WORLD TRADE ORGANIZATION

Panel established pursuant to Article 6 of the
Understanding on Rules and Procedures Governing the Settlement of Disputes

AUSTRALIA – MEASURES AFFECTING THE IMPORTATION OF APPLES FROM NEW ZEALAND (DS367)

Australia's comments on the experts' replies to questions

Geneva, 25 March 2009

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AUS-123	Firko, M.J. and Podleckis, E.V. (2000) "Likelihood of introducing nonindigenous organisms with agricultural commodities: probabilistic estimation" *Quantitative Methods for Conservation Biology*, Springer, pp77-95.
AUS-124	Cross JV and Hall DR (2009), "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, pp139–144.

I. INTRODUCTION AND GENERAL COMMENTS

1. Australia welcomes this opportunity to comment on the experts' replies to the Panel's questions. Australia appreciates the significant commitment made by the experts to assist the Panel. Australia recognises that the experts have to meet many professional demands and, accordingly, it thanks them for their efforts in providing detailed replies to the Panel's questions in a relatively short period of time. Australia believes that these replies highlight a number of important scientific and technical issues in the context of this dispute.

2. Australia's comments go not only to technical aspects of the experts' replies, but also seek to contextualise the experts' responses within the broader legal framework of this dispute. This has been done to assist the Panel in its role as the trier of facts and not on the expectation that any of the experts should be familiar with the legal requirements of the *SPS Agreement*.

3. Australia's comments go both to the content and relevance of particular responses by the experts to issues for the Panel's decision in this dispute. As will be explained below, this has a bearing on the use of the experts' advice, on the weight to be given to the various expert opinions, and consequently on the Panel's ability to make findings of fact on that basis.

4. Australia's comments do not note every instance in which it agrees or disagrees with the experts. Instead Australia has adopted a more targeted approach, focusing on what it considers to be key issues. Australia hopes that this approach will facilitate a more streamlined dialogue at the experts' upcoming meeting with the Panel and the parties. Australia reserves its right to comment further on the experts' replies at the meeting with the experts and also in subsequent submissions.

5. Australia looks forward to meeting with the experts and the opportunity to discuss the issues raised by experts' replies to the Panel's questions at that meeting.

A. THE ROLE OF THE PANEL AND THE EXPERTS

6. The Panel's task is to review the Final IRA Report and to determine, with the assistance of the experts, whether it is "supported by coherent reasoning and respectable scientific evidence and is, in this sense, objectively justifiable."[1] Australia reiterates that it is not the function of either the Panel itself or the experts to act as risk assessor and conduct a *de novo* examination of the Final IRA Report. As the Appellate Body has explained, it is not a question of whether the experts would have done a risk assessment in the same way and would have reached the same conclusions as the IRA Team, because the role of the experts is limited by the kind of review that the Panel is required to undertake.[2]

7. Australia also notes that the burden of proof lies with New Zealand in this case. Therefore, it is for New Zealand to demonstrate serious flaws with the IRA Team's pest risk assessments before the Panel may find that they are not objectively justifiable within the meaning of the *SPS Agreement*. Neither the Panel nor the experts may make New Zealand's case in this regard.

B. GENERAL COMMENTS CONCERNING THE EXPERTS' REPLIES

8. Australia considers that, overall, the experts' replies reinforce its arguments that New Zealand has failed to demonstrate any flaws, let alone serious flaws, with the IRA Team's evaluation of the risks associated with the three pests at issue. The advice provided by the experts indicates that the analysis and conclusions of the IRA Team fall within the range of objective and coherent views that would be considered legitimate science according to the standards of the relevant scientific community.

9. It is to be expected that qualified and respected experts will have differences in opinion. In this regard, Australia notes that the experts in this dispute have expressed diverging scientific opinions on several issues. Australia considers that these reinforce its view that there is no single "correct" view of the science, and that there may be more than one objective and coherent interpretation of the available evidence. It is important that the Panel does not try to choose

[1] See: Appellate Body Report, *US/Canada – Continued Suspension*, para. 590.

[2] See: Appellate Body Report, *US/Canada – Continued Suspension*, para. 592.

between competing views,[3] and it must not automatically give more weight to any majority scientific views that may be apparent in the replies.[4]

10. Australia considers that the conclusions in the Final IRA Report represent the view of qualified and respected scientists and technical experts (i.e. the IRA Team) applying their expert judgment to the available evidence and the particular circumstances of New Zealand apple exports to Australia. Australia accepts that in relation to some issues, the IRA Team arrived at its conclusions on the basis of limited available data.[5] In such situations, it is necessary to complete the analysis through the exercise of expert judgement, as recognised by ISPM No. 11.[6] In Australia's view, this situation reflects the practical reality of conducting risk assessments which are to be used in a quarantine regulatory system directed at facilitating international trade. Alternative approaches (for example, conducting new research which could take many years) may be neither practical nor achievable.

11. Australia notes that, in some instances, the experts have expressed opinions about risk, or elements of risk, without explaining how their responses relate to the reasoning and evidence in the Final IRA Report, or to evidence and argument directly raised by New Zealand. Where this has occurred, Australia has attempted to address the experts' comments within the context of the appropriate step in the Final IRA Report. Australia has also identified relevant parts of the Final IRA Report and Australia's submissions where relevant, which may have been overlooked and invites the experts to consider this material. Until the experts have had an opportunity to take the relevant material into account, Australia considers that their responses can only be treated as provisional insofar as they relate to the issues in dispute.

12. In this regard, Australia highlights the importance of the experts having reference to the methodology applied by the IRA Team. Australia provided an outline of the methodological approach of the IRA Team in its first written submission.[7]

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[3] Appellate Body Report, *US/Canada – Continued Suspension*, para. 612.

[4] Appellate Body Report, *US/Canada – Continued Suspension*, para. 597.

[5] For example, in some cases in the European canker risk assessment, the IRA Team had no choice but to take into account overseas data where data specific to Australia's circumstances was not available.

[6] **Exhibit AUS-6:** ISPM No. 11, section 2.4.

[7] Australia's first written submission, paras 87-120.

13. Australia notes that a number of the Panel's questions go to matters that require specialist expertise and experience – for example, Australia's and New Zealand's climatic conditions, Australia's quarantine practices, the nature of measures that Australia requires, and the operation of the apple industry in both Australia and New Zealand. As far as Australia is aware, none of the experts selected by the Panel have specialist knowledge of these matters.

14. The experts have also provided additional information which does not fall within the scope of the Panel's questions. Australia acknowledges the experts' efforts to assist the Panel. However, in Australia's view, such information should be considered as background information only, as it does not relate to the issues directly before the Panel.

15. Finally, Australia notes several concerns regarding the observance of due process in the expert phase of this dispute. As the Appellate Body stated in *US/Canada – Continued Suspension,* "the protection of due process applies to a panel's consultations with experts … and continues throughout the proceedings".[8]

16. First, Australia notes that several new questions were put to the experts which did not appear in the draft questions provided to the parties for comment. Other questions were modified or amended which substantially altered the nature of the original questions. Australia was not given an opportunity to comment in any of these instances.

17. Secondly, Australia notes that, in answering the questions, some of the experts move outside the field of expertise for which they were appointed.[9] Australia had previously identified the potential for this to occur unless clear guidance was provided by the Panel,[10] and therefore, there can be no criticism of the experts concerned given the lack of such guidance. Accordingly, Australia requests that the Panel rely on the experts' replies only to the extent that they fall within the fields of expertise for which they were appointed.

[8] Appellate Body Report, *US/Canada – Continued Suspension,* para. 436.

[9] See the Panel's various letters to the Parties dated 13 November 2008, 24 November 2008, 5 December 2008, and 15 December 2008 during the course of the expert selection phase of this dispute, as well as Australia's letter to the Panel dated 19 December 2008 in relation to the proposed questions to experts.

[10] Australia's letter to the Panel, 19 December 2008.

II. SPECIFIC COMMENTS ON THE EXPERTS' REPLIES TO THE PANEL'S QUESTIONS

A. QUESTIONS SPECIFIC TO RISK ANALYSIS

18. The Final IRA Report is based on a semi-quantitative methodology. 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 of incursions by the pests. Australia recalls that the *SPS Agreement* does not prescribe a methodology to be used by WTO Members in conducting their risk assessments.[11] A Member may choose a qualitative or quantitative methodology, or a combination of the two. Australia recalls that it is not the role of the experts to advise whether they would have done the risk assessment in the same way as the IRA Team, for example, whether they would have used a particular methodological approach themselves. In Australia's view, the replies of Dr Schrader and Dr Sgrillo do not identify any fundamental objection to Australia's use of a semi-quantitative methodology.

19. Dr Schrader noted that pest risk assessments "can be carried out with quantitative or qualitative data" and that a "combination of both is also possible".[12] Dr Schrader also cited various elements of ISPM No. 11 of relevance, including section 2.5 that refers to a completed pest risk assessment containing:

> … [a] quantitative or qualitative estimate of the probability of introduction of a pest or pests, and a corresponding quantitative or qualitative estimate of economic consequences (including environmental consequences).[13]

20. Although Dr Sgrillo made a number of points about the semi-quantitative methodology applied in the Final IRA Report, which Australia will address below, he did not indicate that Australia should not have chosen such a methodology.

(a) Availability of data and expert judgment (Question 124)

21. In responding to Question 124, Dr Sgrillo observes that in quantitative modelling "statistical distributions and the corresponding parameters are derived from sampling of the real

[11] See: Australia's first written submission, paras 90, 110 and 286. This point is acknowledged by Dr Sgrillo in his Reply to q. 128.

[12] Reply of Dr Schrader, q. 124. Also, see: Reply of Dr Schrader, q. 128.

[13] **Exhibit AUS-6**: ISPM No. 11, section 2.5. (emphasis added)

world".[14] Australia agrees with Dr Sgrillo that data available from sampling or experiments should be fully utilised in quantitative modelling. However, the data available in the context of pest risk assessments are not often going to be comprehensive. This point is acknowledged in Firko and Podleckis (2000), which is cited by Dr Sgrillo, as follows:

> Ideally, existing data would provide the basis for direct estimation of model inputs. However, scientific experiments are seldom conducted specifically to provide these estimates for risk assessments, and results are seldom provided that can be used directly in our models.[15]

22. It follows that pest risk assessments have to be conducted on the basis of available, albeit often incomplete, data. That data must be reviewed and professional scientific and technical judgment used "to represent the available data regardless of whether estimates are characterized as point estimates or distributions of possible values".[16] ISPM No. 11 also acknowledges that risk assessors have to contend with "many uncertainties" which require the exercise of scientific judgment.[17]

23. Accordingly, Australia disagrees with Dr Sgrillo when he comments that "the parameters and the shapes of the distributions [in the Final IRA Report] are *mostly based in guesses* and not derived from sampling".[18] The IRA Team applied expert judgment in arriving at appropriate distributions taking into account available data and the uncertainty resulting from the absence of data. Australia submits that expert judgment cannot be equated with guesswork.

(b) Probability intervals (Questions 133 and 134)

24. In responding to Question 133, Dr Sgrillo comments that the values used for the probability intervals associated with qualitative descriptions in the final IRA Report seem to have been "arbitrarily settled".[19] Australia notes that New Zealand argued that the probability interval of (0, 10^{-6}) was "arbitrary".[20] Australia recalls that it has shown that New Zealand

[14] Reply of Dr Sgrillo, q. 124.

[15] Dr Sgrillo reference 4; **Exhibit AUS-123**: Firko and Podleckis (2000), p. 87.

[16] Dr Sgrillo reference 4; **Exhibit AUS-123**: Firko and Podleckis (2000), p. 87.

[17] **Exhibit AUS-6:** ISPM No. 11, section 2.4.

[18] Reply of Dr Sgrillo, q. 124. (emphasis added) The comment is also repeated in Dr Sgrillo's reply to q. 129.

[19] Reply of Dr Sgrillo, q. 133.

[20] New Zealand's first written submission, para. 4.175.

quoted selectively from Biosecurity Australia's 2001 *Draft Guidelines for Import Risk Analysis*[21] in support of this claim.[22] It may assist Dr Sgrillo in advance of the meeting with experts if Australia identifies relevant text from the Draft Guidelines on the issue of probability intervals, as outlined below.

25. The Draft Guidelines state that:

> By specifying (albeit arbitrary) probability intervals it will generally be possible to describe and interpret estimates of likelihood consistently. For example, …analysts using the term 'moderate' will have indicated that they have estimated a given likelihood to fall 'somewhere between 0.3 and 0.7'. All readers would understand that this was the analysts' understanding of the said likelihood, and that all other likelihoods described as 'moderate' should be interpreted in the same way.[23]

The text explains that the probability intervals are used to aid consistency in risk analysis. The intervals were not randomly chosen, and can be described as arbitrary only in the sense that a different set of intervals could have been chosen to achieve the same purpose of consistency. This point is reflected in Dr Sgrillo's statement that the IRA uses six intervals, but could have used "five, seven or eight".[24] The import of this reply appears to be that various approaches to setting intervals are available. As such, the use of the six intervals rather than "five, seven or eight" is not inherently flawed.

