), nashi pear scab (*Venturia nashicola*),

[1251] Ibid.

[1252] NZFWS, para. 4.446, **Exhibit AUS-109**, p. 61.

[1253] AFWS, footnote 1237, **Exhibit AUS-109**.

[1254] **Exhibit AUS-112**. See NZFWS, background, paras. 3.4 -3.6.

canker and fruit rot (*Physalospora piricola*), black spot (*Alternaria kikuchiana*)."[1255] There was no mention of Japanese Erwinia, despite the fact that Japanese Erwinia had been reported in Hokkaido since the 1970s and eradication was not claimed until 2003. Given Australia's concern over a comparable disease – fire blight – from New Zealand, the absence of any pest risk analysis with respect to Japanese Erwinia and the absence of measures to ensure Tottori Prefecture was and remained free of Japanese Erwinia, is evidence of a lower level of protection applied to Japanese nashi pears.

(ii) No area freedom measure for Japanese Erwinia

2.857 Australia argues that area freedom from Japanese Erwinia is an "ongoing requirement"[1256] in relation to the importation of Japanese nashi pears to Australia.[1257] This statement is inaccurate. There is, in fact, no requirement that nashi pears be exported from areas free from Japanese Erwinia. The requirement under the 2003 Arrangement is, rather, that apples are to be exported from an area (Tottori Prefecture) which is certified as free from brown rot.[1258] That area is supposedly also free from Japanese Erwinia, but this is not made the subject of a measure, let alone an "ongoing requirement" of area freedom.

2.858 Further, the Australian government simply relies on Japanese government assurances that Japan (including the Tottori Prefecture) is free of Japanese Erwinia.[1259] This is to be contrasted with the requirement in respect of New Zealand apples that AQIS be involved in orchard inspections for visible symptoms of fire blight (even accepting the interpretation now offered by Australia that this would be

[1255] **Exhibit AUS-109**.

[1256] AFWS, para. 1013, ARPQ, Q 132.

[1257] New Zealand notes that Australia also says that the restrictions are based on "an assumption" that exports would be from Tottori Prefecture (AFWS, para. 998). This appears to contradict its claim regarding an "ongoing requirement". Further, relying on "assumptions" to deal with the risk of Japanese Erwinia is, in New Zealand's submission, indirect evidence of a difference in ALOP.

[1258] Australia concedes in relation to the requirement that nashi pears be sourced from TP that "this particular measure applies to brown rot". Footnote 1240.

[1259] In response to the Panel's question "can Australia explain what is required of Japan to demonstrate its ability to ensure that area freedom is achieved and maintained", Australia relies on the Japanese notification to the IPPC that it had eradicated Japanese Erwinia. ARPQ, Q 132.

an audit of 100% of orchard survey teams). The differences in treatment of similar risks are obvious.

(iii) Only requirement is to notify outbreaks of Japanese Erwinia

2.859 The only reference to Japanese Erwinia in the 2003 Arrangement is a requirement that the Japanese Ministry of Agriculture Forestry and Fisheries notify Biosecurity Australia should there be an outbreak "in Hokkaido or elsewhere in Japan".[1260] There is not even an explicit requirement to notify Biosecurity Australia if there is an outbreak in Tottori Prefecture (the only prefecture from which nashi pears are supposedly exported to Australia).[1261] Further, the consequence of notification of an outbreak is discretionary. Import conditions could be reviewed under the Arrangement.[1262] However, despite Australia's assertion in its responses to Panel questions that such a review would, "of course"[1263] follow, this is not in fact a requirement under the Arrangement. It is also not clear that a review of import conditions would necessarily result in suspension of trade. This is to be contrasted with the automatic suspension from the export programme if symptoms of fire blight are discovered in a New Zealand orchard.

(iv) No change in conditions following Japanese Erwinia outbreaks

2.860 Australia suggests that the notification requirement was introduced by the 2003 Pome Fruit Review into the 2003 Arrangement, following the eradication of the disease by Japan, as if to imply that more restrictive measures were in place previously.[1264] However, as already noted, no measures in respect of Japanese Erwinia were included in the 1989 Quarantine Circular Memorandum, despite the persistence of Japanese Erwinia at that time.

2.861 New Zealand notes that the 1998 New Zealand Apples IRA makes the similar claim that following the 1995 outbreak of Japanese Erwinia in Hokkaido,

[1260] **Exhibit AUS-108**, Pome Fruit Review, p. 63, para. 15.

[1261] That situation would supposedly be captured by the umbrella term "or elsewhere in Japan".

[1262] **Exhibit AUS-108**, p. 63.

[1263] ARPQ, Q 132.

[1264] ARPQ, Q 132.

"AQIS immediately suspended imports until the situation could be assessed and adequate arrangements implemented to manage any risks. Trade was re-established on the basis of area freedom from the disease for the exporting area. This area freedom is based on orchard inspections, fruit testing, quarantines on the movement of host material from the disease area, and active eradication campaign and pre-clearance fruit inspection…."[1265] However, as noted above, none of these purported conditions are actually reflected in the 2003 Arrangement.

2.862 The lack of Australian response to outbreaks of Japanese Erwinia in Japan is to be contrasted with the proposed automatic suspension of New Zealand orchards from the export programme following detection of *E. amylovora*.

2.863 These inconsistencies in treatment between Japanese Erwinia and fire blight clearly indicate arbitrary or unjustifiable differences in levels of protection applied.

<u>(v) Measures for European canker are more onerous than those for brown rot</u>

2.864 Australia does not refute the point made in New Zealand's first written submission that the measures imposed for European canker are more onerous than those for brown rot. Australia concedes that there are differences in the measures applied, but that these are explained "because there are different risks associated with them".[1266] But, as New Zealand has demonstrated, the risks with respect to brown rot are the same if not higher than those with respect to European canker.

2.865 As set out in New Zealand's first written submission, the measures applied in respect of European canker for New Zealand apples require pest-free places of production, confirmed by inspection. Prior to winter pruning, all trees in all rows of orchards/blocks registered for export to Australia are to be visually inspected for symptoms of European canker and in areas more conducive to the incidence of the

[1265] **Exhibit AUS-112**, p. 27.

[1266] AFWS, para. 1009. While Australia goes on to list the relevant measures applying to trade in each product, it is notable that other than to conclude that "the general operational procedures applying to each product are no dissimilar", it draws no conclusions as to the comparability of the pest-specific measures to address European canker and brown rot.

disease, the same procedure is to be combined with inspection of the upper limbs of trees using ladders. Detection would result in suspension for the coming season.[1267]

2.866 The measure applied to manage the risks associated with brown rot in Nashi pears from Japan is area freedom. The inspection requirements for Nashi pears from Japan in relation to brown rots are much less onerous than those applied to New Zealand apples in relation to European canker. No inspection methodology or intensity is prescribed; Australia simply requires that pears be sourced from disease-free areas established through Prefectural surveys by Japanese officials.

2.867 In addition, the IRA for New Zealand apples also clearly requires that AQIS officers be involved in inspections of New Zealand orchards for European canker. By contrast, in the case of Japanese nashi pears, the area freedom from brown rot of Tottori prefecture is to be confirmed via an inspection by one AQIS pre-clearance inspector of a "pre-harvest inspection of a representative sample of export orchards".[1268]

2.868 Although Australia in its first written submission now seeks to limit the extent of AQIS involvement in inspections of New Zealand orchards,[1269] an audit of 100% of orchard survey teams in the first year is vastly different from the sample inspection carried out in relation to Japanese nashi pears.

2.869 Given the comparable risk profile of Japanese nashi pears for brown rot, these distinctions in levels of protection are arbitrary and unjustifiable.

4. Third element: arbitrary or unjustifiable distinctions in the levels of protection result in discrimination or a disguised restriction on international trade

2.870 The third element under Article 5.5 requires that the arbitrary or unjustifiable distinctions in the levels of protection result in "discrimination or a disguised restriction on international trade." In its first written submission New Zealand

[1267] While measures 10 and 15 identified in NZRPQ, Q 134 are of key relevance to the comparison of measures, all of the European-canker specific measures and general measures which apply to the trade in New Zealand apples may be considered.

[1268] **Exhibit AUS-108**, p. 31.

[1269] AFWS, paras. 151 and 1015.

identified three warning signals and three additional factors which cumulatively establish that the distinctions in appropriate levels of protection applied by Australia with respect to New Zealand apples and Japanese Nashi pears result in discrimination and a disguised restriction on international trade.[1270] Australia's attempt to rebut New Zealand's case should be rejected.