26. Australia also notes that the IRA Team "was not constrained by the intervals suggested in the draft Guidelines".[25] It was open to the IRA Team to use other intervals if it believed that the interval would contain the relevant value. For example, Importation step 3 for fire blight is represented as a triangular distribution from 0.001 to 0.03 with a most likely value of 0.01[26], which is not one of the intervals set out in Table 12 of the Final IRA Report.[27]

27. Dr Sgrillo observes in his reply to Question 133 that the choice of the interval $(0, 10^{-6})$ is arbitrary "because other ranges, as 0 to 1E-9 [10^{-9}: one in one billion] or 2E-6 [$2x10^{-6}$: one in 500 thousand], could also be used, after adjustment of the remaining ranges, without violating any

[21] **Exhibit AUS-17**: Biosecurity Australia (2001), *Draft Guidelines*.

[22] See Australia's first written submission, paras. 296 and 297.

[23] **Exhibit AUS-17:** Biosecurity Australia (2001), *Draft Guidelines*, p. 89. (emphasis added)

[24] Reply of Dr Sgrillo, q. 133.

[25] Final IRA Report, Part B, p.42.

[26] See: Final IRA Report, Part B, pp. 65-71.

[27] Final IRA Report, Part B, p. 43.

scientific principle".[28] This observation appears to Australia to indicate, if different maximum values could be used for the interval as identified by Dr Sgrillo without "violating any scientific principle", then neither does the choice of 10^{-6} (one in one million) as a maximum value.

28. Dr Sgrillo makes a similar observation in his reply to Question 134, stating that there is "no scientific base to support the exclusive choice of 1E-6 [10^{-6}: one in one million]" as the maximum value for the negligible interval.[29]

29. Dr Sgrillo comments that:

> There is a difference between *likelihood per unit* and *number of expected occurrences* in the population. The numeric probabilities representing the qualitative descriptors in the IRA are to be interpreted in a *per unit* basis. However they have to reflect the concept of each category (negligible, low, etc) also in populational terms.[30]

It is not entirely clear, but it seems to Australia that Dr Sgrillo is suggesting different intervals may be required depending on the number of apples being considered. If this is so, Australia disagrees with Dr Sgrillo. Intervals relating to the qualitative categories must be assigned consistent values which do not depend on the size of the population. The calculation of the likelihood of an event occurring in a population will reflect the definition of the intervals and the size of the population. As the population grows, so will the likelihood of an event occurring. This point is illustrated in Dr Sgrillo's comments regarding volume of trade under Question 137, when he states that "risk is directly proportional to the volume imported".[31]

30. Another issue Australia wishes to raise relates to Dr Sgrillo's view that:

> In the phytosanitary context "negligible" should represent, in populational terms, one event in several years and not 200 events in one year.[32]

It is not clear to Australia what the basis is for Dr Sgrillo's statement regarding "one event in several years" representing "negligible" in the phytosanitary context.[33]

(c) Distributions (Questions 135 and 136)

[28] Reply of Dr Sgrillo, q. 133.

[29] Reply of Dr Sgrillo, q. 134.

[30] Reply of Dr Sgrillo, q. 133. (original emphasis) Dr Sgrillo makes a similar comment under q. 134 and q. 136.

[31] Reply of Dr Sgrillo, q. 137.

[32] Reply of Dr Sgrillo, q. 133. (emphasis added)

[33] See similar statements in the replies of Dr Sgrillo to q. 134 and q. 136.

31. Question 135 related the use of three types of distributions in pest risk assessments: uniform, triangular and beta-Pert. Dr Sgrillo refers to comments about the characteristics of uniform and the triangular distributions made in Firko and Podleckis (2000). The comments identify when these two types of distributions can be used and the limitations associated with their use. The comments do not indicate that either type of distribution should be excluded from use in pest risk assessments. Firko and Podleckis (2000) lists the uniform and triangular distributions, together with the normal distribution, lognormal distribution and beta distribution, as being "among those [distributions] chosen most often".[34]

32. Dr Sgrillo goes on to comment that:

> Realistic stochastic models, however, are only developed when available numeric data are sufficient to estimate, directly from real populations, the shape of the distributions and the values of the respective parameters.[35]

Australia agrees with Dr Sgrillo about the importance of data in determining the shape of distributions and the values of parameters. Firko and Podleckis (2000) states that "[i]deally, existing data would provide the basis for direct estimation of model inputs".[36] The use of the word "ideally" indicates that the circumstance described is unlikely to be the general case.

33. Firko and Podleckis (2000) emphasises that:

> [D]istributions should be chosen carefully so as to best reflect the availability of specific information or specific assumptions about the underlying characteristics of parameters.[37]

By way of example, Firko and Podleckis (2000) then observes that:

> [i]f available information only allows the analyst to estimate a minimum and maximum value, then a uniform distribution may be most appropriate.[38]

34. This observation reflects the comment by Dr Schrader that the uniform distribution:

> is useful in situations, where a minimum and maximum value are available, but no sufficient information to determine the most likely value.[39]

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[34] **Exhibit AUS-123**: Firko and Podleckis (2000), p. 88.

[35] Reply of Dr Sgrillo, q. 135.

[36] **Exhibit AUS-123**: Firko and Podleckis (2000), p. 87.

[37] **Exhibit AUS-123**: Firko and Podleckis (2000), p. 92.

[38] **Exhibit AUS-123**: Firko and Podleckis (2000), p. 92. (emphasis added)

[39] Reply of Dr Schrader, q. 135.

As noted by Dr Schrader, the use of the uniform distribution "implies a high degree of uncertainty".[40]

35. In conclusion, Australia notes that, in Dr Sgrillo's reply to Question 136, he provides Table 1 which divides the interval (0, 10^{-6}), as a uniform distribution, into a number of separate ranges. Dr Sgrillo states that:

> Table 1 shows that 90% of the random numbers generated in a simulation will fall in the range 1E-7 [10^{-7}] to 1E-6 [10^{-6}] and only 0.0001% of the random numbers will fall in the range 0 to 1E-12 [10^{-12}].[41]

As the intervals used by Dr Sgrillo in Table 1 decrease successively in size by a tenth, Australia does not find it surprising that the wider intervals contain a greater percentage of the samples. The widest interval of 10^{-7}–10^{-6} contains 90% of the samples and the second widest interval of 10^{-8}–10^{-7} contains 9% of the samples. In total, the two intervals contain 99% of the samples and in total, these intervals represent 99% of the interval of (0, 10^{-6}). The remaining five intervals contain 1% of the samples and represent 1% of the interval of (0, 10^{-6}).

[40] Reply of Dr Schrader, q. 135. (original emphasis)

[41] Reply of Dr Sgrillo, q. 135.

B. QUESTIONS SPECIFIC TO FIRE BLIGHT

36. Australia notes that the replies of Dr Deckers and Dr Paulin confirm that the conclusions reached in Final IRA Report, including its recommendations as to appropriate measures, fall within the spectrum of legitimate science.

37. Dr Paulin indicated general support for risk reduction measures for fire blight, in particular, that orchards be free of fire blight symptoms and disinfection of fruit.[42] Dr Deckers agrees with this position.[43] This represents support for Australia's two principal risk reduction measures for fire blight.

38. Further, Dr Deckers stated that "limit[ing] apple exports to mature symptomless apples is not enough to achieve Australia's ALOP."[44] Similarly, Dr Paulin commented that such a measure "could not replace any of" Australia's current measures for fire blight.[45]

39. In Australia's view, this support is highly significant. Not only does it support the Final IRA Report's conclusion that the risk associated with New Zealand apples is above Australia's ALOP, but critically, that Australia's measures are sufficiently warranted for fire blight.

40. Importantly, both Dr Deckers and Dr Paulin also expressed views indicating the irrelevance and inappropriateness of New Zealand's reliance upon Robert and Sawyer (2008) in this dispute.[46] Both experts also dismissed the purported analogy between the circumstances of possible Australia – New Zealand trade and trade in New Zealand apples to Chinese Taipei.[47] Furthermore, neither expert referred to *Japan – Apples*. Australia recalls that the substance of New Zealand's case in relation to fire blight is based on a claim that each of these three pieces of "evidence" prove the absence of a pathway.[48]

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[42] Reply of Dr Paulin, q. 6(d).

[43] Reply of Dr Deckers, q. 8, 18 and 28.

[44] Reply of Dr Deckers, q. 15.

[45] Reply of Dr Paulin, q. 15.

[46] Reply of Dr Deckers, q. 41; Reply of Dr Paulin, q. 41.

[47] Reply of Dr Deckers, q. 44; Reply of Dr Paulin, q. 44.

[48] New Zealand's first written submission, paras. 4.9, 4.12, 4.15, 4.18, 4.25-4.29, 4.31, 4.183-4.186, 4.237, 4.245, 4.251; New Zealand's responses to the Panel's questions after the first meeting, qs. 62, 64; New Zealand's opening statement at the first meeting, paras. 3, 4, 52, 89-90, 91.

41. Finally, Australia notes that qualified and respected experts may disagree on the science and have different views regarding certain steps in the pathway. This case is no exception. However, in light of the fact that Dr Deckers and Dr Paulin support the Final IRA Report's ultimate conclusion on risk, and consider that limiting imports to "mature, symptomless apples" would not achieve Australia's ALOP, Australia does not consider that any of the experts' criticisms can be taken to support flaws in the Final IRA Report that are so serious that the Panel should not have reasonable confidence in the evaluation made, and the ultimate conclusion that risk management measures are warranted.

(a) The probability of entry

Questions 22 and 23: Importation step 1

42. Importation step 1 is concerned with the presence of *Erwinia amylovora* in source orchards. It is not concerned with the presence of fire blight *symptoms* in orchards, or the presence of *E. amylovora* on fruit, as both these issues are accounted for at importation step 2.[49]

43. Dr Paulin's response to Question 22 confirms that "each stage [of the reasoning at importation step 1] is based on scientific evidence"[50] from qualified and respected sources.[51] Accordingly, he considers that "the conclusion that no orchard in New Zealand can be considered free of *E. amylovora* seems soundly based."[52] Dr Paulin specifically notes that bacterial contamination (vectored by wind-driven rain, insects and birds) in a symptomless orchard is *more likely* in New Zealand where orchards have a long history of fire blight.[53]

44. Some of the experts expressed concern that the probability of this step may have been overestimated.[54] However, in Australia's view, when these comments are read in light of Dr Paulin's positive support, it suggests that the concerns expressed do not support evidence of a *serious* flaw in the overall risk assessment.

[49] Final IRA Report, Part B, pp. 53-54; Australia's first written submission, paras. 379 & 382.
[50] Reply of Dr Paulin, q. 22(c).
[51] Reply of Dr Paulin, q. 22(b).
[52] Reply of Dr Paulin, q. 22(e).
[53] Reply of Dr Paulin, q. 22(a).
[54] Reply of Dr Paulin, q. 22(f); reply of Dr Schrader, q. 22; reply of Dr Sgrillo q. 22(c)-(f).

45. Australia further notes that Dr Sgrillo's response to Question 22 appears to be based on a scientific opinion about the biology of *E. amylovora*. Dr Schrader's response to Question 22 that "[t]he assumption that orchards in New Zealand are 100% infested with *E.amylovora* lacks sufficient scientific evidence"[55] is similarly an opinion about the substantive scientific basis of importation step 1. However, Dr Sgrillo and Dr Schrader were appointed to assist the Panel's understanding of risk assessment methodology, and not fire blight. Accordingly, the Panel should rely on their advice only to the extent that it remains within the field of expertise for which they have been appointed.

46. In any event, Dr Sgrillo notes the insignificance of Importation step 1 to the fire blight risk assessment, correctly identifying that the IRA Team undertook an analysis of this step to achieve transparency and methodological consistency with the risk assessments in relation to other pests, such as European canker:

> If the probability of step 1 is set to 1, then this step is unnecessary and could be removed from the model. However the model was developed to be applied by different pests that may not have probability 1 in this step, such as *N. galligena*.
>
> Also, step 1 could be included in step 2. The probability of the fruit picked be infested could be assessed including the probability of the pest be present in the orchard. In this case, however, some transparency would be lost.[56]

47. Consequently, Australia takes a different view to Dr Paulin that the "relevance of step 1 is major for the risk assessment".[57] Dr Paulin's opinion in this regard may have been influenced by scientific data regarding epiphytic infestation levels detectable on fruit and their relationship to the level of active fire blight in orchards (ie. orchards showing symptoms).[58] However, as this issue of fruit contamination is relevant to importation step 2, not importation step 1, Australia addresses this concern below.

[55] Reply of Dr Schrader, q. 22.

[56] Reply of Dr Sgrillo, q. 23 (footnote omitted; emphasis added).

[57] Reply of Dr Paulin, q. 23 (original emphasis).

[58] Reply of Dr Paulin qs. 6, 7(b), 18, 20, 23 and 25.

Questions 6, 7, 8, 18, 20, 24 and 25: Importation step 2

i. Variation in data

48. The experts make a number of points that question the IRA Team's conclusion in respect of Importation step 2. Australia discusses these points below and shows that, when specific circumstances relating to the particular risk scenario (ie. epiphytic infestation of mature apples) are taken into account, the experts' responses do not go to support serious flaws in the IRA Team's analysis.

49. Dr Paulin's and Dr Sgrillo's responses to Question 24 note that the scientific data relating to infestation and infection of mature apple fruit with *E. amylovora* contains significant variation. Dr Sgrillo states that the "figures available are contradictory and variable",[59] while Dr Paulin notes that:

> Each paper [considered in the Final IRA Report] deals with its own type of fruit (mature or not, sometimes not precisely indicated), its own technique of detection of the bacteria, etc... No general feature for the presence of *E.amylovora* on/in mature apple fruit can be seriously based on these results. The range of frequencies indicated on the table 4 from AUS FWS (from <1% to 75%) just shows that, in these papers, different things were analysed differently.[60]

50. Dr Paulin continues as follows:

> [I]t could be not valid to aggregate these technical data. Therefore I am in the opinion that this evaluation is not scientifically based, cannot be objective and, as shown on table 4, is just not credible as a whole.[61]

51. Australia agrees with Dr Sgrillo and Dr Paulin that the scientific data is variable.[62] However, Australia does not consider that the variation in data necessarily precluded the IRA Team from arriving at a credible estimate of probability for infection and infestation. ISPM No. 11 acknowledges that risk assessors have to contend with "many uncertainties"[63] even when data is sufficient to undertake a risk assessment.

[59] Reply of Dr Sgrillo, q. 24.

[60] Reply of Dr Paulin, q. 24.

[61] Reply of Dr Paulin, q. 24.

[62] As stated in the Final IRA Report, Part B, p. 55, and noted in the Reply of Dr Sgrillo, q. 24.

[63] **Exhibit AUS-6:** ISPM No. 11, section 2.4.

52. In such cases, risk assessors must apply expert judgment to arrive at an estimate of risk, or elements of risk, taking account of the specific circumstances of the case.[64] Bearing this point in mind, Australia considers that there are a number of issues that may have been overlooked by the experts in arriving at their conclusion that the probability range ascribed to Importation step 2 is not scientifically supported.

ii. Endophytic infection

53. The first is the relevance of endophytic infection to the fire blight risk assessment. The Final IRA Report expressly states:

> The risk pathway of concern for fire blight with regard to apples for export is epiphytic infestation of fruit with *E. amylovora*.[65]

54. As Australia noted previously, endophytic infection is not significant to the IRA Team's assessment at importation step 2.[66] Accordingly, the probability range ascribed to Importation step 2 reflects the scientific data demonstrating epiphytic infestation, which as both Dr Deckers and Dr Paulin note, is well-established.[67]

55. Dr Deckers and Dr Paulin do not appear to have taken this fact into account in providing opinions about *endophytic* infection.[68] Similarly, Dr Sgrillo and Dr Paulin's responses to Question 24 similarly do not distinguish between the relative significance of endophytic infection and epiphytic infestation to the IRA Team's analysis. Accordingly, Australia considers that the experts' criticisms, which are partly directed at endophytic infection, ought to be read in the context of the IRA Team's conclusion that "the paucity of evidence of endophytic infection in mature fruit suggests that if endophytic infection does take place, it must be a rare event".[69]

56. As Dr Paulin appears to have overlooked the insignificance of endophytic infection to the IRA Team's analysis, he consequently assumes that the probability range assigned to importation step 2 is partially based on studies concerning immature fruit.[70] However, as the IRA Team did

[64] **Exhibit AUS-6:** ISPM No. 11, section 2.4.

[65] Final IRA Report, Part B, p. 105 (see also: p. 52) (emphasis added).

[66] Australia's first written submission, paras. 389-90 & 407.

[67] For example, Reply of Dr Deckers, qs. 6, 7, 18, 19, 22 & 23; Reply of Dr Paulin, qs. 6, 18, & 19.

[68] Reply of Dr Deckers, qs. 6 & 7; Reply of Dr Paulin, qs. 6 & 7.

[69] Final IRA Report, Part B, p. 64.

[70] Reply of Dr Paulin, q. 24.

not give weight to endophytic infection, it necessarily discounted studies relating to immature fruit (since endophytic infection is associated with immature fruit). The Final IRA Report refers only to studies concerning *mature*, symptomless fruit in deciding the appropriate value to assign to Importation step 2.[71]

iii. Epiphytic infestation

57. The reasoning at Importation step 2 should be judged only in relation to its treatment of *epiphytic* infestation with respect to *mature* apples. Dr Paulin's response to Question 6 expresses support for the IRA Team's reasoning regarding epiphytic infestation at Importation step 2:

> [T]he reasoning established by the IRA [regarding epiphytic infestation] seems consequently coherent and usually based on available evidence, although it may tend to exaggerate the risks of *E. amylovora* associated with fruits (mature symptomless).[72]

58. Critically, Dr Paulin continues:

> [T]he results of the assessment therefore support sufficiently the need for information on the orchard previous infection, for inspection of orchards before export, as well as for the disinfection of fruits in the packing houses…[73]

59. Dr Deckers makes a similar statement. He notes in his response to Question 8:

> It is important that not only the orchards should be fire blight free but also the immediate environment around the orchard should be fire blight free.

60. In Australia's view, the Panel should regard these responses as significant support for Australia's claim that its measures requiring that apples be sourced from symptom-free orchards, verified by inspection, are warranted and weigh contradicting evidence in light of this positive support. This point is critical as it suggests that any potential flaws in the Final IRA Report's reasoning are not so serious as to compromise the objective justifiability of its final conclusions and therefore, the consequent probability range assigned to importation step 2.

iv. Weighting of studies derived from orchards showing fire blight symptoms

61. Given the specific risk scenario assessed by the IRA Team (ie. epiphytic infestation of mature apples), Australia can only identify one significant concern expressed by the experts on

[71] Final IRA Report, Part B, p. 65 (section entitled "Summary").

[72] Reply of Dr Paulin, q. 6(c). (emphasis added)

[73] Reply of Dr Paulin, q. 6(d). (emphasis added)

the analysis at importation step 2. Dr Deckers and Dr Paulin both appear to consider that epiphytic infestation of mature apples generally occurs when the apples are sourced from orchards where there is active fire blight (ie. an orchard showing fire blight symptoms).[74] As neither Dr Paulin nor Dr Deckers accepts that all New Zealand orchards "permanently show active symptoms",[75] they consider that the IRA Team should not have given more weight to "studies on apples sourced from orchards that were showing symptoms of fire blight disease".[76] Instead, Dr Paulin suggests that each study ought to have been "weighted according to their own scientific value [and] should be considered with the same level of interest".[77] Dr Sgrillo broadly concurs noting that "more weight should be given to studies with more reliable methodology".[78] However, Australia notes that Dr Sgrillo does not clarify what he considers a more reliable methodology might be.

62. Australia agrees with Dr Paulin and Dr Deckers that not all New Zealand orchards will have active fire blight all of the time. Australia recalls that the IRA Team does not make this claim. The probability range assigned to Importation step 2 is far more modest than if such an assumption was made: a triangular distribution with a minimum of 10^{-3}, a maximum of 5×10^{-2} and a most likely value of 3×10^{-2}. The IRA Team's decision to more heavily weight studies on apples sourced from orchards with symptoms to arrive at this probability range was based on its consideration of the sporadic character of fire blight[79] and the specific circumstances of this case. Australia considers that it is precisely these factors which diminish the "scientific value" of the other data. Although Dr Deckers and Dr Paulin do not appear to have factored this consideration into their assessment of the probability range assigned to Importation step 2, they do appear to acknowledge the significance of these factors in responses to other questions.

[74] Reply of Dr Paulin, qs. 6, 7(b), 18, 20 and 25; Reply of Dr Deckers, qs. 18, 22. Australia notes that this is broadly consistent with the IRA Team's own view that *E. amylovora* will be present in higher quantities on apples sourced from orchards with active blight (see: Final IRA Report, Part B, pp. 105-6). However, the IRA Team also considered that apples from orchards without symptoms could be infested, particularly if infected host plants were in the vicinity and there was a rain event. This point is discussed below.

[75] Reply of Dr Paulin, q. 25; see also: Reply of Dr Deckers, q. 25.

[76] Final IRA Report, Part B, p. 65.

[77] Reply of Dr Paulin, q. 25 (original emphasis).

[78] Reply of Dr Sgrillo, q. 25.

[79] Cf. Reply of Dr Deckers, q. 25; Australia's first written submission, para. 399.

63. Dr Deckers' response to Question 8 supports the IRA Team's view[80] that, given the sporadic nature of fire blight, the presence of the causative organism, *E. amylovora*, always presents the possibility of actual disease activity:

> Freedom of the visible symptoms of the disease does not mean that the disease is not present on the fruit or that there is a pest free place of production. It only describes the situation of fire blight in the orchard and indicates that there is a reduced risk for the presence of fire blight bacteria on the fruits because there are no active fire blight infections in the considered orchards. … The sporadic appearance of the fire blight disease in an orchard or on another host plant is one of the typical characteristics of this bacterial disease under orchard conditions. This means that the disease will not be present every year on the same place and in the same intensity.[81]

64. Australia recalls that New Zealand did not provide the IRA Team with data confirming any orchard freedom from *E. amylovora*.[82] Further, Australia notes the evidence supporting the widespread distribution of fire blight in New Zealand[83] and the unrestricted movement of nursery stock within the country. The IRA Team therefore concluded that no orchard in New Zealand could be assumed permanently free of *E. amylovora*. Dr Paulin expresses specific support for this view:

> I would say that each apple orchard symptom-free in New Zealand may be temporarily contaminated by *E. amylovora*, not permanently.[84] …
>
> It is coherent to assume that no orchard in New Zealand is or has been permanently free of fire blight.[85] …
>
> [B]acterial populations in a symptomless orchard[s] …[is]…probably more likely in the case of New Zealand, where the history of fire blight is very long on the same sites.[86]

65. Accordingly, taking into account the sporadic nature of active fire blight in orchards where *E. amylovora* is already present, and the fact that no orchard in New Zealand could be presumed free of *E. amylovora*, Australia considers that it was open for the IRA Team to conclude that apples could come from orchards with fire blight symptoms.

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[80] Although the issue of bacterial presence is a matter for importation step 1, the IRA Team considered bacterial presence to increase the likelihood of active fire blight in an orchard. As this in turn increases the likelihood that fruit would be contaminated, this issue is also relevant to Importation step 2.

[81] Reply of Dr Deckers, q. 8 (emphasis added). See similar statement in the Reply of Dr Deckers, q. 25.

[82] Final IRA Report, Part B, pp. 53-54 &105; Australia's first written submission, para. 378.

[83] Final IRA Report, Part B, p. 53.

[84] Reply of Dr Paulin, q. 22. (original emphasis; emphasis added)

[85] Reply of Dr Paulin, q. 25. (emphasis added)

[86] Reply of Dr Paulin, q. 22. (emphasis added)

66. In contrast, many of the experiments which failed to detect *E. amylovora* on apples used techniques that were insufficiently sensitive to detect low bacterial populations. As such experiments could not be considered evidence that *E. amylovora* was *not* present, the results of these experiments were deemed inconclusive.[87] Consequently, the IRA Team considered them to be unreliable and gave them less weight.[88]

67. In relation to the studies that the IRA Team did rely upon, Dr Paulin states that "the van der Zwet et al. 1990 paper … is criticised by its own first author" and accordingly, should not have been considered by the IRA Team.[89] Australia assumes that the criticisms Dr Paulin refers to are contained in the declaration of Dr van der Zwet provided in the context of the *Japan – Apples* dispute rather than a subsequent scientific publication by that author.[90] Australia explained in detail in its first written submission why it does not consider that declaration to affect the reliability of the specific experiments which the IRA Team relied upon.[91] In addition, the declaration of Dr van der Zwet is primarily aimed at clarifying that certain experiments could not be relied upon to demonstrate endophytic infection of mature fruit because the samples used contained immature fruit. However, as Australia noted previously, *endophytic* infection is not significant in the Final IRA Report's risk analysis.

68. Accordingly, Australia considers that the IRA Team's use of the data from van der Zwet *et al*. (1990)[92] is consistent with the later clarification in Dr van der Zwet's declaration. Dr Paulin's response indicates that he may not have considered these parts of Australia's first written submission and therefore his views regarding the relevance of van der Zwet *et al.* (1990) do not fully address the particular way this study was used in the Final IRA Report.

69. Thus, a broader review of Dr Paulin's and Dr Deckers' responses reveals some acknowledgement that the underlying reasons for the IRA Team's decision to give more weight to studies on apples sourced from orchards showing symptoms of fire blight are sound. In

[87] Australia's first written submission, paras. 401-404.