(a) Australia misinterprets the legal requirements

2.871 Australia first claims that New Zealand has failed to distinguish between "discrimination" and a "disguised restriction on international trade", and that New Zealand has not "identified which of the two limbs it believes Australia to have contravened."[1271] In New Zealand's view, although "discrimination" and "disguised restriction on international trade" are distinct concepts, they are closely related. In the *EC – Hormones* case, for example, the panel and the Appellate Body considered "discrimination or a disguised restriction on international trade" together, without distinguishing between the two.[1272] However, Article 5.5 can be satisfied upon a showing either of "discrimination" or "a disguised restriction on international trade". New Zealand reaffirms its view that, consistent with the warning signals and additional factors, the differences in appropriate levels of protection in this case result in both discrimination and a disguised restriction on international trade.[1273]

2.872 Australia also claims that "discrimination" under the third element of Article 5.5 must be "arbitrary and unjustifiable between countries where identical or similar conditions prevail".[1274] Australia bases this claim on the fact that a violation of Article 5.5 implies a violation of Article 2.3.[1275] This argument is flawed for a number of reasons. First, where there is a relationship between two provisions such that proof of a breach of one implies a breach of the other, it is not necessary to explicitly establish inconsistency with all of the terms in the provision for which a

[1270] NZFWS, paras. 4.433, 4.435, 4.452-4.481.

[1271] AFWS, para. 1033.

[1272] Panel Report (numbering from Canada report), *EC – Hormones*, paras. 8.204-8.209; Appellate Body Report, *EC – Hormones*, paras. 236-246.

[1273] See, for example, NZFWS, paras. 4.433, 4.435, and 4.481.

[1274] AFWS, para. 1038.

[1275] AFWS, para. 1039.

breach is implied. This is inherent in the notion that the breach is "implied" as opposed to established explicitly. Second, the plain words of Article 5.5 do not support Australia's position. Article 5.5 does not refer to "arbitrary or unjustifiable discrimination between countries where identical or similar provisions prevail". Instead it requires that Members avoid arbitrary or unjustifiable distinctions in appropriate levels of protection that result in discrimination or a disguised restriction on trade. Third, none of the previous cases on this point have considered it necessary to look at whether discrimination is "arbitrary or unjustifiable between countries where identical or similar conditions prevail" in the context of Article 5.5. Finally, New Zealand notes that Australia's argument only relates to "discrimination" under Article 5.5. It has no relevance to New Zealand's claims regarding "disguised restriction on international trade".

2.873 With regard to "disguised restriction on international trade" Australia relies on the panel report in EC – Asbestos to suggest that it is appropriate to "focus on intention".[1276] New Zealand notes that the statement by the panel in EC – Asbestos was made in the context of the chapeau of GATT Article XX rather than in the context of the *SPS Agreement*. Moreover, after suggesting that "disguise" implies intention, the panel in EC – Asbestos continued, "[h]owever, as the Appellate Body acknowledged in *Japan – Alcoholic Beverages*, the aim of a measure may not be easily ascertained."[1277] The panel went on to consider a number of objective elements to assist it in ascertaining "intention".[1278] In New Zealand's view, this demonstrates that even if a "disguised" restriction on international trade does imply some notion of intention, such intention is to be discerned objectively from the circumstances. The warning signals and additional factors identified in New Zealand's first written submission are aimed at doing exactly that. Moreover, an approach based on unilateral and retroactive clarifications of intention by defending parties during dispute settlement proceedings[1279] would not be consistent with the standard of review under DSU Article 11 which requires an "objective assessment of the matter",

[1276] AFWS, para. 1042.

[1277] Panel Report, *EC – Asbestos*, para. 8.236.

[1278] Panel Report, *EC – Asbestos*, para. 8.236.

[1279] See AFWS, para. 1043.

or with the normal rules of burden proof that apply once a prima facie case has been made.

(b) Warning signals and additional factors

2.874 Australia goes on to "question the status" of warning signals and additional factors because "there is no mention" of them in the *SPS Agreement*.[1280] In making this argument Australia misunderstands the nature and role of warning signals and additional factors. They are not part of the legal obligation established in Article 5.5. Rather they are circumstances that may be considered by panels to assist in determining whether discrimination or a disguised restriction on international trade exists. While this determination must be made on a case-by-case basis, there appears to be no reason why certain matters considered relevant in previous cases would not be equally relevant in the present case.

2.875 As regards the three warning signals identified by New Zealand, Australia's rebuttal turns on its assertions that there are no differences in the appropriate levels of protection it applies, and that the measures at issue in this case are consistent with Article 5.1 of the *SPS Agreement*. As New Zealand has argued above, these assertions by Australia are incorrect.

(i) Additional factor – the level of politicisation

2.876 Turning to the first additional factor – the level of politicisation – Australia has provided no specific rebuttal, and is content simply to proclaim that New Zealand's arguments are "spurious, unsupported by evidence, and should be disregarded by the Panel".[1281] In New Zealand's view, this falls far short of a rebuttal of New Zealand's prima facie case. Contrary to Australia's claim, in its first written submission New Zealand provided substantial evidence regarding the level of political involvement during the development of the IRA in this case. In contrast, Australia has not provided any support or argumentation for its assertion that this factor ought to be disregarded. Moreover, the contrast between the politicisation of New Zealand's apples access request and the absence of any similar political involvement

[1280] AFWS, para. 1044.

[1281] AFWS, para. 1054.

with regard to Nashi pears from Japan is a further indicator which, together with the other warning signals and additional factors, provides an indicator of discrimination.

(ii) Second additional factor – undue delay

2.877 With regard to the second additional factor – undue delay – Australia argues that because "New Zealand's undue delay claim under Article 8 and Annex C(1)(a) is outside the scope of the Panel's terms of reference", therefore "the Panel should not take this 'additional factor' into account".[1282] As New Zealand has pointed out, the undue delay claim is not outside the scope of the Panel's terms of reference. But even if it were, this would have no bearing on the relevance of undue delay as an additional factor to be considered under Article 5.5. Irrespective of the Panel's decision regarding Article 8 and Annex C, the substantial delay between the time New Zealand first requested access for apples and the completion of the IRA suggests discrimination and a disguised restriction on international trade. In *Australia – Salmon* the Appellate Body agreed with the panel that considering a previous draft IRA was relevant under the third element of Article 5.5 because it was "part of a process" leading to the final risk assessment.[1283] If "part of a process" can be relevant, then New Zealand submits that the entire process leading to the completion of the IRA is also relevant.

(iii) Third additional factor – the absence of internal controls

2.878 With regard to the third additional factor – the absence of controls on the internal movement on apples during the European canker outbreak in Spreyton – Australia considers that this factor is "entirely irrelevant".[1284] Australia suggests that New Zealand has "not made the correct comparison, which needs to be between the respective products from Japan and Australia." According to Australia, the outbreak in Spreyton is "completely unconnected to trade in Japanese Nashi pears."[1285]

[1282] AFWS, para. 1057.

[1283] Appellate Body Report, *Australia – Salmon*, para. 173 (discussing the relevance of a previous draft IRA).

[1284] AFWS, para. 1061.

[1285] AFWS, para. 1061.

2.879 In making these arguments Australia has mistaken an "additional factor" in support of New Zealand's arguments regarding "discrimination or disguised restriction on international trade", for an argument that the outbreak in Spreyton itself constitutes "discrimination or a disguised restriction on international trade". As New Zealand has pointed out, the absence of controls during the Spreyton outbreak is indicative of the fact that Australia's measures result in "discrimination or a disguised restriction on international trade."[1286] The absence of controls is therefore a relevant circumstance to be considered under Article 5.5.

2.880 The relevance of this factor is supported by the approach taken in previous cases. In *Australia – Salmon*, the fact that Australia did not appear to apply similarly strict restrictions on the internal movement of salmon products compared to imported salmon products was considered to be a relevant additional factor in considering the third element of Article 5.5. For the same reasons, this factor is equally relevant in the present case. Moreover, while in the circumstances of the *Salmon* case the panel could not make definitive conclusions as to the absence of internal controls, here the absence of controls has been established and is not disputed by Australia. Accordingly this factor should be accorded more weight than it was given in *Australia – Salmon*.

2.881 Australia makes a number of supporting arguments regarding the "irrelevancy" of the Spreyton outbreak, all of which are misguided. First, Australia argues that a "comparison of how a disease outbreak was managed pre-*SPS Agreement* is inappropriate".[1287] Australia offers no argumentation or support for this assertion. New Zealand fails to see how the adoption of the *SPS Agreement* would affect the way Australia regulates an internal outbreak of European canker. Second, Australia argues that "Article 5.5 logically requires that the alleged discrimination or disguised restriction on trade be current."[1288] Again, Australia has misunderstood the

[1286] In addition, presumably since Article 5.5 focuses on differences in ALOP, it is only possible to claim discrimination in the MFN sense (country discrimination) rather than in the national treatment sense (internal discrimination). This can be contrasted to Article 2.3 where it is possible to claim both with respect to country-country discrimination and country-internal discrimination. So it is not possible to claim that the Spreyton incident itself constituted a breach of Article 5.5 – but it can still be a factor indicating a breach.

[1287] AFWS, para. 1062.