[88] Final IRA Report, Part B, p. 65.

[89] Reply of Dr Paulin, q. 24.

[90] **Exhibit AUS-32**: van der Zwet, T. (2002) "Declaration of Dr Tom van der Zwet", 16 July, 2002 (provided as Exhibit US-18 in *Japan – Apples*).

[91] Australia's first written submission, paras. 393-395 & 465-469.

[92] **Exhibit AUS-31:** van der Zwet *et al*. (1990).

Australia's view, support for the IRA Team's reasoning tends to confirm Australia's claim that the IRA Team's decision regarding the weighting of evidence was not flawed.

v. Weighting of other scientific evidence

70. In any event, even though the IRA Team gave more weight to studies on apples from orchards showing active disease, it did not discount other studies. It is important to understand that the objective of Importation step 2 was to estimate infestation *generally*, and not just infestation arising from actively infected source orchards. As the IRA Team noted, bacterial contamination could arise if apple trees were close to fire blight infected hosts.[93] Dr Deckers specifically supports this source of contamination in his response to Question 22:

> Epiphytic contamination of the apple fruits is possible, even when there is no EA present in the orchard itself, but when active EA infections are present on a host plant in the surroundings.[94]

71. Indeed, Dr Deckers appears to consider this to be a source of contamination sufficiently serious to warrant risk management:

> It is important that not only the orchards should be fire blight free but also the immediate environment around the orchard should be fire blight free.[95]

72. Dr Paulin and Dr Deckers both express views which support the IRA Team's conclusion that contamination is more likely in the event of rain or hail, even if the orchard itself is symptomless. Dr Paulin notes:

> Another source of bacteria in a healthy orchard could be through wind-driven rain or insects or birds carried bacteria constituted by ooze from near-by (but possibly unseen) "alternative" host plants such as wild hawthorn, which may be difficult to survey, and which presence is sometimes not even acknowledged. These bacteria will disappear soon, because *E. amylovora* is not a good epiphyte, in most of the cases, but they may cause late infection which, progressing slowly if weather conditions are not conducive to symptom expression, may constitute a bacterial population in a symptomless orchard. These two possibilities are probably more likely in the case of New Zealand, where the history of fire blight is very long on the same sites.[96]

vi. Concluding remarks

[93] Final IRA Report, Part B, p.65.

[94] Reply of Dr Deckers, q. 22. (emphasis added)

[95] Reply of Dr Deckers, q. 8. (emphasis added) Similarly, see: Reply of Dr Deckers, q. 22.

[96] Reply of Dr Paulin, q. 22 (original emphasis; emphasis added).

73. In sum, the IRA Team exercised expert judgment to estimate the infestation level associated with New Zealand apples because the scientific data regarding epiphytic infestation demonstrated considerable variation. The above demonstrates that the IRA Team's estimate was not based on an indiscriminate aggregation of the technical data, which Dr Paulin and Dr Sgrillo correctly note would not be appropriate where the data is not comparable,[97] but rather, a considered weighting of evidence as appropriate to the circumstances. Once this point is understood, Australia considers that the expert responses broadly show support for the IRA Team's judgment in relation to importation step 2.

Questions 20 and 28: Importation step 4 and bacterial survival during packing house procedures

74. The experts' replies reflect different views regarding some of the conclusions of the IRA Team in relation to Importation step 4. Dr Deckers supports the IRA Team's conclusion regarding bacterial survival.[98] By contrast, Dr Paulin considers the probability range assigned to Importation step 4 to be "too high",[99] while Dr Sgrillo states that "the scientific evidence available does not fully support the values … chosen as parameters for … describing the survival of *E. amylovora* during routine processing procedures".[100]

75. A closer inspection of Dr Paulin's response to Question 28 indicates that Dr Paulin's concerns may result from a mistaken assumption that importation step 4 was assessing the likelihood of bacterial survival *after the fruit had been disinfected*. He states:

> … in the case of fruit disinfection, the probability range and pattern distribution for this step seems too high for this step.[101]

76. Australia notes that the evaluation at Importation step 4, like all the other steps in the risk assessment, assessed elements of the *unrestricted* risk associated with New Zealand apples. Accordingly, Dr Paulin's response to Question 28 should be read in light of this qualification. When this is taken into account, it is clear that Dr Paulin's response demonstrates clear support for bacterial survival:

[97] Reply of Dr Paulin, q. 24; reply of Dr Sgrillo, q. 24.
[98] Reply of Dr Deckers, q. 28.
[99] Reply of Dr Paulin, q. 28.
[100] Reply of Dr Sgrillo, q. 28.
[101] Reply of Dr Paulin, q. 28. (emphasis added)

> If routine procedure in New Zealand packing houses does not include a disinfectant bath for fruits, I do not see which factor could effectively markedly decrease the supposed bacterial population on fruit surface. I would then consider that processing in the packing house has no influence on the level of bacterial contaminants on fruits. The scientific bases of the IRA conclusions are data on the resistance of *E. amylovora* in adverse conditions, such as low temperature and dessication. It seems that most data tend to show that cool temperature will reduce *E. amylovora* populations over time. … It seems certain that, if conditions in the packing house tend to reduce *E. amylovora* population, they will not allow the complete disappearance of these bacteria. The fact that VBNC state has been demonstrated in laboratory conditions for *E. amylovora* adds a potential for survival (whatever the frequency of cells at the VBNC state, and the chance of resuscitation, which is controversial in natural condition).[102]

77. It seems clear from the above response that Dr Paulin regards disinfection as a justifiable means of reducing the risk associated with bacterial survival. Dr Deckers also notes:

> The disinfection process during packaging should reduce the risk of survival of the epiphytic population strongly and reduce the distribution pattern substantially.[103]

78. In addition to the above comments, Dr Paulin provides further support for disinfection:

> The disinfection of apple could be justified when arriving in the packinghouse, if these are sourced from orchards showing fire blight symptoms.[104]

In Australia's view, the Panel should regard these responses as significant support for Australia's claim that its disinfection measure is warranted and weigh contradicting evidence in light of this positive support. This point is critical as it suggests that any potential flaws in the Final IRA Report's reasoning are not so serious as to compromise the overall validity of the conclusions.

79. Australia therefore considers that Dr Sgrillo's concerns regarding the scientific basis of Importation step 4 should be read in light of the clear support expressed by Dr Deckers and Dr Paulin. Australia also notes that Dr Sgrillo's response to Question 28 appears to be partially based on his opinion about the biology of *E. amylovora*. As Dr Sgrillo was appointed to assist the Panel's understanding of risk assessment methodology, and not fire blight, the Panel should rely on Dr Sgrillo's advice only to the extent that it remains within the field of expertise for which he was appointed. On issues relating to the biology of *E. amylovora*, Australia considers that the Panel should give more weight to the responses of Dr Deckers and Dr Paulin.

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[102] See also: Reply of Dr Paulin, q. 28. (emphasis added)

[103] Reply of Dr Deckers, q. 28. See similar comment in Reply of Dr Deckers, q. 20.

[104] Reply of Dr Paulin, q. 20.

Questions 32 and 33: Importation step 7

80. Australia recalls its objection[105] to the Panel in posing Question 33 to the experts on the basis that New Zealand has not advanced substantive argument in relation to bacterial ooze production in mature apples under Importation step 7.[106] The Panel should therefore consider the responses of Dr Deckers and Dr Paulin as background information only, and should not permit New Zealand to rely upon them to complete an argument which it failed to make itself.

(b) Exposure

The objectives of the "exposure" analysis and the nature of the questions

81. The likelihood that *E. amylovora* will be present in sufficient quantities to be transferred to a suitable host and initiate infection is assessed in the "exposure" analysis of the Final IRA Report. Australia recalls that successful infection requires the following key events to occur in sequence:[107]

a. a source of inoculum must be present;

b. *E. amylovora* must be transmitted to a susceptible host by an appropriate vector;

c. there must be sufficient *E. amylovora* to establish infection.

82. On the whole, the experts' responses indicate that they consider the probability that this sequence of steps will occur to be extremely unlikely,[108] but not impossible.[109] Australia notes in particular Dr Paulin's response to Question 35 in which he states:

> The fact that *E. amylovora* can be transmitted to a susceptible host via insects feeding on discarded apples is conceivable through an apparently logical succession of events, each of them being questionable, but never completely impossible.[110]

[105] Australia's letter to the Panel, 19 December 2008: Attachment, draft question 33.

[106] See: New Zealand's first written submission, para 4.232.

[107] This is elaborated in Australia's first written submission, para. 448. Dr Deckers also notes the conditions for fire blight infection in his reply to question 10. Australia agrees with these points.

[108] Reply of Dr Deckers, qs. 18, 19, 27, 35, 36, 37, 38 & 40; Reply of Dr Paulin, qs. 18, 19, 27, 36, 37 & 38; reply of Dr Sgrillo, q. 36.

[109] Reply of Dr Deckers, qs. 19, 27, 35 & 40; Reply of Dr Paulin, qs. 35, 37 & 40.

[110] Reply of Dr Paulin, q. 35. (emphasis added)

83. Although it seems to attract little comment from the experts, the conclusion reached by the IRA Team is entirely consistent with this view. Australia draws attention to the fact that the probability range assigned by the IRA Team to this step is zero to one in a million $(0, 10^{-6})$. The IRA Team provided the following explanation for assigning this value which should be regarded as part of the conclusion associated with this step:

> In reaching a conclusion on the value for exposure … the potential transmission modes in all cases was either mechanical transfer … or insect mediated transfer… The IRA team further noted that very low exposure values expressed on a per apple basis could be highly significant when the potential volume of trade is taken into account. The IRA concluded that very little of the experimental work is directly relevant to this situation. It is just not possible to do experimental work with a robust experimental design and sufficient replication to assess events where the probabilities are potentially so low. Most of the work has been done under highly artificial conditions with experimental designs that have very little chance of detecting low probability but significant events.[111]

84. Australia notes that Questions 18, 19, 27, 35, 36 and 37 essentially ask the same question using slightly different language and Questions 38 and 40 cover aspects of the same issues. Australia notes that Questions 18, 27 and 37 appear to be new questions substantially based on proposals by New Zealand and several of the other questions have been modified to give greater emphasis to scientific evidence drawn from experiments under orchard conditions.[112]

85. Australia did not have an opportunity to comment on these new questions and amendments, which is a due process issue. Australia is concerned about the restriction as to the nature of the scientific evidence that the experts were asked to consider. Australia notes that the *SPS Agreement* recognises no limitation on what constitutes "scientific evidence",[113] provided that it meets the standards of the relevant scientific community. Accordingly, questions which prejudge the evidentiary value of other studies which may have been conducted under laboratory conditions, but nevertheless constitute respectable science, do not allow the experts to comment objectively on the full *range* of relevant scientific evidence. In Australia's view, it is important that no scientific evidence is *a priori* excluded[114] on topics like "exposure" which, as the IRA

[111] Final IRA Report, Part B, pp. 89-90.

[112] Questions 19, 20, 27, 35 & 38.

[113] Panel Report, *Japan – Apples*, para. 8.98; Appellate Body Report, *EC – Hormones*, para. 206.

[114] Appellate Body Report, *EC – Hormones*, para. 206.

Team noted and the experts' responses demonstrate, is extremely difficult to establish experimentally under orchard conditions.[115]

Questions 7, 19, 21, 26 and 40: Sources of inoculum

86. Dr Deckers' responses to Questions 7 and 19 note that "there will be no multiplication of the epiphytic bacterial population on the fruit surface or in the calyx tissue"[116] and the "chance that this epiphytic population of [*E. amylovora*] serves as a new source of infestation in the orchard is very small".[117] Dr Paulin's response to Question 26 similarly notes that "the available scientific evidence shows that *E. amylovora* is not a true epiphyte, hence it cannot multiply, but only survive, with decreasing population on contaminated surfaces".[118]

87. Australia agrees with Dr Deckers and Dr Paulin that, under normal conditions, surface multiplication does not generally occur as *E. amylovora* is a poor epiphyte. However, the IRA Team did not limit its analysis to bacterial behaviour on apple surfaces under normal conditions. The IRA Team was focussed on the potential for *discarded apple waste*, primarily from orchard pack houses and consumers, to provide a source of inoculum.[119] Although the IRA Team noted that many factors mitigate against bacterial survival in the orchard,[120] they observed that:

> Waste material should either have an adequate inoculum dose in a viable state or bacteria must multiply to a concentration that could initiate an infection. When cores are discarded into the environment, nutrients released from damaged cells in apple cores could encourage viable bacteria in the calyx to multiply.[121]

88. Dr Paulin's response to Question 21 appears to specifically support this view:

> [I]t has been proven that low bacterial populations (Hale et al. 1990) sometimes as VBNC (Ordax et al, 2008) may be present for some times in the calyx of fruits. If these fruits were discarded in the open and exposed to the elements, the decaying fruit could constitute a suitable medium for a multiplication of these low bacterial populations. They could multiply, or

[115] See in particular: reply of Dr Paulin, qs. 38 & 43; reply of Dr Deckers, qs. 37, 43; Reply of Dr Sgrillo, q. 43.