[1288] AFWS, para. 1063.

relevance of this additional factor. New Zealand has highlighted the lack of internal controls as a factor indicating "discrimination or a disguised restriction on international trade", not as the "discrimination or disguised restriction on international trade" itself. In this context it is not necessary for the difference between Australia's response to the Spreyton outbreak and its proposed restrictions on New Zealand apples to be current (although, it must be pointed out, New Zealand apples were also subject to an import ban in the 1960's and 1970's), because that discrimination is not the subject of New Zealand's claim under Article 5.5. Rather, it is an additional factor in support of the claim and it highlights inconsistencies in Australia's approach to similar risks. It therefore supports a finding of an ongoing breach of Article 5.5. Finally, Australia argues that the controls in place in Tasmania were equivalent to those proposed for New Zealand, "even if there were no restrictions on the movement of fruit".[1289] New Zealand disputes this argument – the measures very clearly are not equivalent because the measures applied to New Zealand apples are designed to prevent trade from orchards with European canker. There were no "equivalent" measures with respect to Tasmanian apples.

2. Conclusion on Article 5.5

2.882 In its first written submission, New Zealand showed that Australia's actions have resulted in arbitrary and unjustifiable distinctions in the level of protection that it considers appropriate in different situations and these distinctions have resulted in discrimination and a disguised restriction on international trade. Australia has failed to rebut any of New Zealand's arguments in this regard. Accordingly, New Zealand requests that the Panel find that Australia is in breach of its obligations under Article 5.5.

J. ARTICLE 5.6

2.883 As set out in New Zealand's first written submission, Article 5.6 imposes an obligation on a WTO Member not to establish or maintain sanitary or phytosanitary measures that are more trade-restrictive than required to achieve its appropriate level of protection (ALOP). There will be a breach of Article 5.6 where there are

[1289] AFWS, para. 1064.

alternative SPS measures that: (i) are reasonably available taking into account technical and economic feasibility; (ii) achieve the Member's ALOP; and (iii) are significantly less restrictive to trade than the SPS measure contested.

2.884 Australia argues that the "most logical starting point of the Panel's analysis" is whether the alternative SPS measure meets the Member's ALOP.[1290] Presumably this is because, for the most part, Australia does not contest that the alternative measures proposed by New Zealand meet the first and third elements. However, in New Zealand's view, whichever element is examined first by the Panel, the conclusion will be the same; that Australia has breached its obligations under Article 5.6.

1. There is an alternative measure in respect of fire blight and European canker which is reasonably available, would meet Australia's ALOP and is significantly less trade restrictive than the measures imposed by Australia

2.885 As explained in New Zealand's first written submission, there is a very simple and straightforward measure that could have been imposed by Australia; a measure which is reasonably available, would achieve Australia's ALOP and significantly less trade restrictive than the range of measures proposed by Australia in respect of fire blight and European canker. That measure is the restriction of imports to apple fruit that are mature and symptomless.

2.886 In its first written submission, Australia does not contest the fact that the alternative measure proposed by New Zealand is "reasonably available taking into account technical and economic feasibility", and that is "significantly less restrictive to trade" than the measures at issue in this case.

(a) Requirement that apples be symptomless is technically and economically feasible

2.887 While Australia does not, in its first written submission, challenge the technical and economic feasibility of a requirement that apples be mature and symptomless, in its questions to New Zealand, Australia asked: "How would New

[1290] AFWS, paras. 1071 and 1075.

Zealand confirm that only "symptomless" apples would be exported? If New Zealand's response is linked to the Class 1 export quality standard, could New Zealand explain how compliance with that standard would ensure that only "symptomless" apples are exported to Australia?"[1291]

2.888 A requirement that fruit be "symptomless" (i.e. that fruit have no visible indication of fire blight or European canker) would be technically and economically feasible because it would simply make current practice mandatory.[1292] The only difference would be that the New Zealand government (MAF) would provide Australia with phytosanitary certification that apples were free from symptoms of fire blight or European canker.[1293] Indeed, the expert responses confirm that the Pipfruit Best Practice Guidelines contain commonly accepted standards for maturity and "symptomlessness".[1294] Dr Lattore confirmed that "…there is no risk that 'Class I export quality apples' exported from New Zealand will not always be mature, asymptomatic and free of trash."[1295] Dr Paulin specifically noted that: "This requirement [the Pipfruit Guidelines] corresponds to a high standard of quality. The specifications for absence of damage are of a proper level of precision to guarantee 'symptomless fruits'…".[1296] Finally, Dr Latorre confirmed that "…the requirements established by Pipfruit New Zealand with regard to maturity and absence of fruit damage are acceptable."[1297]

[1291] Australia's questions to New Zealand, Q 2(b) p. 1.

[1292] Biosecurity New Zealand's "Export Certification Standard – Technical Requirements: Phytosanitary Inspection" (2006) provides for the verification of the absence of symptoms of quarantine pests (including symptoms of fire blight and European canker) of all export fruit prior to export as part of the normal phytosanitary inspection.

[1293] The specific details of the certification are determined in consultation with the importing country but in this instance an Additional Declaration could be inserted in the Certificate to the effect that: "This consignment conforms to the Australian requirements for maturity and freedom from symptoms of the specified quarantine pests."

[1294] **Exhibit NZ-93**, Pipfruit NZ Inc Best Practice Guidelines, which are applied to all export fruit, provide for the inspection in the packing house of fruit for rots, with any fruit found with rot being discarded at that point (the minimum grade standards provide for a nil tolerance level for rot – p. 25) which would prevent the export of fruit with symptoms of fire blight and European canker.

[1295] Lattore RPQ, Q 3, p. 5.

[1296] Paulin RPQ, Q 2, p. 2.

[1297] Latorre RPQ, Q 2, p. 4.

2.889 Thus, because a requirement that apples be mature and symptomless is both reasonably available and significantly less trade restrictive than the Australian measures, the only issue for the Panel is whether the alternative measure proposed by New Zealand achieves Australia's ALOP. New Zealand recalls that Australia's ALOP is currently expressed as "providing a high level of sanitary or phytosanitary protection aimed at reducing risk to a very low level, but not to zero."[1298]

(b) Requirement that apples be mature and symptomless would meet Australia's ALOP

2.890 Australia disputes New Zealand's claim that the alternative measure meets Australia's ALOP "[o]n the basis of the risk assessment in the Final IRA Report."[1299] Australia states that:

> As the Final IRA Report is a valid risk assessment within the meaning of Article 5.1 Australia is entitled to rely upon the Final IRA Report's findings as to the unrestricted risks associated with fire blight and European canker and the measures that should be taken to reduce those risks to achieve Australia's ALOP.[1300]

2.891 Thus, it is clear that Australia's defence of its measures under Article 5.6 is contingent on the consistency of the IRA with Article 5.1. However, as explained earlier, Australia's assessment of risk does not find sufficient support in the scientific evidence and therefore is in breach of Annex A(4) and Article 5.1. There is no scientific evidence that mature, symptomless apples can provide a pathway for the introduction of fire blight in Australia. Equally, mature, symptomless apples do not provide a pathway for the introduction of European canker. For the reasons elaborated in New Zealand's first written submission, and reiterated in earlier sections of this submission, the alternative measure identified by New Zealand would meet Australia's ALOP.

2.892 Indeed, Australia's argument that New Zealand's proposed alternative measure "has already been factored in to the assessment in the IRA for both fire blight

[1298] IRA, p. 4.

[1299] AFWS, para. 1071.

[1300] AFWS, para. 1085.

and European canker"[1301] misses the point. New Zealand is challenging the validity of that assessment. In New Zealand's view the assessments in the IRA do not find sufficient support in the scientific evidence.

2.893 In its comments on expert responses, Australia claims that the experts support the Australian contention that a mature, symptomless requirement for fire blight and European canker would not achieve Australia's ALOP.[1302] However in doing so, Australia has taken the experts' responses out of context. As explained in New Zealand's comments on Australia's comments, the experts' responses do not always directly address the question of whether mature, symptomless apples would meet Australia's ALOP.[1303] In other instances, the experts' responses are premised on an assumption that the risk assessment in the IRA is correct, or are directed to only certain aspects of the pathway (for example probability of entry). When the expert responses are taken as a whole (including their responses on exposure, establishment and spread and consequences) it is clear that there is no basis for the Australia's contention that a requirement that fruit be mature and symptomless would not meet Australia's ALOP.

2.894 In its first written submission, New Zealand also identified various other alternative measures for fire blight, European canker and ALCM that would meet the requirements of Article 5.6, but which would still be more trade restrictive than required. A measure limiting imports to apples that are retail-ready packaged fruit was identified.[1304] Indeed, as noted above in respect of Article 5.1 and as confirmed by the experts, such a measure would effectively exclude the primary pathway for ALCM identified by the IRA.[1305] In respect of fire blight, an alternative measure restricting apple fruit imports to those fruit that have been cold stored was noted.[1306]

[1301] AFWS, para. 1084.

[1302] ACER paras. 39, 41 and 124-126 and 130.

[1303] See NZCACER, paras. 30 and 67 to 70. See for European canker, Swinburne RPQ, Q 62/63, p. 9. Latorre RPQ, Q 63, p. 16. For fire blight see Deckers RPQ, Q 15, p. 7 and Paulin RPQ, Q 15, p. 10.