[116] Reply of Dr Deckers, q. 19. See also: Reply of Dr Deckers, q. 40.

[117] Reply of Dr Deckers, q. 7. See also: Reply of Dr Deckers, q. 27 where he describes the chance that *E. amylovora* on apples will initiate an infection on another host plant to be "very low".

[118] See also: Reply of Dr Paulin, q. 40.

[119] See: Final IRA Report, Part B, p. 80-85 (description of the "proximity" analysis); Australia's first written submission, para. 453.

[120] Final IRA Report, Part B, pp. 86-87.

[121] Final IRA Report, Part B, p. 86.

> resuscitate from the VBNC status, and therefore constitute a potential inoculum for near-by host plants.[122]

89. Dr Deckers also notes that "packinghouses … should not leave waste uncovered and exposed because this fruit waste *can form a risk of contamination*".[123]

90. Although Dr Paulin's response to Question 21 also notes that bacterial competition on rotting fruit is likely to reduce populations of *E. amylovora*, Australia notes that there is no support for total disappearance in all cases. In any event, the Final IRA Report explicitly qualified that bacteria can multiply in rotting or damaged fruit "provided there is no competition from other micro-organisms and nutrient, temperature, humidity, as well as moisture levels are optimal".[124]

91. Accordingly, although both Dr Deckers and Dr Paulin appear to express conflicting views about the availability of *E. amylovora*, in general, Australia considers that these should be read in light of the specific support provided in their responses to Question 21. In Australia's view, the Panel should give most weight to Dr Paulin's response in Question 21 as it comments on the precise waste scenario contemplated in the Final IRA Report. As Dr Paulin confirms the likelihood that "decaying fruit could constitute a suitable medium for a [bacterial] multiplication", the Panel should treat it as direct support of Australia's claim that the IRA Team's analysis of inoculum dose is sound.

Questions 18, 19, 35 and 43: Transmission

92. The experts variously describe the likelihood of insect-vectored transmission[125] as "unlikely",[126] "rather exceptional",[127] "rather small",[128] "difficult to prove"[129] and "questionable" but, significantly, not zero and "never completely impossible".[130] Indeed, both Dr Deckers[131]

[122] Reply of Dr Paulin, q. 21 (emphasis added). The reply of Dr Paulin, q. 26 also notes the risks associated with decaying fruit in the context of contamination.

[123] Reply of Dr Deckers, q. 21.

[124] Final IRA Report, Part B, p. 92; Australia's first written submission, para. 463.

[125] Australia has not addressed mechanical transmission as New Zealand has not advanced substantive arguments on this issue. (See: Australia's first written submission, paras. 473 & 476.)

[126] Reply of Dr Paulin, q. 19.

[127] Reply of Dr Deckers, q. 19.

[128] Reply of Dr Deckers, q. 35.

[129] Reply of Dr Deckers, q. 37.

[130] Reply of Dr Paulin, q. 35. (original emphasis)

and Dr Paulin acknowledge that pollinating insects have been implicated in the spread of fire blight and accordingly, there is some likelihood that they will constitute a potential vector for transmitting *E. amylovora*.

93. In his response to Question 35, Dr Paulin states:

> The fact that *E. amylovora* can be transmitted to a susceptible host via insects feeding on discarded apples is conceivable through an apparently logical succession of events, each of them being questionable, but never completely impossible.
>
> Many insects are supposed to be able to transmit the bacteria from a source (ooze) to an host plant. …
>
> As far as insects are concerned, I am in the opinion that any insect that is able to travel from a source of inoculum (drop of ooze) to an infection site can be considered as a potential vector. It could be considered more dangerous if it is a pollinating insect, because it goes to the right place, more receptive, on the plant, or if it is a browser of fresh watery tissues. The list of insects involved in *E. amylovora* transport is neither complete nor limitative. It is an assessment of what has been seen, or thought to be vectors of the bacteria. To my knowledge, there is no specificity between any given insect and *E .amylovora*.[132]

94. In Australia's view, Dr Paulin's response is consistent with the IRA Team's reasoning that "the most likely mechanism of transfer of bacteria from discarded apples to a receptive site in a susceptible host is by browsing insects",[133] particularly bees. This tends to confirm Australia's claim that the IRA Team's judgment in relation to insect-vectored transmission falls within the spectrum of credible views, given available evidence.[134]

95. Australia recalls that against the evidence relied upon by the IRA Team, New Zealand primarily relies on only two studies, Hale *et al.* (1996)[135] and Taylor *et al.* (2003a),[136] as purported "proof" that transmission does not occur.[137] Dr Deckers and Dr Paulin unanimously express views which support Australia's submission that there are significant limits to what can

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[131] Reply of Dr Deckers, q. 35.

[132] Reply of Dr Paulin, q. 35 (original emphasis; emphasis added). See also: reply of Dr Paulin, qs. 18, 19.

[133] Final IRA Report, Part B, p. 87; Australia's first written submission, para. 474.

[134] Australia's first written submission, paras. 473-474.

[135] **Exhibit NZ-27:** Hale *et al.* (1996).

[136] **Exhibit NZ-28:** Taylor *et al.* (2003a).

[137] Australia notes that United States in its third party submission also relies on these studies in support of its view that transmission does not occur: United States' third party submission, para. 32.

be concluded from these experiments as their sample sizes are too small to detect rare events.[138] Dr Paulin's response to Question 43 states:

> Combining the sampling dates, the size of the number of fruits analysed reaches 683 fruits in Hale et al (1996). This size is probably not enough to detect a very rare event…. The size sample is similar (600) in Taylor et al (2002). It is again probably not enough to demonstrate the occurrence of a very rare event.[139]

96. Dr Deckers' response to Question 43 goes further and cautions against reliance on these studies for risks associated with higher populations of apples. This demonstrates strong support for Australia's submission as to the inappropriateness of these studies for assessing the risk associated with commercial volumes of apples.[140] Dr Deckers states:

> Extrapolation of these data to the spread of the disease under different natural conditions on a larger scale under orchard conditions should be considered with prudence. [141]

97. In sum, Australia considers that Dr Deckers' and Dr Paulin's responses to Questions 18, 19 and 35 are consistent with the IRA Team's conclusion that insect-vectored transmission, though rare, can occur. Further, their responses to Question 43 unanimously confirm the correctness of Australia's criticisms of Hale *et al.* (1996) and Taylor *et al.* (2003a). Accordingly, Australia considers that the balance of expert opinion strongly suggests that New Zealand has not discharged its burden of proof in relation to this issue.

Questions 18, 19, 27, 28, 36, 38 and 40: Epidemiologically significant populations

98. Australia recalls that the IRA Team reviewed available scientific evidence on inoculum doses, some of which were conducted under laboratory conditions,[142] and others which were conducted under orchard conditions.[143] The IRA Team noted a wide divergence in experimental results and therefore concluded that "there is no accepted threshold number of bacteria required to initiate an infection, and this may vary with environmental and host factors".[144] Accordingly,

[138] Australia's first written submission, para. 475.

[139] Reply of Dr Paulin, q. 43. (original emphasis; emphasis added)

[140] Australia's first written submission, para. 475.

[141] Reply of Dr Deckers, q. 43. (emphasis added)

[142] **Exhibit AUS-39:** Hildebrand (1937).

[143] **Exhibit AUS-28:** van der Zwet *et al.* (1994); **Exhibit NZ-27:** Hale *et al.* (1996); **Exhibit NZ-23:** Taylor *et al.* (2003b). See: Final IRA Report, Part B, pp. 88 & 92; Australia's first written submission para. 459; Australia's responses to the Panel's questions after the first meeting, q. 63.

[144] Final IRA Report, Part B, p. 88; Australia's first written submission, paras. 361-362 & 458-462.

the IRA Team took the view that even low numbers of *E. amylovora* can cause infection under the correct conditions.

99. The experts express diverging views in relation to the number of *E. amylovora* required to initiate infection on a susceptible host.

100. Dr Deckers does not nominate a specific population size that he considers could initiate infection. However, Dr Deckers considers bacterial multiplication to be necessary before infection is likely to occur.[145] Accordingly, Dr Deckers' responses seem to indicate that he considers that higher bacterial populations are epidemiologically significant.

101. Dr Sgrillo's response to Question 28 appears to support the view that a minimum population of *E. amylovora* is required to initiate infection by noting the possibility of a "threshold for the inoculum concentration, below which no infection will occur[]". Although Dr Sgrillo does not specifically identify what that threshold is, Dr Sgrillo's response notes that the epidemiological significance of bacterial populations will increase proportional to population size, and accordingly, "the decrease of…inoculum may be enough to break the pathogen cycle, having the same effect as the total elimination of the inoculum". Accordingly, it appears to Australia that Dr Sgrillo is of the view that higher bacterial numbers are required to initiate infection. However, as Australia noted above,[146] Dr Sgrillo's response to Question 28 appears to be partially based on a scientific opinion about the biology of *E. amylovora*. As Dr Sgrillo was appointed to assist the Panel's understanding of risk assessment methodology, not fire blight, the Panel should rely on Dr Sgrillo's advice only to the extent that it remains within the field of expertise for which he was appointed.

102. In contrast, Dr Paulin expresses firm support for the view that low numbers of bacteria can provoke infection, albeit under optimal conditions:

> The number of 38 cells needed to initiate an infection on apple shoot, as obtained by Crosse et al., 1972, seems a soundly established basis for the minimal number of cells able to initiate an infection, when introduced artificially at the proper site of the suitable plant, in optimal conditions for the disease. [147]

[145] Reply of Dr Deckers, qs. 27 & 38.

[146] See above: Australia's comments in relation to expert responses relating to importation step 4.

[147] Reply of Dr Paulin, q. 27 (emphasis added).

103. Dr Paulin later confirms this view in his response to Question 38:

> Crosse and Goodman's paper (1972) seems to establish clearly that less than 50 cells in experimental condition have the potential to infect a plant.[148]

104. In Australia's view, it is important to note that the IRA Team's view that low bacterial populations can initiate infection implicitly acknowledges that under the correct conditions, low populations of *E. amylovora* transferred to a suitable site on a host plant, can multiply to initiate infection. This is the normal mode of infection of most bacterial pathogens. Accordingly, Australia agrees with Dr Deckers[149] and Dr Paulin[150] that bacterial multiplication is necessary before infection can occur.

105. Australia notes that Dr Deckers and Dr Paulin consider the likelihood that insect-vectored *E. amylovora* will initiate an infection to be very small. Dr Deckers notes that "the chance for such a successful transfer and multiplication of bacteria will be *rather exceptional*."[151] Dr Paulin expresses a similar view noting that "the likelihood of successful multiplication on the hypanthium and infection would be *extremely low*".[152] However, in Australia's view, it is significant that neither Dr Deckers nor Dr Paulin denies the possibility of infection. Indeed, Dr Paulin's response to Question 40 shows that he considers rapid bacterial multiplication in a susceptible host to be possible under orchard conditions. He notes:

> The rapid multiplication of *E. amylovora* in natural orchard environment can be observed only after infection (or artificial inoculation) of a susceptible host plant. The values indicated in the literature are strictly linked to the conditions in which they are obtained (no nutrient limitation, no water limitation, optimal and constant temperature..). They are obtained from credible scientific sources, but need to be considered as the maximum potential for the bacterial multiplication, in absence of any limiting factor.[153]

106. Australia recalls that Question 40 sought expert comment on "the conclusion in Australia's IRA regarding multiplication in natural orchard environments". Accordingly, Australia considers that Dr Paulin's response to this question should be treated as support for Australia's claim that Final IRA Report's reasoning on this point is objective and coherent.

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[148] Reply of Dr Paulin, q. 38 (emphasis added).

[149] Reply of Dr Deckers, qs. 27 & 38.

[150] Reply of Dr Paulin, qs. 19, 27, 38 & 40.

[151] Reply of Dr Deckers, q. 19 (emphasis added).

[152] Reply of Dr Paulin, q. 19 (emphasis added).

[153] Reply of Dr Paulin, q. 40. (original emphasis; emphasis added)

107. Dr Paulin's response to Question 38 further confirms the objectivity and coherence of the IRA Team's reasoning by noting that the "infectivity of one or very few cells[] is *based on scientific evidence*".[154] Australia acknowledges that Dr Paulin qualifies this statement by noting that infection occurs under "condition[s] very different from natural conditions."[155] Indeed, Dr Paulin notes that many of the experiments which tend to support low epidemiologically significant populations are conducted under artificial conditions[156] which are designed to optimise bacterial multiplication and infection.[157]

108. The IRA Team's judgment is consistent with this view. Australia recalls that the Final IRA Report notes that many of the experiments which the IRA Team relied upon were conducted under "highly artificial" conditions. Consequently, in Australia's view, Dr Paulin's responses tend to support the coherence of the IRA Team's reasoning in relation to epidemiologically significant populations, based on the evidence. Australia also notes in this regard that Dr Sgrillo considers the exposure analysis to be "logical".[158]

109. Accordingly, in Australia's view, the key issue that the Panel must determine is what weight it should give to the evidence relied upon by the IRA Team. Australia notes in this regard that not all the evidence relied upon by the IRA Team was conducted under artificial conditions. The experiment relied upon by the IRA Team in van der Zwet *et al.* (1994) was carried out in an orchard under normal field conditions and established that as few as five bacteria could initiate infection in certain seasons.