[1304] NZFWS, para. 4.490.

[1305] See paras. 2.251 to 2.257. Cross RPQ, Q 105 p. 15. Professor Cross confirms that "if fruit were supplied from New Zealand 'retail ready' or 'just in time', then it seems most unlikely that any fruit would be returned to the orchard wholesalers for repacking": Cross RPQ, Q 122, p. 22.

[1306] NZFWS, para. 4.491.

In respect of European canker, alternatives such as restricting imports of apples to those that are sourced from "pest-free places of production,"[1307] (as determined by a much less onerous inspection requirement than currently imposed for European canker) or limiting imports to apples sourced from areas of "low pest prevalence"[1308] were identified.

2.895 Australia argues in respect of those additional alternatives, that they should be ignored by the Panel because New Zealand "chose not to substantiate" them.[1309] As made clear in New Zealand's first written submission, New Zealand considers that these alternative measures meet the requirements of Article 5.6.[1310] Relative to the measures imposed by Australia they are significantly less trade restrictive, reasonably available, and would meet Australia's ALOP. However, given that these additional alternatives are based on the assumption that mature, symptomless apples are vectors for fire blight and European canker, they are still more trade restrictive than required and would not be consistent with Articles 2.2 and 5.1 of the *SPS Agreement*. The fact that *less* trade restrictive measures than the measures at issue are still *more* trade restrictive than required simply indicates the severity of the breach in this case.

2. There is an alternative measure in respect of ALCM that is reasonably available, would meet Australia's ALOP and is significantly less trade restrictive than the measures imposed by Australia

2.896 As explained in New Zealand's first written submission, the inspection of a 600 fruit sample from each import lot is a measure that is reasonably available, would meet Australia's ALOP and is significantly less trade restrictive than the two

[1307] NZFWS, para. 4.491. Determined by a single inspection (i.e. in the first year only) of each orchard requesting registration, that less than 0.5% of trees are infected, and maintained in subsequent years through controls on the movement of disease free nursery stock into the registered orchard.

[1308] NZFWS, para. 4.491. Determined by annual inspection of a regional sample of the orchards requesting registration that less than 0.5% of trees are infected.

[1309] AFWS, paras. 1087-1088.

[1310] NZFWS, paras. 4.490-4.491.

alternative measures proposed by Australia for ALCM.[1311] Australia has not contested the first element.

(a) Requiring inspection of a 600 fruit sample from each lot would achieve Australia's ALOP in respect of ALCM

2.897 As explained in New Zealand's first written submission, because the likelihood of establishment of ALCM in Australia as a result of trade in New Zealand apples is negligible, a 600 unit sample would be more than sufficient to meet Australia's ALOP.[1312]

2.898 In its first written submission Australia claims that, because the IRA assessed that a 600-unit inspection would not meet its ALOP, unless New Zealand can establish that the IRA is not a valid risk assessment the Panel should accept the IRA Team's conclusion.[1313] It also claims that in order to satisfy this second element of 5.6, New Zealand would need to demonstrate that a 600-unit sample would achieve Australia's ALOP on the basis of the level of risk calculated by the IRA Team.[1314]

2.899 However, Australia's argument overlooks the fact that New Zealand is contesting the assessment of risk in the IRA. As explained in the context of Article 5.1, the IRA's statistical analysis of both the level of unrestricted risk of ALCM and the effect of a 600-unit sample inspection were flawed because, in addition to the methodological flaws identified above in paragraphs 2.327 to 2.366, it failed to factor in cocoon viability, ALCM biology and normal trade practices.

2.900 Next, in its comments on the expert responses, Australia claims that a 600 unit would not meet its ALOP because the "ALCM-infestation rate of New Zealand apples… is the key determinant as to whether or not a 600 fruit sample would reduce the risk adequately to achieve Australia's ALOP."[1315] In doing so, Australia reveals

[1311] NZFWS, paras. 4.513-4.523. Australia's two alternative measures for ALCM are: 1) inspection of a 3000 fruit sample from each lot with a find resulting in mandatory treatment or rejection for export; or 2) inspection of a 600 fruit sample from each lot, combined with mandatory treatment of all fruit (regardless of whether any quarantine pest is found).

[1312] NZFWS, paras. 4.517-4.519.

[1313] AFWS, paras. 1098 and 1091.

[1314] AFWS, para. 1091.

[1315] ACER, para. 258.

the fundamental flaw with the IRA's analysis of the appropriate measure for ALCM – they were premised on the infestation level, rather than the overall likelihood of ALCM entry, establishment and spread.

2.901 As confirmed by Professor Cross, the infestation level should not have been used by the IRA as the key determinant of the appropriate measure for ALCM.[1316] Rather, the key determinant should have been the overall risk of entry, establishment and spread. The infestation level is relevant only as an aspect of that assessment of the overall risk. Indeed, given that the aim of setting measures is to bring the risk within the ALOP, it is hard to understand how Australia could maintain that the overall risk is not relevant to an assessment of the appropriate measure. Had the IRA correctly focussed on the overall risk of ALCM entry, establishment and spread – which, as explained above in respect of Article 5.1 is negligible – it would have been clear that a 600 unit sample goes beyond what is required to meet Australia's ALOP.[1317]

2.902 Indeed, the effect of a 600-unit sample would be that no more than 1 in approximately 6,500 New Zealand apples entering Australia would have a viable cocoon. This equates to a final importation rate for total imports of 0.015% (i.e. only 0.015% of New Zealand apples entering Australia would have viable cocoons). On the basis of such an importation rate (even discounting the prolonged period of adult emergence) approximately 19,000 apples would need to be left outside of cold storage, uncovered, in the same place at the same within 30-50 metres of newly unfurling apple trees, for there to be any likelihood of ALCM mating and egg laying occurring.[1318] However, as explained above, the likelihood of such a sequence of events occurring is negligible – it is an event that would almost certainly not

[1316] Cross RPQ, Q 120, p. 22.

[1317] NZFWS, paras. 4.360-4.362 and 4.518.

[1318] The August 2005 data showed that 0.16% of apples have occupied cocoons. With a 600-unit sample approximately 62% of consignments would be fumigated, meaning 38% would enter without fumigation. Only 25% of occupied cocoons have viable ALCM in them (Rogers *et al.* 2006). Thus, 0.015% (0.16% x 38% x 25%) of apples entering Australia would have viable ALCM. This is approximately 1 in 6,500. Three individuals are needed to have at least a 60% chance of a male and a female being present together; this means that over 19,000 apples would have to be left outside of cold storage, uncovered, in the same place within 30-50m of apple trees with newly unfurling leaves.

occur.[1319] As such, the alternative measure identified would clearly meet Australia's ALOP.

(b) Requiring inspection of a 600 fruit sample for each lot would be significantly less trade restrictive than the Australian measures in relation to ALCM

2.903 Australia claims that, to meet the third element of Article 5.6, an alternative measure needs to be less restrictive to trade by a degree which is "important, notable or consequential," and claims that, when compared to the measure at issue (a 3000 unit sample or a 600 unit sample plus mandatory fumigation), the alternative measure identified by New Zealand does not meet this threshold.[1320]

2.904 As explained in New Zealand's first written submission, New Zealand is already required to undertake a 600 fruit sample inspection of export apple fruit in order to comply with Australia's other more general quarantine pest requirements in the IRA. Thus, coverage of ALCM within the same 600 fruit inspection would certainly be a less time consuming and expensive measure than sampling 3000 fruit, or requiring mandatory treatment of all fruit in addition to a 600 fruit sample.

2.905 In addition, both the Australian alternative measures would result in fumigation of virtually all consignments.[1321] This is significantly more trade restrictive than a 600 unit sample, which would result in fumigation of only approximately 60% of consignments.[1322] And indeed, it is important to bear in mind that such fumigation would be totally unnecessary. With or without fumigation, the likelihood of ALCM establishment is negligible.

2.906 Such high levels of fumigation would contribute significantly to the trade restrictiveness of the Australian ALCM measures because, not only is fumigation costly, it also has a negative impact on fruit quality. Fumigation can cause a number

[1319] NZFWS, paras. 4.350-4.366 and 4.517-4.519.

[1320] AFWS, para. 1079.

[1321] If 0.16% of apples have occupied cocoons, and a 3000-unit sample is used, the probability that an apple with an occupied cocoon will be found is 1 - (1-0.16%)^3000, or approximately 99%. This assumes that only detection of occupied cocoons will lead to fumigation.