110. In saying this, Australia does not accept that the scientific evidence under laboratory conditions should be automatically discounted. Laboratory experimentation under standardised conditions is a valuable method to build a detailed understanding of what might be possible under field conditions in many areas of biological science. It cannot be excluded purely on the basis that it was not verified under field conditions. Australia recalls that the Appellate Body has confirmed WTO Members' right to rely upon scientific evidence, provided that it comes from qualified and respected sources.[159] A review of the expert responses as a whole discloses no

[154] Reply of Dr Paulin, q. 38 (emphasis added).
[155] Reply of Dr Paulin, q. 38.
[156] Reply of Dr Paulin, qs. 27, 38 & 40.
[157] Reply of Dr Paulin, qs. 27, 38 & 40.
[158] Reply of Dr Sgrillo, q. 36.
[159] See: Appellate Body Report, *US/Canada – Continued Suspension*, paras. 591-592.

suggestion that any of the scientific sources relied upon by the IRA Team were not from qualified and respected sources. Accordingly, they should be assessed for probative value in the same way as evidence derived from orchard experiments.

111. In considering whether the IRA Team's reliance upon studies conducted under artificial or laboratory conditions was objectively justifiable, the Panel should bear in mind that the task of weighing and balancing the value of scientific evidence is not an abstract exercise. Although, as Dr Paulin correctly notes, "experimental manipulation of very low level of bacterial populations (say less than 100 cfu/ml) is extremely difficult to perform",[160] this must be balanced against the fact that *all* evidence relating to elements of the exposure analysis are "difficult to prove"[161], including the evidence under orchard conditions relied upon by New Zealand (and consequently, the only evidence which is genuinely in dispute). Australia discussed this point above in relation to transmission and considers that those comments are equally applicable here. Thus, when laboratory studies are compared with data derived from experiments under orchard conditions, it simply becomes a case of balancing one type of uncertainty against another. While experiments conducted under laboratory conditions do tend to optimise results, experiments conducted under orchard conditions tend to have the opposite effect.

112. In short, Australia considers that the experts' responses show that experiments conducted under orchard conditions are no more reliable than other evidence, and indeed are likely to be less so for the purposes of assessing risk associated with large populations (such as those associated with the expected volume of trade in New Zealand apples to Australia). Accordingly, the experts' responses to the Panel's questions on epidemiologically significant populations illustrate a state of scientific uncertainty rather than evidence of serious flaws in the Final IRA Report.

Question 36: Overall probability of exposure

113. The experts were of the view that the overall exposure value in the Final IRA Report was not supported by scientific evidence.[162] Further, in places, Dr Deckers and Dr Paulin suggest that elements of the exposure analysis appear to be without scientific support.[163] However, in

[160] Reply of Dr Paulin, q. 38.
[161] Reply of Dr Deckers, q. 37.
[162] Reply of Dr Deckers, q. 36; Reply of Dr Paulin, q. 36; Reply of Dr Sgrillo, q. 36.
[163] Reply of Dr Deckers, q. 36; Reply of Dr Paulin, qs. 19 & 36.

Australia's view, this conclusion appears at odds with the support provided by the experts for individual steps in the IRA Team's exposure analysis. Accordingly, Australia asks the Panel to carefully consider what weight may be attributed to the experts' general conclusions about the scientific basis of elements of the "exposure" step in light of their positive support for the IRA Team's reasoning at individual steps in the exposure analysis.

114. In Australia's view, the significant point is that the experts' responses on this issue also demonstrate the high degree of difficulty associated with providing a quantitative estimate of the probability of bacterial transfer and consequent initiation of infection in a suitable host. In the absence of any direct or conclusive evidence on this point, the experts confirm that *all* conclusions about the potential for transfer and infection will necessarily be a matter of expert judgment.[164] Consequently, there will be no single "correct" scientific opinion on these issues.

115. In the present case, the IRA Team had to exercise expert judgment to determine the likelihood of "exposure", taking account of Australia's particular circumstances, with little available evidence. The IRA Team arrived at a similar view as the experts that the available scientific evidence suggests that the chance of bacterial transfer and successful initiation of infection is very unlikely. Accordingly, the IRA Team assigned the probability range of $(0, 10^{-6})$ to the "exposure" step.

116. The question that the Panel must consider is whether, taking account of the uncertain nature of the available evidence, any other value was so obviously available on the evidence that it tends to suggest a serious flaw in the IRA Team's decision to represent the "exposure" step with this range. In Australia's view, the high degree of uncertainty surrounding the evidence on this step cannot support such an inference. Accordingly, Australia considers that the opinions expressed by the experts support the IRA Team's probability range of $(0, 10^{-6})$.

117. Australia acknowledges that the potential indeterminacy surrounding this step may not produce the most precise estimate of probability. However, the *SPS Agreement* does not require risk assessments to be free of uncertainties[165] nor to establish risk, or elements of risk, with

[164] Since it is difficult to experiment on these matters. See: Reply of Dr Deckers, q. 37; Reply of Dr Paulin, q. 37.

[165] Panel Report, *EC – Biotech Products*, para. 7.1525.

unequivocal certainty to satisfy the requirements of Article 5.1.[166] Australia refers the Panel to its comments on Dr Sgrillo's response to Question 124 and recalls a useful point made in Firko and Podleckis (2000):

> Ideally, existing data would provide the basis for direct estimation of model inputs. However, scientific experiments are seldom conducted specifically to provide these estimates for risk assessments, and results are seldom provided that can be used directly in our models.[167]

118. Thus, where a panel is confronted with uncertainty in a risk assessment, it should ask itself whether that element of uncertainty ultimately compromises the overall conclusion of the risk assessment so seriously that it should not have reasonable confidence in the evaluation made. In this regard, Australia recalls that Dr Deckers and Dr Paulin have both expressed views which support the application of Australia's risk management measures. Accordingly, the Panel should weigh any uncertainties in the IRA Team's "exposure" analysis in light of this positive support. In Australia's view, when uncertainties are weighed against the clear support for the view that risk management measures are warranted, it tends to suggest that any alleged flaws in the Final IRA Report's reasoning are not so serious as to compromise the overall validity of the final conclusions.

(c) Comments on specific questions

Question 8: area freedom and low pest prevalence

119. The experts' comments accord with Australia's advice that its measures for fire blight are based on the concept of low pest prevalence in New Zealand orchards, rather than requiring *freedom* from the causal agent, *E. amylovora*, in exporting orchards.[168]

120. Dr Deckers commented that:

> Freedom of the visible symptoms of the disease does not mean that the disease is not present on the fruit or that there is a pest free place of production. It only describes the situation of fire blight in the orchard and indicates that there

[166] See: Australia's first written submission, para. 233; Panel Report, *EC – Biotech Products*, para. 7.3420. As this is fundamentally a legal point, Australia will elaborate this issue further in its second written submission.

[167] Reply of Dr Sgrillo, q. 124; **Exhibit AUS-123**: Firko and Podleckis (2000), p. 87.

[168] See: Australia's first written submission, paras. 156-160; Australia's responses to the Panel's questions after the first meeting, qs. 35 & 36.

> is a reduced risk for the presence of fire blight bacteria on the fruits because there are no active fire blight infections in the considered orchards.[169]

121. Similarly, Dr Paulin expressed the view that "the IRA provides a certain level of tolerance" for fire blight in terms of the measures recommended.[170] Dr Paulin also recognised that the concept of "low pest prevalence" (ISPM No. 22) is different to the notion of area freedom (ISPM No. 4).[171]

Question 14: Restricting imports to apples that have been cold stored; or limiting imports to apples that are "retail ready packaged fruit"

122. Australia recalls its objection to the Panel posing this question to the experts[172], on the basis that New Zealand has not pursued a claim that either of the purported "alternative" measures referred to in the question are alternative measures for fire blight within the meaning of Article 5.6.[173]

123. In any event, Australia notes that both Dr Deckers[174] and Dr Paulin[175] support the IRA Team's conclusion[176] that the "alternative" measures referred to in the question would not achieve Australia's ALOP.

Question 15: Restricting imports to mature, symptomless apples

124. Both Dr Deckers and Dr Paulin[177] note that limiting apple imports to "mature symptomless apples" will not achieve Australia's ALOP.[178]

125. Dr Deckers stated that:

> The limitation of apple exports to mature symptomless apples is not enough to achieve Australia's ALOP. … Fruits from heavy infected orchards or from

[169] Reply of Dr Deckers, q. 8.

[170] Reply of Dr Paulin, q. 8, p. 5.

[171] Reply of Dr Paulin, q. 8, p. 6.

[172] Australia's letter to the Panel, 19 December 2008: Attachment, draft question 15.

[173] In relation to Australia's measures for fire blight, New Zealand explicitly limited its claim under Article 5.6 to the "alternative" measure of restricting imports to mature, symptomless apples. See: New Zealand's first written submission, para. 4.490.

[174] Reply of Dr Deckers, q. 15.

[175] Reply of Dr Paulin, q. 15.

[176] See: Final IRA Report, Part B, pp. 109-110, 115.

[177] Reply of Dr Paulin, q. 15.

[178] Reply of Dr Deckers, q. 15.

> orchards with hail damage can harbour the bacteria in the calyx end of the fruits.[179]

126. Similarly, Dr Paulin commented that:

> The restriction of export to mature symptomless apples would make even safer the different measures taken by Australia (disinfection, storage…), but could not replace any of them.[180]

Question 46: Repackaging of fruit

127. Australia has submitted previously that whether or not New Zealand apples are repacked at orchard packing houses would make very little difference to the risks associated with fire blight, reflecting the fact that the major risk for these pests is associated with the end consumer and not the distribution pathway.[181] Dr Sgrillo agreed, stating that "there are no implications whether the imported apples will be repacked or not".[182] Similarly, Dr Paulin considered that "[t]his question seems to me of *minor importance* for fire blight risks."[183]

128. Dr Deckers notes in contrast that "[t]his assessment is not convincing and seems not to be based on objective criteria",[184] in relation to fire blight. Australia notes, however, that Dr Deckers has not provided reasons for his views.

C. QUESTIONS SPECIFIC TO EUROPEAN CANKER

(a) Introduction

129. Australia notes that four of the seven experts appointed in this dispute (Prof Swinburne, Prof Latorre, Dr Deckers and Dr Sgrillo) have replied to some or all of the European canker questions. Australia recalls that, of these experts, only Prof Swinburne and Prof Latorre were put forward as having expertise in the area of European canker during the expert selection process. In addition, Australia recalls that Dr Deckers and Dr Sgrillo were only put forward as

[179] Reply of Dr Deckers, q. 15 (emphasis added).

[180] Reply of Dr Paulin, q. 15 (emphasis added).

[181] See: Australia's responses to the Panel's questions after the first meeting, q. 99; Final IRA Report, Part B, pp. 25-26, 97.

[182] Reply of Dr Sgrillo, q. 46.

[183] Reply of Dr Paulin, q. 46. (original emphasis)

[184] Reply of Dr Deckers, q. 46.

having expertise in the areas of fire blight and pest risk assessment, respectively. At no stage during the expert selection process were the Parties afforded an opportunity to comment on whether Dr Deckers or Dr Sgrillo had expertise in the area of European canker. Accordingly, Australia submits that the Panel should rely on the advice of Dr Deckers and Dr Sgrillo only to the extent that it remains within the field of expertise for which they were appointed.

(b) General comments

130. Australia notes that, according to Prof Latorre, the challenged measures for European canker are "based on the biology of *N. galligena* and on current knowledge of the epidemiology of European canker".[185] Prof Latorre accepts the IRA Team's view that "there is a risk of the entrance of *N. galligena* [into Australia] associated with asymptomatic (=symptomless) fruits carrying latent infection [imported from New Zealand]" as such fruits "cannot be differentiated from healthy fruits at harvest".[186] In doing so, he acknowledges that this view is based on previous reports from France and the United Kingdom (Bondoux and Bulit, 1959; Swinburne, 1975; McDonnell, 1970).[187] Moreover, Prof Latorre states that: "[t]he IRA conducted by Australia was performed in accordance with today's concepts and knowledge of plant diseases."[188] Prof Latorre goes on to conclude that the IRA Team's requirement that apples be sourced from export orchards/blocks free of European canker (pest free places of production) is a "reasonable" risk mitigation measure.[189]

131. Similarly, Prof Swinburne states that the IRA Team's requirement of "receiving only fruit from inspected orchards certified as free from canker would eliminate virtually all risk of fruit being [latently] infected."[190] Again, this statement provides support for the IRA Team's view that there is a risk of the introduction of European canker associated with shipments of New Zealand apples to Australia.

[185] Reply of Prof Latorre, Guideline (g). See also Reply of Prof Latorre, q. 50.
[186] Reply of Prof Latorre, Guideline (g) and q. 65.
[187] Reply of Prof Latorre, Guideline (g). See also Reply of Prof Latorre, q. 55.
[188] Reply of Prof Latorre, Guideline (g).
[189] Reply of Prof Latorre, Guideline (g).
[190] Reply of Prof Swinburne, qs. 62/63. (emphasis added)

132. Australia notes that neither of the experts rule out the IRA Team's view that the movement of mature apple fruit may be a pathway for the long distance spread of European canker. In this regard, Prof Swinburne states that:

> There is no data that confirms or refutes that rotted fruit forms a pathway for the long distance transport of infection with *N. galligena*, (see Q54). Virtually all research publications emanate from countries in which the disease is essentially endemic (CAB, 2001), so it is not surprising that the focus has been on more obvious routes, such as orchard to orchard, and hedge-row to orchard.[191]

Prof Latorre states that:

> There is no scientific evidence demonstrating that long-distance spread of European canker is due to the movement of fruits. Eventually, conidia and ascospores can develop in rotted fruits and contribute to local spread (tree-to-tree movement). Therefore, long-distance spread along with mature apple fruits should be regarded as a hypothesis rather than a true fact.[192]

133. As a result, Australia submits that the responses of Prof Latorre and Prof Swinburne do not support a view that there are any serious flaws in the IRA Team's risk assessment for European canker. Many of the differences of opinion between the experts and the IRA Team appear to be grounded in the methodological approach of the IRA Team. Another key difference relates to the existence of climatic conditions conducive to European canker.

(c) The IRA Team's methodology

134. Some of the experts' responses on European canker suggest to Australia that they may not have fully understood the methodology and model underlying the IRA Team's analysis.[193] In order to properly understand the IRA Team's risk assessment for European canker,[194] it is important to read it together with the methodology section of the Final IRA Report.[195] In this regard, Australia notes in particular that the annual probability of entry, establishment and spread of European canker was calculated using the @RISK model.[196] Accordingly, in these comments Australia has sought to assist the experts' understanding of the IRA Team's use of the

[191] Reply of Prof Swinburne, q. 64.

[192] Reply of Prof Latorre, q. 64.

[193] Australia recalls that it has already addressed specific concerns raised by the experts in respect of the methodology used by the IRA Team, above.

[194] Final IRA Report, Part B, pp. 117-155.

[195] Final IRA Report, Part B, pp. 11-45.

[196] Final IRA Report, Part B, pp. 145 & 150.

methodology and the model, and would be pleased to provide further clarification, as required, at the experts' upcoming meeting with the Panel and the parties.

135. To highlight this issue, Australia notes the following comment of Prof Latorre:

> [The] overall probability of entrance, establishment and spread of *N. galligena* was 7.0 x 10^{-2}, which was rated as low (Table 37, AUS-2 BA p. 150). Indeed, this is a very high, rather than low, probability for any biological event associated with *N. galligena*. If this likelihood value is true, and assuming that market penetration in Australia is equal to 50,000,000 apples annually (AUS-2 BA, p. 19), *N. galligena* should be present in 3,500,000 apples (7%) annually, which is non-credible. Therefore, the overall probability (7.0 x 10^{-2}) should be validated before acceptance. Data validating the probability values given in Table 12 were not presented.[197]

136. Australia considers that Prof Latorre may have misunderstood the IRA Team's conclusion of the probability of importation for European canker. Specifically, he has used the probability of *entry, establishment and spread* instead of the probability of *importation* (which is one component of the former). The IRA Team estimated that the probability of importation, the proportion of infected/infested apples, to be "0.0068% (mean) of the total proposed number of apples imported from New Zealand annually".[198] Hence, if 50 million apples were imported, the IRA Team's analysis suggests that around 3,400 infected/infested apples would be imported, rather than the 3.5 million apples suggested by Prof Latorre.

137. By way of further illustration, Australia notes Prof Swinburne's statement that:

> Unless the meaning of these values has been misunderstood, and based on the import of 2X10E8 apples of which 0.0068% is infected, the worst case scenario is that c14 infection events/year are anticipated, or at the lower probability, it would take nearly 100 years to get one such event.[199]

138. In relation to this conclusion, Australia is unclear as to the basis for Prof Swinburne's calculations. In particular, the figure of 14 infection events per year is a significant overestimate. The IRA Team's analysis of the *unrestricted* probability of entry, establishment and spread suggests that the median time to an "infection event" would be around 14 years.[200]

(d) Climate

[197] Reply of Prof Latorre, guideline (g). (emphasis added)

[198] Final IRA Report, Part B, p. 128. (emphasis added)

[199] Reply of Prof Swinburne, qs. 84/85. (emphasis added)

[200] Final IRA Report, Part B, p. 145, Table 35.

139. A recurrent focus of the experts' replies relates to climatic conditions conducive to European canker. Prof Latorre and Prof Swinburne have offered expert opinions on the climatic conditions conducive to the development of the disease generally. However, as far as Australia is aware, neither expert has a detailed appreciation of the climatic conditions present in either New Zealand or Australia upon which to base an opinion on this issue. In fact, Prof Swinburne acknowledges that "[t]he dispute between the parties regarding the suitability of the climate in the fruit growing regions of Australia for the establishment and spread of European canker in apple is difficult to resolve on the basis of the data available."[201]

140. Given the pervasive nature of the climate issue in the experts' relies,[202] Australia has commissioned Australia's Bureau of Rural Sciences (BRS)[203] to undertake a further detailed analysis of the climatic conditions conducive to European canker, which is not yet complete, but will be included as an annex to its rebuttal submission. In the meantime, Australia draws the experts' attention to the climate analysis of BRS set out in Annex 2 of Australia's first written submission.

(e) Probability of entry

Questions 49, 50, 54, 55, 57, 65 and 76: latent infection as the primary risk scenario

i. General comments

141. The Final IRA Report makes it clear that "[t]he 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."[204] While the IRA Team also considered surface infestation of mature apple fruit, this was clearly only of minor significance to their analysis.[205]

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[201] Reply of Prof Swinburne, q. 58. (emphasis added)

[202] See Reply of Prof Swinburne, qs. 49, 54/55, 56, 57, 58, 60, 62/63, 66, 67, 72, 74, 75 & 90; Reply of Prof Latorre, Guideline (g) and qs. 49, 51, 53, 54, 55, 56, 57, 58, 60, 66, 67, 72, 74, 75, 76, 84 & 86.

[203] The Bureau of Rural Sciences (BRS) is the scientific bureau within the Australian Department of Agriculture, Fisheries and Forestry that provides advice to the Australian Government.

[204] Final IRA Report, Part B, p. 118. (emphasis added)

[205] The risk scenario section of the European canker chapter of the Final IRA Report only includes a single sentence on infestation which simply states that "[a]ny infestation on the surface of the fruit that later gains entry into the fruit and causes infection may also be of concern": Final IRA Report, Part B, p. 118. (emphasis added)

142. Australia notes that Prof Swinburne acknowledges that the "central contention of the IRA is that fruit at the time of harvest can be infected but show no symptoms of rotting."[206] Similarly, Prof Latorre acknowledges that "the [Final] IRA Report was based mainly on the possibility that mature apples carry latent infections, which cannot be detected at harvesting or during processing in the packing house."[207]

143. Prof Swinburne usefully outlines why "it is possible for infected fruit of all varieties to be harvested with no visible symptoms."[208] He also notes that for most apple varieties in current commercial production (including dessert varieties) rots occur after harvest.[209] While Prof Latorre seems to have a different view on the relevance of varietal differences, he too considers that "latent infection of mature fruit should not be under discussion",[210] stating that:

> … it is feasible that *N. galligena* can develop as a latent infection at harvest and hence, apparently healthy (asymptomatic) mature apples eventually could carry *N. galligena* internally. Infected but asymptomatic fruits would be impossible to differentiate from healthy fruits at harvest or during post-harvest processing.[211]

144. Australia notes Prof Latorre's suggestion that the overseas research on latent infection involved "apple varieties quite different from those produced today in New Zealand".[212] In this regard, Australia advises that the potential impact of varietal differences on latent fruit infection was taken into account by the IRA Team during the course of its analysis.[213]

145. Finally, Australia emphasises that both Prof Swinburne and Prof Latorre accept, on the basis of the available scientific evidence, that *N. galligena* may occasionally cause latent fruit

[206] Reply of Prof Swinburne, q. 49. (emphasis added) Australia understands that Prof Swinburne considers that such fruit infections are most appropriately described as "quiescent infection" rather than "latent infection". However, for the sake of consistency with the Panel's questions to experts Australia will continue to use the term "latent infection" throughout these comments.

[207] Reply of Prof Latorre, q. 49. (emphasis added) See also Reply of Prof Latorre, qs. 54 & 63.

[208] Reply of Prof Swinburne, q. 49. (emphasis added) See also: Reply of Prof Swinburne, qs. 54/55, 62/63 & 77/78/79.

[209] Reply of Prof Swinburne, q. 49.

[210] Reply of Prof Latorre, q. 55.

[211] Reply of Prof Latorre, q. 50. (emphasis added)

[212] Reply of Prof Latorre, q. 55.

[213] Final IRA Report, Part B, pp. 117, 118, 122, 123 & 126.

infection in New Zealand.[214] This is in line with the IRA Team's conclusion on latent infection.[215]

ii. Timeframe for development of symptoms

146. In Australia's view, Prof Swinburne's and Prof Latorre's replies confirm that there is scientific uncertainty surrounding the timeframe for latently infected mature apple fruit to develop visible symptoms of European canker. They suggest that development of rot depends on a number of variables including the apple variety, the time of infection, the conditions within the store and the period of storage.[216] This position is in line with the IRA Team's view on this issue:

> In cooking varieties and immature fruit, fruit infections can remain latent and express themselves after 3–7 months of storage (Swinburne, 1975; Snowdon, 1990a) especially if contamination occurs towards the end of the season (Bondoux and Bulit, 1959).[217]

iii. Braithwaite (1996)

147. One of the pieces of scientific evidence taken into account by the IRA Team in arriving at a conclusion on latent fruit infection of New Zealand apple fruit is Braithwaite (1996).[218] According to Braithwaite (1996), European canker "[f]ruit rot occurrences have also been reported (NZPPC records) and 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."[219] It is clear from this statement that the fruit rot originated from latent infections (*post-harvest*). If rot was detected prior to storage (*pre-harvest*), such fruit would have exhibited symptoms and been excluded before they were stored.

148. Both experts appear to accept that the views expressed in Braithwaite (1996) on the transmission of European canker via latently infected New Zealand apple fruit are based on relevant overseas studies of the disease's development in Europe. However, at the same time, they appear to be concerned that in arriving at this position Braithwaite (1996) may not have

[214] Reply of Prof Swinburne, qs. 57 & 67/68; Reply of Prof Latorre, qs. 57, 63 & 65.
[215] Final IRA Report, Part B, p. 123.
[216] Reply of Prof Swinburne, qs. 50, 77/78/79 & 78/80/81/82/83; Reply of Prof Latorre, q. 50.
[217] Final IRA Report, Part B, p. 122. See also: Final IRA Report, Part B, pp. 125, 126, 128 & 135.
[218] Final IRA Report, Part B, p. 122 & 123. See **Exhibit NZ-34:** Braithwaite (1996).
[219] **Exhibit NZ-34:** Braithwaite (1996), p. 5. (emphasis added)

considered differences in the climatic conditions in New Zealand and Australia.[220] In any event, Australia does not accept the suggestion that Braithwaite (1996) is "not a reliable and relevant reference"[221] and that it should have been "disregarded"[222] by the IRA Team.

149. Australia understands that Dr Braithwaite, as well as the other individuals substantively involved in preparing the report,[223] are all respected and qualified scientists in New Zealand. In addition, the report contains a lengthy reference list which cites a wide range of scientific papers from qualified and respected sources around the world, including both Prof Swinburne and Prof Latorre.[224] The report also draws on fruit rot records from the official New Zealand Plant Protection Centre.[225] Australia has no reason to believe that Dr Braithwaite, who would be very familiar with the climatic conditions in New Zealand, failed to take these into account in exercising his expert judgment.

150. Moreover, Braithwaite (1996) is an official New Zealand Ministry of Agriculture and Forestry (NZMAF) report that was provided to Australia's quarantine authorities in 1996 in response to a specific request for additional information during the course of the 1998 IRA process. New Zealand reaffirmed the relevance of this material to the IRA Team during the course of preparing the Final IRA Report. Australia is entitled to rely on such information provided by New Zealand.