[1322] See footnote 1318 above.

of fruit disorders, including scalding, internal damage and staining, all of which restrict the marketability and therefore the competitiveness of the product.[1323]

2.907 As explained above, there is no basis for Australia's imposition of a 3000-unit sample. Indeed, the expert responses confirm that "[t]he requirements for a 3000 fruit inspection or for fruit fumigation are *clearly restrictive*" (emphasis added).[1324] The unrestricted risk of ALCM establishment in Australia from the import of New Zealand apples is negligible. Thus, the standard 600-unit sample would provide ample insurance that the number of viable cocoons entering Australia is not enough to allow for establishment to occur.[1325]

(c) Australia's new proposal is also significantly more trade restrictive than New Zealand's proposed alternative

2.908 In its first written submission, Australia claims the trade restrictiveness of the 3000 unit sample could be minimised through the operationalisation of the measure.[1326] Specifically, it claims that grower 600 unit sample inspection undertaken by New Zealand could be aggregated towards achieving the required 3000-unit inspection.[1327] However, as explained in New Zealand's responses to Panel questions, in making this new claim Australia misses the point.[1328]

2.909 The key problem with Australia's proposal is that it relates not to the inspection completed by Australian officials in Australia[1329] but to the inspection completed by New Zealand officials in New Zealand. What Australia is proposing is that, while the Australian inspection would remain a 3000 sample, New Zealand could

---

[1323] **Exhibit NZ-134:** Schimanski LJ, Jennings D, Brown G (2005) "Overcoming fumigation damage of 'Fuji' apples destined for Japan", *Acta Horticulturae* 682(2): 1185-1191.

[1324] Cross RPQ, Q 120, p. 22.

[1325] NZFWS, para. 4.137.

[1326] AFWS, para. 1102.

[1327] AFWS, para. 1102.

[1328] NZRPQ, Q 139, paras. 291-293.

[1329] Or in New Zealand if part of a pre-clearance program.

combine individual 600 unit inspections in New Zealand towards the 3000 requirement.[1330]

2.910 However, such a scenario would result in the New Zealand inspection failing to match the confidence/sensitivity levels applied by Australia.[1331] This is because, while a 600 unit sample ensures that less than 0.5% of fruit are infested, the 3000 unit sample, being a significantly larger sample size, detects a much lower infestation level of 0.1%.

2.911 The consequence of New Zealand implementing the Australian proposal would be an increase in the likelihood that MAF would clear shipments which would then go on to be rejected by Australian authorities when they conducted a 3000-unit sample inspection on arrival in Australia. Thus, because Australia would utilize a 3000 unit sample, so would New Zealand have to. As a result, the Australian proposal would not, in practice, reduce the trade restrictiveness of the 3000 unit sample requirement.

3. There is an alternative to the measures relating to inspections by AQIS officials, verification of standard commercial practice and the provision of packing house details imposed by Australia on the importation of apples that is reasonably available, would meet Australia's ALOP and is significantly less trade restrictive than the measures imposed by Australia

2.912 There is an alternative measure that is reasonably available, would achieve Australia's ALOP, and would be less trade restrictive than the three general measures imposed by Australia.[1332] It would involve auditing by AQIS officers of the New Zealand systems applicable to the import of apples to Australia from New Zealand.

[1330] AFWS, para. 1103.

[1331] A 600-fruit sample would provide 95% confidence that less than 0.5 % of the fruit are infested with ALCM. A 3000-fruit sample, being a significantly larger sample, would provide 95% confidence that less than 0.1% fruit are infested.

[1332] That AQIS officers be involved in inspection for European canker and fire blight, in direct verification of packing house procedures, and in fruit inspection and treatment; That MAF verify compliance with standard commercial practices; That packing houses provide details of the layout of their premises.

2.913 Australia claims that such a measure is identical to Australia's existing requirement in respect of the involvement of AQIS officials.[1333] As a result, it claims that New Zealand has not identified an "alternative" measure because it is in fact the same requirements as that which Australia imposes.[1334]

2.914 Australia is incorrect. New Zealand's characterisation of an AQIS audit is very different from Australia's. While, as explained above, Australia has characterised the IRA's measure requiring "AQIS involvement" as "100% audit of survey teams and packing houses",[1335] New Zealand's proposed alternative would involve the audit of only a sample of the relevant New Zealand systems. These are two very different things.

2.915 In terms of the relevant New Zealand systems that would be audited, in accordance with the findings of the panel in *Japan – Apples*, any AQIS involvement should relate only to those requirements imposed by Australia that are scientifically justified in accordance with Article 2.2.[1336] Since none of the Australian measures at issue are scientifically justified, AQIS involvement should extend only to the two less trade restrictive alternatives available for fire blight, European canker and ALCM (the requirements that apples be mature and symptomless and be subject to a 600 unit sample inspection). Consequently, the less trade restrictive alternative for the three general measures would be an audit by AQIS of a sample of: (i) the relevant New Zealand systems designed to ensure that apples are mature and symptomless, and (ii) the procedures for inspection of a 600-unit sample.

2.916 Australia argues that New Zealand has only identified a potential alternative in relation to one of the three general requirements, and has failed to demonstrate how any alternative measure could replace the other two general requirements.[1337] However, as explained in New Zealand's first written submission, New Zealand is

[1333] AFWS, para. 1107.

[1334] AFWS, para. 1107.

[1335] ARPQ, Q 52, p. 41.

[1336] The Panel stated that: "Confirmation and inspection procedures can be legitimate phytosanitary instruments if they support measure necessary to address legitimate phytosanitary risks." Panel Report, *Japan – Apples (Article 21.5 – US)*, para. 8.115.

[1337] AFWS, para. 1108.

proposing one measure – an audit by AQIS officials of a sample of the New Zealand systems that implement the relevant requirements – as the alternative to all three general measures.[1338]

(a) Requiring audits by AQIS officials of New Zealand systems is a reasonably available measure, taking into account technical and economic feasibility

2.917 A requirement that there be audits by AQIS officials of a sample of the New Zealand systems that implement those requirements that are themselves scientifically justified (here the requirement that apples are mature and symptomless, and the procedures for inspection of a 600-unit sample) is reasonably available. As explained above, there is one example of a form of audit by sampling currently imposed on New Zealand exports of stone fruit to Western Australia.[1339]

2.918 Thus, a requirement for audit by AQIS of a sample of the New Zealand systems that implement the relevant requirements is reasonably available and technically and economically feasible and, in fact, Australia does not contest this.

(b) Requiring audits by AQIS officials of New Zealand systems would achieve Australia's ALOP

2.919 The IRA makes clear that the general measures are not required to meet Australia's ALOP in respect of fire blight, European canker and ALCM.[1340] Thus, given that the three general measures imposed by Australia are not required to meet Australia's ALOP, New Zealand's less trade restrictive alternative must similarly meet Australia's ALOP.

(c) Requiring audits by AQIS officials of New Zealand systems would be less trade restrictive than Australia's measures requiring involvement of AQIS officials in inspections of orchards and packing house procedures

2.920 As explained in New Zealand's first written submission, the three general measures proposed by Australia – requiring audit by AQIS officials of 100% of

[1338] NZFWS, paras. 4.524-4.525.

[1339] See above para. 2.276.

[1340] IRA, p. 116 (fire blight), p. 155 (European canker), and p. 192, (ALCM).

survey teams and packing houses, verification by MAF of compliance with standard commercial practice and provision of packing house details – would be time consuming, labour intensive and costly. These requirements are unprecedented and are not required in respect of any other New Zealand exports to Australia.

2.921 Requiring audits by AQIS officials of New Zealand systems would be less trade restrictive than Australia's requirement in respect of AQIS involvement, because it is much less intensive. As noted above, Australia requires AQIS audit of 100% of survey teams and packing houses (i.e. all survey teams and all packing houses), whereas New Zealand's proposed alternative is for an audit of a sample of the New Zealand systems that implement the requirements which are scientifically justified. That is significantly less trade restrictive than a measure requiring an audit of all survey teams and all packing houses involved in the export of New Zealand apples to Australia.

2.922 Requiring audits by AQIS officials of New Zealand systems would also be less trade restrictive than Australia's requirement that MAF verify that there has been compliance with standard commercial practice. While the details of Australia's requirement in this regard have not yet been operationalised, it would require MAF to audit a sample of growers in order for MAF to be able to *verify* that the growers had followed the recommendations of the industry integrated fruit production manual. And it is the verification component that makes it so trade restrictive. This MAF audit (in addition to being unnecessary since, as explained above, there is no scientific justification for such a requirement), would be costly and time consuming and would have flow on effects concerning maintenance of auditable records of growers' monitoring and pest control activities.

2.923 As explained in New Zealand's responses to the Panel's questions, New Zealand is not aware of Australia requiring verification of production of fruit under standard commercial practice in any other import risk analysis.[1341] Australia does not require this of New Zealand for any other fruit exported to Australia, including stonefruit, kiwifruit or avocadoes.

[1341] NZRPQ, Q 53, para. 80.

2.924 Australia claims that its standard commercial practice requirement is not novel and points to Australian IRAs which it claims include an identical requirement.[1342] However, the examples cited by Australia do not contain a requirement for the national plant protection organisation in the exporting country to verify that fruit has been produced in accordance with standard commercial practice. For example, the import risk analysis for Longan and Lychee Fruit from China and Thailand states that "[a]ll export orchards are expected to produce commercial longan and lychee under standard cultivation, harvesting and packing activities."[1343] The Indian Mango IRA states that "[t]he existing commercial practice of a post-harvest fungicidal dip, as advised by India to support its market access application, is an underlying requirement for export to Australia." By contrast the IRA for New Zealand apples requires that "*MAFNZ will ensure* that all orchards registered for export to Australia are operating under standard commercial practice".[1344] (Emphasis added.)

4. Conclusion on Article 5.6

2.925 New Zealand has shown that, there are alternative measures in respect of fire blight, European canker ALCM, and the general measures, that are reasonably available, taking into account technical and economic feasibility, which would achieve Australia's ALOP and are less trade restrictive than Australia's measures. Australia has failed to rebut any of New Zealand's arguments in this regard. Accordingly, the Panel should find that Australia is in breach of its obligations in respect of Article 5.6.

K. Article 8 and Annex C

2.926 In its first written submission New Zealand established that Australia's measures for the importation of New Zealand apples are inconsistent with Article 8 and Annex C(1)(a) of the *SPS Agreement*.[1345]

[1342] AFWS, para. 968 and **Exhibit AUS-119**.

[1343] **Exhibit AUS-119**.

[1344] IRA, p. 315

[1345] NZFWS, paras. 1.17-1.18 and 4.541-4.563.

2.927 Australia's only response to this in its first written submission was to suggest that the "IRA process" is not a measure at issue and thus the Panel should dismiss the claim.[1346] Australia made a similar claim in its request for a preliminary ruling on this matter.

2.928 New Zealand does not, and has never, claimed that the IRA process is a measure at issue in this dispute. As made clear in New Zealand's first written submission and oral statement for first substantive meeting with the parties, New Zealand's claim is that the measures resulting from the IRA process are the measures at issue under Article 8 and Annex C(1)(a).[1347] In New Zealand's view, SPS measures resulting from an unduly delayed process have not been imposed in accordance with the *SPS Agreement*. New Zealand elaborated on its views further in its responses to Panel questions.[1348]

2.929 Australia has not yet responded to New Zealand's substantive arguments, and as such there is little for New Zealand to respond to in this submission. However there are two points in Australia's responses to Panel questions on which New Zealand will comment.

2.930 First, Australia argues that Article 8 and Annex C(1) do not relate to the development of SPS measures. It bases this view on the fact that the "SPS measures" referred to in the chapeau of Annex C must already exist, given that the procedures referred to in the chapeau are checking and ensuring the fulfilment of such SPS measures. Therefore, Australia concludes, Annex C cannot be an obligation relating directly to the development of SPS measures.[1349] However, this view is based on a misunderstanding of Annex C(1)(a) as it relates to approval procedures. It confuses

[1346] AFWS, para. 1117.

[1347] See, for example, NZFWS, paras. 1.17 and 1.18. See also oral statement for first substantive meeting with parties, paras. 119-135.

[1348] See NZRPQ, Q 146.

[1349] ARPQ, Q 144, pp. 120-121. For ease of reference, the relevant paragraph in Australia's response is reproduced: "If a procedure *checks and ensures the fulfilment of* a measure, logically that measure must already be in existence. In other words, a procedure could not check and ensure the fulfilment of something that does not already exist. Accordingly, a procedure within the scope of Annex C(1) must check and ensure the fulfilment of pre-existing SPS measures, and it is *these* procedures that Annex C(1)(a) requires to be "undertaken and completed without undue delay". It therefore follows that Annex C(1)(a) cannot, as New Zealand states, be an "obligation that relates directly to the *development* of SPS measures"."

the reference to SPS measures in the chapeau of Annex C(1) with the measures at issue in the dispute. The reference to SPS measures in the chapeau refers to Australia's generic approval regime for the approval of fresh fruit and vegetables. This is not a measure at issue and New Zealand is not claiming that Article C(1) relates to the development of that SPS measure. However, the completion of these approval procedures as applied to New Zealand's request for apples access resulted in the adoption of the measures at issue in this dispute. In these circumstances, Article C(1)(a) relates directly to the development of SPS measures. Such measures must be developed without undue delay.

2.931 Second, in response to the Panel's request for Australia to provide the average period of time for completion of an IRA, Australia responded by noting that,

> It is difficult to give a meaningful average period of time for the completion of an IRA, as the length of time taken varies depending on the number of pests involved, the availability of information on these pests, the time taken for the country seeking access to respond to information requests, and the availability of scientific resources to undertake the work.[1350]

2.932 Australia went on to note that,

> Australia recalls that in *EC – Biotech Products*, the panel stated that "whether a particular approval procedure has been undertaken and/or completed 'without undue delay' must be made on a case-by-case basis, taking account of relevant facts and circumstances".[1351]

2.933 With respect to New Zealand's request concerning apples, there were no significant issues with respect to the availability of information on the pests, the time taken for New Zealand to respond to information requests, or the availability of scientific resources to undertake the work. Indeed, much of the work had been undertaken and completed in the context of New Zealand's three prior requests for

[1350] ARPQ, Q 145, p.121.

[1351] ARPQ, Q 145, p. 122.

access.[1352] This was reflected in Australia's initial estimate of the time necessary to complete the IRA.

2.934 On 15 April 1999 AQIS wrote a letter to stakeholders (including New Zealand) setting out the proposed approach to the risk analysis for apples. In that letter AQIS estimated that "the risk analysis will take approximately twelve months to complete", and expected the draft IRA to be released in November 1999.[1353] In a subsequent letter, dated 29 June 1999, AQIS confirmed that it would proceed with a routine process for assessing apples "based on consideration that this proposal is technically less complex and does not require assessment of significantly greater or different risks than those AQIS has previously examined."[1354] That letter reiterated the expectation that the draft IRA would be released in November 1999. In New Zealand's view, this demonstrates that none of the factors that may justify a longer period of assessment were present in New Zealand's request for apples access. According to Australian officials at the time, the clear expectation was that the IRA process would take twelve months. The IRA was issued some 94 months later.

2.935 The issue of time frames for Australian IRAs was discussed in a recent comprehensive government-initiated review of Australian quarantine and biosecurity.[1355] The review panel identified a small number of so-called "legacy" IRAs, including the IRA for New Zealand apples, which have "done much to generate international perceptions [concerning Australia's] trade restrictiveness, unreasonable delays, and questionable science."[1356] The review panel noted that the timeframes for

[1352] See also in this regard Dr Sgrillo's response to Q 132 where he states, "Consequently much of the data and information necessary for the development of the current IRA had already been revised and was available when the development of the current IRA began."

[1353] **Exhibit NZ-104**.

[1354] **Exhibit NZ-104**.

[1355] One Biosecurity: A Working Partnership, The Independent Review of Australia's Quarantine and Biosecurity Arrangements, Report to the Australian Government, 30 September 2008. The Australian Government has indicated that it agrees in principle with all of the panel's 84 recommended reforms, see http://daff.gov.au/about/publications/quarantine-biosecurity-report-and-preliminary-response/beale_response.

[1356] One Biosecurity: A Working Partnership, The Independent Review of Australia's Quarantine and Biosecurity Arrangements, Report to the Australian Government, 30 September 2008, p. 125.

these legacy IRAs were "extraordinary compared to equally complex science-based decisions in other regulatory fields"[1357] and concluded that:

> While these IRAs may have involved complex scientific assessments, the Panel's judgement is that the *time taken is difficult to justify*. The Panel notes [in] that other equally complex areas such as therapeutic goods and major project approvals involving environmental issues, the time taken has been much less than in the biosecurity context.[1358]

2.936 New Zealand recalls that the panel in *EC – Biotech Products* considered that "Annex C(1)(a), first clause, requires that approval procedures be undertaken and completed with *no unjustifiable loss of time*."[1359]

2.937 The review panel went on to note that:

> The 2007 changes to the regulations governing Import Risk Analysis require that assessments are handled within much tighter timelines. Biosecurity Australia is now required to complete a standard IRA within 24 months, and an expanded IRA within 30 months.[1360]

2.938 The panel in *EC – Biotech Products* found that a delay would be "undue" if the time taken to complete an approval procedure "exceeds the time that is reasonably needed to check and ensure the fulfilment of its relevant SPS requirements".[1361] It is notable that the apples IRA took over three times longer than the maximum time now allowed for "expanded IRAs" and nearly four times longer than that allowed for "standard IRAs". In the absence of any reasonable justification, this amounts to "undue delay".

2.939 In light of the above, the time taken to complete the IRA clearly exceeded what was reasonably necessary. This is evidenced by the fact that: Australian officials originally expected the process to take 12 months; Australian IRAs must now

[1357] One Biosecurity: A Working Partnership, p. 112.

[1358] One Biosecurity: A Working Partnership, p. 100 (emphasis added).

[1359] Panel Report, *EC – Biotech Products* para. 7.1495 (emphasis added).

[1360] One Biosecurity: A Working Partnership, p.100.

[1361] Panel Report, *EC – Biotech Products*, para. 7.1499.

be completed within 24-30 months; similar IRAs had been conducted previously; there was no difficulty gaining access to the scientific information; and there was no significant evolution of the science during this period. Most importantly, there is no explanation that would justify the eight years taken to complete the apples IRA. This establishes a breach of Article C(1)(a).

2.940 In its first written submission, New Zealand drew attention to the fact that the risk assessment process was intertwined with a political process and noted that it is reasonable to conclude that this parallel political process led to delays in the approval process.[1362] Australia has elected to avoid responding to most of the points made in New Zealand's first written submission, simply asserting that "New Zealand's allegations of "politicisation" of the IRA process are spurious and unsupported by evidence."[1363] Indeed, Australia expresses "surprise" that New Zealand, as a "fellow parliamentary democracy" considers that "the robust scrutiny of biosecurity issues by a range of legitimate bodies amounts to "politicisation" of a separate risk analysis [process]".[1364]

2.941 Notwithstanding Australia's surprise, it appears that New Zealand is not alone in harbouring such concerns. The independent review of Australia's quarantine and biosecurity arrangements referred to above concluded that "there is an unmistakeable and widespread perception among Australia's trading partners – and in many quarters in Australia as well – that there has been a high level of political intervention in the Import Risk Analysis process".[1365] The review panel also noted its belief that "the current arrangements do not support…an appropriate distancing of science-based analysis and decision making in relation to Import Risk Analyses and import measures from political influence."[1366]

2.942 To the extent that Australia attempts to respond to New Zealand's arguments in this regard, it focuses on only "three examples", and does so in a cursory fashion.

[1362] NZFWS, paras. 4.553-4.562.

[1363] AFWS, para. 1125.

[1364] AFWS, para. 28.

[1365] One Biosecurity: A Working Partnership, p. 40.

[1366] One Biosecurity: A Working Partnership, p. 40.

First, with respect to the involvement of the relevant Senate Committee, Australia simply states that this reflects "the normal functioning of a healthy democracy"[1367] without engaging with New Zealand's specific claims that the Senate process led to delays in the IRA process as well as influencing its methodology. Second, Australia responds to statements made by the Australian Prime Minister and Deputy Prime Minister by pointing to a statement made by the Australian Minister for Agriculture.[1368] And finally, with regard to the inclusion of a former President of the Australian Apple and Pear Growers Association on the IRA Team, Australia suggests that this was necessary to obtain "[i]nformation on industry production systems, pest management programs and packing, handling and distribution networks".[1369] Australia does not explain why this information could not have been obtained from independent sources as opposed to including an industry member directly in the assessment process, including in the consensus decision making which determined the measures identified in the IRA. In this regard New Zealand notes that in the Australian government's preliminary response to the recommendations of the recent review of biosecurity arrangements in Australia, the government has indicated that it will create a new and independent expert panel, the Biosecurity Standards Commission, to conduct IRAs and make independent biosecurity import policy determinations. This can be contrasted to the decision in the apples IRA to include a high profile member of the relevant Australian industry on the IRA.[1370]

2.943 Finally, as noted above, the absence of justification for a time period that clearly exceeds what is reasonably needed to check and ensure fulfilment of the relevant SPS measures constitutes "undue delay". While it is not incumbent on New Zealand to definitively "prove" that politicisation caused undue delay, the intertwined political process helps to explain such a delay.

[1367] AFWS, para. 28.

[1368] AFWS, para. 29.

[1369] AFWS, para. 30.

[1370] This individual's relationship with Australian apple industry interests remains close. ,*Australian Fruitgrower*, Dec. 2008, Vol 2 Issue 11, pp. 8-10 reports that in December 2008, he was accorded the Australian apple and pear industry's highest achievement award.

III. CONCLUSION

3.1 In its first written submission New Zealand set out a *prima facie* case that Australia's measures for the importation of apples from New Zealand are not in conformity with Australia's obligations under the *SPS Agreement*. Australia has failed to rebut that case. Australia's purported rebuttal is based on redefining the standard of review, attempting to shift the burden of proof, and seeking to shore up a defective IRA with new (but equally defective) arguments about science not considered by the IRA Team and with claims that the Australian measures rest on divergent science. All of this has been shown by New Zealand to be supportable in neither law nor fact.

3.2 As New Zealand has reiterated in this submission, Australia's measures for apples from New Zealand are not supported by sufficient scientific evidence, and are often not supported by any scientific evidence at all. This lack of scientific support has been noted repeatedly in the responses of the experts appointed by the Panel. The result is that there is no "rational or objective relationship" between the measures and scientific evidence and Australia is in violation of its obligations under Article 2.2. It also means that there has not been a proper assessment of the "likelihood of entry, establishment and spread" of the three pests at issue, and thus there has been no risk assessment within the meaning of Article 5.1. As New Zealand has pointed out, Australia is equally in violation of its obligations under Articles 5.2, 5.5, and 5.6 as well as Article 8 and Annex C of the *SPS Agreement*.

3.3 Accordingly, New Zealand reaffirms the request in its first written submission that the Panel find that Australia's measures as set out in the New Zealand panel request (as modified in this submission) are inconsistent with Australia's obligations under the *SPS Agreement*.

Glossary: Relevant scientific and technical terms

Ascospores: Sexual spores of ascomycetes, a form of fungus. These are produced within an ascus or saclike cell within a perithecium.

Bacteria: Single-celled organisms which lack a distinct nuclear membrane, are found throughout nature and can be beneficial or cause disease.

Calyx: The outer floral leaves of a flower. On an apple fruit it refers to the structures at the end opposite to the stalk end.

Canker: A usually well-defined sunken or swollen necrotic lesion caused by a localised disease of the bark and the cambium (cells between the wood and the bark). There are several forms of canker based on shape, position of occurrence on the tree, and whether produced in one year or several.

Conidia: Asexual spores of a fungus, formed from specialised organs of the fungus.

Disease (of a plant): A disorder of structure or function in a plant of such a degree as to produce or threaten to produce detectable illness or disorder; a definable variety of such a disorder, usually with specific signs or symptoms.

Endophytic: With respect to *E. amylovora*, the term **endophytic** is used when the bacterium occurs inside a plant or apple fruit in a non-pathogenic relationship.

Entry, establishment and spread (of a pest): Entry refers to the movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled. Establishment means the perpetuation, for the foreseeable future, of a pest within an area after entry. Spread refers to the expansion of the geographical distribution of a pest within an area.

Epidemiologically significant: able to initiate an infection. For example, in the case of fire blight, levels of bacteria are not epidemiologically significant if they are so low that there is a negligible likelihood that they could initiate a fire blight infection.

Epiphytic: With respect to *E. amylovora*, the term **epiphytic** is used when the bacterium occurs on the outer surface of a plant or fruit in a non-pathogenic relationship, including on the calyx.

Infection: Process in which an organism (e.g., *E. amylovora or N. galligena*) enters into a host plant, establishing a permanent or temporary pathogenic relationship with the host.

Infestation: Presence of an organism (e.g. bacterium, fungus, insect) on the outside of a host plant (including the fruit), without any implication that an infection has occurred.

Inoculum: Material consisting of or containing bacteria to be introduced into or transferred to a host or medium. Inoculation is the introduction of inoculum into a host or into a culture medium. Inoculum can also refer to potentially infective material available in soil, air or water and which by chance results in the natural inoculation of a host.

Heterothallism: A fungus requiring another mating type for sexual reproduction (i.e. in order to produce ascospores)

Homothallism: A fungus with male and female organs in the same body which is able to reproduce sexually without requiring another mating type.

Larva: Immature feeding stage of some insect types (e.g. flies, midges, moths), between egg and pupa, usually in the form of a grub, caterpillar, or maggot.

Locule: A chamber containing seeds (i.e. the core of the fruit where the seeds are found).

Nectar: A sweet liquid secreted by the nectaries of plants in order to attract pollinating animals.

Nectary: Nectar-secreting organs that serve as insect feeding stations in flowers and thus attract insects, which then assist in the transfer of pollen.

Pathogen: Any disease-producing organism.

Perithecium: A flask-shaped fruiting body produced by a fungus for the production and release of ascospores (sexual spores) from asci. The perithecium has a hole though which the spores emerge.

Protoperithecium - the structure that develops into a perithecium following mating, which for heterothallic strains would require a compatible mating type to be present.

Pupa: A developmental stage of many insects types (e.g. flies, midges, moths), between the larva and the adult stages; this stage is generally inactive and encased in a case or cocoon.

Stigma: The receptive part of flowers (female organ of plants) that receives the pollen. The stigma is normally the site where *E. amylovora* bacteria initially multiply followed by movement, facilitated by rain or dew, to the other flower parts (especially the nectaries) where infection may occur.

Stomata: Pores in the leaf epidermis (surface cells) through which gaseous exchange occurs. They are bounded by specially adapted guard and accessory cells.

Vector: An organism or agent that transmits inoculum of a pathogen.

ANNEX 1 – APPLE IMPORTATION SCENARIO FOR FIRE BLIGHT

Based on assumptions and procedures described in the IRA, pp. 19-24.

Calculation of probability that individual apple is infested	**Australian IRA values (distribution averages)**			
	Source orchards			
Proportion of orchards in which pest is present	imp1	1.000		
Proportion of orchards in which pest is not present	1-imp1	0.000		
	Harvesting of fruit			
Probability that picked fruit is infected/infested with pest	imp2	0.027		
Probability that picked fruit is not infected/infested with pest	1-imp2	0.973		
	Infested orchard		Uninfested orchard	
Probability that clean fruit is contaminated during picking and transport	imp3a	0.013667	imp3b	0
Probability that clean fruit is not contaminated during picking and transport	1-imp3a	0.986333	1-imp3b	1
	Processing of fruit			
Probability that pest survives routine packhouse procedures	imp4	0.55		
Probability that pest does not survive routine packhouse procedures	1-imp4	0.45		
Probability that clean fruit contaminated in packhouse	imp5	0.025333		
Probability that clean fruit not contaminated in packhouse	1-imp5	0.974667		
	Pre-export and transport			
Probability pest survives palletisation, quality inspection and containerisation	imp6	0.833333		
Probability pest doesn't survive palletisation, quality inspection and containerisation	1-imp6	0.166667		
Probability clean fruit contaminated during palletisation, inspection and containerisation	imp7	5E-07		
Probability clean fruit is not contaminated during palletisation, inspection and containerisation	1-imp7	1		
	On arrival procedures			
Probability pest remains with fruit after on-arrival border procedures	imp8	1		
Probability pest doesn't remain with fruit after on-arrival border procedures	1-imp8	0		

Pathways for infested fruit to arrive	Pr(entry)	Number of infested fruit entering on pathway[1371]
Path 1 Orchard infected, infected/infested fruit picked, pest remains after packhouse, pre-export and on-arrival procedures	0.012375	2,165,625
Path 2 Orchard not infected, clean fruit contaminated during transport, pest remains after packhouse, pre-export and on-arrival procedures	0	0
Path 3 Orchard not infested, clean fruit contaminated in packhouse, pest survives later procedures	0	0
Path 4 Orchard not infected, clean fruit contaminated during palletisation, passes on-arrival procedures	0	0
Path 5 Orchard not infected, clean fruit contaminated during picking, pest removed during packhouse process, recontaminated during palletisation, pest passes border	0	0
Path 6 Orchard infected, clean fruit contaminated during picking and transport, pest remains through later processes	0.006095	1,066,584
Path 7 Orchard infected, clean fruit contaminated in packhouse, pest survives remaining processes	0.02026	3,545,567
Path 8 Orchard infected, clean fruit contaminated during picking, decontaminated in packhouse, contaminated during palletisation and remaining after on-arrival procedures	2.99E-09	1
Path 9 Orchard infected, clean fruit contaminated during palletisation and remaining after on-arrival procedures	4.68E-07	82
Path 10 Orchard infected, infected/Infested fruit decontaminated in packhouse, re-contaminated in palletisation, pest remains after border process	6.08E-09	1
Total	0.038731	6,777,859

[1371] Calculations are based on the volume of trade distribution provided in the IRA which results in a mean export volume of 175,000,000 fruit.

Contributions of pathway to overall probability of importation	
Path1	32.0%
Path2	0.0%
Path3	0.0%
Path4	0.0%
Path5	0.0%
Path6	15.7%
Path7	52.3%
Path8	0.0%
Path9	0.0%
Path10	0.0%
Total	100.0%

ANNEX 2 - APPLE IMPORTATION SCENARIO FOR EUROPEAN CANKER

Based on assumptions and procedures described in the IRA, pp. 19-24

Calculation of probability that individual apple is infested	**Australian IRA values (distribution averages)**			
	Source orchards			
Proportion of orchards in which pest is present	imp1	0.030		
Proportion of orchards in which pest is not present	1-imp1	0.970		
	Harvesting of fruit			
Probability that picked fruit is infected/infested with pest	imp2	0.000501		
Probability that picked fruit is not infected/infested with pest	1-imp2	0.9995		
	Infested orchard		Uninfested orchard	
Probability that clean fruit is contaminated during picking and transport	imp3a	0.000037	imp3b	0
Probability that clean fruit is not contaminated during picking and transport	1-imp3a	0.999963	1-imp3b	1
	Processing of fruit			
Probability that pest survives routine packhouse procedures	imp4	0.85		
Probability that pest does not survive routine packhouse procedures	1-imp4	0.150		
Probability that clean fruit contaminated in packhouse	imp5	5.33E-05		
Probability that clean fruit not contaminated in packhouse	1-imp5	1.000		
	Pre-export and transport			
Probability pest survives palletisation, quality inspection and containerisation	imp6	1		
Probability pest doesn't survive palletisation, quality inspection and containerisation	1-imp6	0.000		
Probability clean fruit contaminated during palletisation, inspection and containerisation	imp7	5E-07		
Probability clean fruit is not contaminated during palletisation, inspection and containerisation	1-imp7	1.000		
	On arrival procedures			
Probability pest remains with fruit after on-arrival border procedures	imp8	1		
Probability pest doesn't remain with fruit after on-arrival border procedures	1-imp8	0		

Pathways for infected/infested fruit to arrive	Pr(entry)	Number[1372] of infested fruit entering on pathway
Path 1 Orchard infected, infected/infested fruit picked, pest remains after packhouse, pre-export and on-arrival procedures	1.28E-05	2,233
Path 2 Orchard not infected, clean fruit contaminated during transport, pest remains after packhouse, pre-export and on-arrival procedures	0	0
Path 3 Orchard not infected, clean fruit contaminated in packhouse, pest survives later procedures	5.17E-05	9,053
Path 4 Orchard not infected, clean fruit contaminated during palletisation, passes on-arrival procedures	4.85E-07	85
Path 5 Orchard not infected, clean fruit contaminated during picking, pest removed during packhouse process, recontaminated during palletisation, pest passes border	0	0
Path 6 Orchard infected, clean fruit contaminated during picking and transport, pest remains through later processes	9.43E-07	165
Path 7 Orchard infected, clean fruit contaminated in packhouse, pest survives remaining processes	1.6E-06	280
Path 8 Orchard infected, clean fruit contaminated during picking, decontaminated in packhouse, contaminated during palletisation and remaining after on-arrival procedures	8.32E-14	0
Path 9 Orchard infected, clean fruit contaminated during palletisation and remaining after on-arrival procedures	1.5E-08	3
Path 10 Orchard infected, infected/infested fruit decontaminated in packhouse, re-contaminated in palletisation, pest remains after border process	1.13E-12	0
Total	6.75E-05	11,819

[1372] Calculations are based on the volume of trade distribution provided in the IRA which results in a mean export volume of 175,000,000 fruit.

Contributions of pathway to overall probability of importation

Path1	18.9%
Path2	0.0%
Path3	76.6%
Path4	0.7%
Path5	0.0%
Path6	1.4%
Path7	2.4%
Path8	0.0%
Path9	0.0%
Path10	0.0%
Total	100.0%

ANNEX 3 - APPLE EXPORTS 2007

	Australia**	New Zealand*
Country	Jan-Dec 2007	Jan-Dec 2007
Total exports (kgs)	4,655,834	295,412,000
India	1,105,665	3,606,000
United Kingdom	862,948	64,223,000
Indonesia	597,138	2,442,000
Papua New Guinea	521,252	423,000
Sri Lanka	513,444	143,000
Malaysia	330,580	5,369,000
Taiwan	231,337	17,961,000
Singapore	84,379	4,822,000
Brunei Darussalam	83,137	80,000
New Caledonia	74,592	1,507,000
Hong Kong	32,486	6,245,000
Russia	29,650	1,329,000
Fiji	28,063	1,499,000
Kiribati	26,083	9,000
Maldives	24,758	353,000
Seychelles	21,888	185,000
Pakistan	20,580	0
Bahrain	19,145	0
East Timor, Dem Rep of	12,708	0
French Polynesia	9,072	1,111,000
Tuvalu	7,793	2,000
Nauru	4,630	
Western Samoa	4,176	154,000
Thailand	3,175	3,092,000
Vietnam	2,796	703,000
United Arab Emirates	2,640	4,513,000
Vanuatu	1,547	82,000
Cambodia	112	164,000
Cameroon	60	0
Egypt	0	21,000
Germany	0	13,332,000
Canada	0	6,176,000
China	0	965,000
Bangladesh	0	21,000
Belgium Luxembourg	0	46,803,000
Kuwait	0	353,000
Ireland	0	2,531,000
Italy	0	122,000
Japan	0	0
France	0	4,976,000

Tonga	0	319,000
United States	0	49,433,000
Wallis & Futuna Islands	0	49,000
Sweden	0	312,000
Switzerland	0	364,000
Solomon Islands	0	34,000
Philippines	0	144,000
Netherlands	0	45,166,000
Norway	0	1,286,000
Portugal	0	40,000
American Samoa	0	15,000
Saudi Arabia	0	561,000

Source of data

* Pipfruit Industry Statistical Annual 2007. Pipfruit New Zealand Inc.

** Australian Bureau of Statistics