Questions 75, 77, 79, 80, 82 and 84: methodology and assignment of probability ranges for the importation steps

151. At the outset, Australia draws attention to Prof Swinburne's acknowledgement that:

> … the importation steps described in the [IRA Team's] model do not fit comfortably with the steps in commercial marketing, as practised in, say, the UK. Consequently it is inappropriate to comment here on the veracity of the conclusions …[226]

[220] Reply of Prof Swinburne, qs. 54/55; Reply of Prof Latorre, q. 54.

[221] Reply of Prof Latorre, q. 54.

[222] Reply of Prof Swinburne, qs. 54/55.

[223] Dr Dance and Dr Hill.

[224] **Exhibit AUS-54:** Ivess (1996), pp. 8 & 9 of attached NZMAF report.

[225] **Exhibit NZ-34:** Braithwaite (1996), p. 5.

[226] Reply of Prof Swinburne, qs. 78/80/81/82/83.

In Australia's view, to fully appreciate the IRA Team's methodology and analysis of the importation scenarios, a detailed understanding of New Zealand commercial apple production is required (eg. picking, transportation, packing house operations, palletisation, quality inspection and containerisation).

152. Australia notes that some of the experts in this dispute have raised the possibility of alternatives or variations to the importation scenarios used for European canker in the Final IRA Report.[227] However, it is important to bear in mind that the IRA Team's model is not pest-specific – rather, it covers a range of pests (i.e. fire blight, European canker, apple scab, ALCM, and garden featherfoot).[228] As a result, the design of the model was by necessity generic to some degree. Further, when considering the IRA Team's assignment of probability ranges for importation steps it is essential to understand that under the model:

> These importation steps represent an approximation of the trade in apples sufficient to estimate the proportion of fruit that will be infected/infested. While more complicated pathways could be considered … this was not done because the IRA team concluded that the added complexity would not lead to significant differences in the assessment.[229]

In any event, Australia recalls that, according to the Appellate Body, it is not the role of the experts in WTO SPS disputes to advise whether they would have done the risk assessment in the same way as the IRA Team.

iv. Importation step 2

153. Importation step 2 deals with the likelihood that picked fruit is infested/infected with *N. galligena*. At the outset, Australia welcomes Prof Swinburne's acknowledgment of 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.[230] In particular, Prof Swinburne states that "[i]t is unfortunate that there is so little data on the causes and extent of rotting of fruit in New Zealand."[231] Regrettably, such data constraints are an everyday reality when undertaking risk assessments as part of a quarantine regulatory system. Moreover, it is worth mentioning that

[227] Reply of Prof Swinburne, qs. 78/80/81/82/83; Reply of Prof Latorre, qs. 77, 79, 81, 83; Reply of Dr Sgrillo, q. 80.

[228] Final IRA Report, Part B, p. 19.

[229] Final IRA Report, Part B, p. 21. (emphasis added)

[230] Final IRA Report, Part B, p. 122.

[231] Reply of Prof Swinburne, q. 49. (emphasis added) Also: Reply of Prof Swinburne, qs. 54/55, 57 & 75.

the IRA Team sought further details from New Zealand on this matter but such information was not forthcoming.[232]

154. In addition, Australia notes Prof Latorre's suggestion that "[s]everal scientific sources were cited [by the IRA Team], but none of them report information regarding the frequency of apple infection and latency in New Zealand or elsewhere."[233] While there may only be limited data available on the frequency of latent infection, it is clear that the IRA Team took into account the available scientific evidence, both in New Zealand and overseas, including: Swinburne (1975); Snowdon (1990a); Bondoux and Bulit (1959); Braithwaite (1996) (which draws on official records from the New Zealand Plant Protection Centre (NZPPC)); Atkinson (1971); Brook and Bailey (1965); and MAFNZ (2005a).[234]

155. On the basis of this evidence, the IRA Team applied its expert judgment to arrive at the following conclusion on Importation step 2:

> After considering the technical information given above and stakeholders' comments, the IRA team decided to represent Imp2 as a uniform distribution, with a minimum value of 10^{-6} and a maximum of 10^{-3}. In reaching this conclusion the IRA team focused on the fact that under New Zealand conditions fruit is only occasionally attacked and this generally results in rotting of the fruit. Rotted fruit would not be picked. There is some likelihood of fruit getting infected late in the season and remaining latent, but this likelihood would be extremely low.[235]

156. Australia notes that Prof Swinburne and Prof Latorre expressed some doubts about the probability range assigned to Importation step 2.[236] However, upon closer examination, it seems that the IRA Team's conclusion on Importation step 2 actually accords with Prof Latorre's view that "the likelihood of latent infection on mature apple fruits [in New Zealand] would be extremely low or negligible".[237] This does not seem to fit with his comment that the probability range assigned by the IRA Team to Importation step 2 "may overestimate the likelihood".[238]

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[232] Final IRA Report, Part B, p. 123.

[233] Reply of Prof Latorre, q. 75. (emphasis added)

[234] Final IRA Report, Part B, pp. 121-123. See, also: Reference list in the Final IRA Report, Part B, pp. 347-376.

[235] Final IRA Report, Part B, p. 123. (emphasis added) See also: Final IRA Report, Part B, p. 43, Table 12.

[236] Reply of Prof Swinburne, qs. 75 & 84/85; Reply of Prof Latorre, q. 75.

[237] Reply of Prof Latorre, q. 57. (emphasis added) See also: Reply of Prof Latorre, q. 76.

[238] Reply of Prof Latorre, q. 75.

157. In relation to Prof Swinburne's concerns about the assigned probability range, Australia notes his statement that:

> The implication of there being one infected fruit per thousand (max), coupled with the fact that 95% of exported fruit comes from orchards with little or no tree cankers (IRAb p121), is that fruit from infected orchards has in the order of 2% apples that will rot with *N. galligena* each year.[239]

158. From this calculation, it appears that Prof Swinburne may not have appreciated that Importation step 2 only refers to the proportion of infested/infected apples within an infested/infected orchard.[240] One infected fruit per thousand (0.1%) is the upper limit for the proportion of fruit from infected/infested orchards, rather than the 2% suggested by Prof Swinburne.

v. Importation step 4

159. In relation to Importation step 4 (the likelihood that *N. galligena* survives routine processing procedures in the packing house), the Final IRA Report concluded that "latent infections are unlikely to be visible and none of the processes in the packing house are likely to substantially reduce infections."[241] In this regard, Australia notes Prof Latorre's statement that:

> … it is acceptable to consider that no aspect of the process in the packing house reduces the number of latently infected fruits. Once the fungus has penetrated mature fruits, the normal post-harvest management including brushing, waxing, sorting and grading, cold storage and even fungicide treatments, will be unable to arrest the fungus inside the fruits. Cold temperature would only be able to retard symptom development by lowering the rate of fungal growth.[242]

160. Similarly, Prof Swinburne acknowledges that latent infection "would not be affected by handling, or washing by water, even with disinfectant present".[243] However, Australia disagrees with Prof Swinburne's suggestion that the IRA Team omitted to take into account the factor of time in relation to Importation step 4 (or any of the other importation steps).[244] In fact, the Final IRA Report explicitly states that "[f]ruit becomes more susceptible to rotting from latent

[239] Reply of Prof Swinburne, q. 75. (emphasis added)

[240] Final IRA Report, Part B, p. 22.

[241] Final IRA Report, Part B, p. 126. (emphasis added)

[242] Reply of Prof Latorre, q. 79. (emphasis added) See also: Reply of Prof Latorre, q. 71.

[243] Reply of Prof Swinburne, qs. 77/78/79.

[244] Reply of Prof Swinburne, qs. 77/78/79, 78/80/81/82/83 & 91.

infections as storage times increase (Snowdon, 1990)."[245] In addition, after visiting packing house operations in New Zealand, the IRA Team noted that "[a]ny temporary cold storage soon after harvest and before processing begins is likely to be very short, a few days at the most, and this period of storage will be too short for significant expression of latent infections."[246] Prof Swinburne commented that pack house operations would "reduce the probability of the shipment of infected fruit",[247] but he does not appear to acknowledge that the IRA Team's reasoning was concerned with the potential for *substantial* reductions in *New Zealand* pack houses.

161. Australia notes that Prof Swinburne and Prof Latorre also expressed some doubts about the probability range assigned to Importation step 4.[248] In particular, Prof Latorre focussed on surface infestation and considered that there is "no scientific literature" supporting the chosen probability range.[249] However, as previously mentioned, the IRA Team was primarily focused on the risk of latent fruit infection rather than surface infestation. In addition, there are always data constraints when undertaking a risk assessment and that is why the expert judgment of the IRA Team played an important role.

vi. Importation step 6

162. Importation step 6 deals with the likelihood that *N. galligena* survives palletisation, quality inspection, containerisation and transportation. The likelihood assigned to Importation step 6 represents the uncertainty about the proportion of apples in or on which pests survive routine practices used during palletisation, quality inspection, containerisation and transport to Australia. Consideration was given to the physical characteristics of the pest, its resilience to a range of temperatures, aspects of its lifecycle, and the nature of its infection or infestation of apple fruit.[250]

163. In its expert judgment, the IRA Team determined that:

[245] Final IRA Report, Part B, p. 126. See also: Final IRA Report, Part B, p. 127.
[246] Final IRA Report, Part B, p. 126.
[247] Reply of Prof Swinburne, qs. 77/78/79 & 78/80/81/82/83.
[248] Reply of Prof Swinburne, qs. 77/78/79 & 78/80/81/82/83; Reply of Prof Latorre, q. 80.
[249] Reply of Prof Latorre, q. 80.
[250] Final IRA Report, Part B, p. 23.

> Some infected fruit not detected during sorting [i.e. Importation step 4] may be identified at quality inspection. However, quality inspection will not detect latent infections or any surface infestation, and these will survive palletisation, containerisation and transport because there are no mechanisms in these procedures to remove them.
>
> The time between Imp4 and Imp6 will not be long enough for latent infection to express itself to a significant level. Because spores are microscopic, any remaining surface infestation will also remain undetected and survive.[251]

In this regard, Prof Latorre stated that "[i]t appears to be reasonable to assume that post-harvest processing does not affect survival of latently infected fruits".[252] Australia notes that it is well-documented in the literature that it can take several months for fruit in storage to express symptoms and rot.

164. Australia notes that Prof Swinburne and Prof Latorre expressed some doubts about the probability range assigned to Importation step 6.[253] In particular, Prof Latorre considers that there is "no scientific literature" supporting the chosen probability range.[254] As already mentioned above, the IRA Team was primarily focused on the risk of latent fruit infection rather than surface infestation. There are always data constraints when undertaking a risk assessment and that is why expert judgment plays an important role.

vii. Summary

165. Australia believes that Prof Latorre usefully summarised the situation regarding the IRA Team's primary risk scenario of latent infection in fruit in the following statement:

> The reasoning in [the Final] IRA [Report] with respect to the possibility that latent infections of *N. galligena* may occur in mature New Zealand apple fruit and not become apparent until after storage is based on published information. … it is possible to assume that latent infection may occur if fruit rot caused by *N. galligena* were to occur. There is always a concern that fruit rot can further develop in cold stores. It is true that [the Final] IRA [Report] relies on scientific research about latent fruit infection in the UK and Northern Europe, but differences between New Zealand and Northern Europe can only be expected in relation to the likelihood of this event …[255]

[251] Final IRA Report, Part B, p. 127. (emphasis added)

[252] Reply of Prof Latorre, q. 82.

[253] Reply of Prof Swinburne, qs. 77/78/79 & 78/80/81/82/83; Reply of Prof Latorre, q. 82.

[254] Reply of Prof Latorre, q. 82.

[255] Reply of Prof Latorre, q. 76.

Australia considers that these comments support its view that the IRA Team's analysis was based on evidence from respected and qualified sources, and was objectively justifiable.

(f) Establishment and spread

Questions 58, 69, 70, 73, 85 and 89: transfer scenario

i. General comments

166. The IRA Team's conclusions[256] on the probability of establishment and spread reflected its evaluation of the available evidence[257] and application of its risk assessment methodology.[258]

167. According to Prof Latorre, the "conclusion of [the Final IRA Report] as to the establishment of European canker is based on the available scientific evidence."[259] However, at the same time, he appears to have some doubts about the likelihood values assigned by the IRA Team for establishment and spread. In particular, Prof Latorre considers that "these values have not been validated locally".[260] In addition, Prof Latorre states that "[b]ased on the general information available, I would assume that these events have a likelihood of occurring different from zero, but still extremely low."[261] Australia makes the following observations regarding these concerns. First, Australia highlights the inevitable data constraints when undertaking a risk assessment and the role of the IRA Team's expert judgment in relation to the likelihood of establishment and spread in Australia. Secondly, Australia notes that it is not the role of the experts to act as risk assessors and undertake a *de novo* review.

ii. Timing of importation

168. Prof Latorre has raised the issue of the period of time during the year when New Zealand apples would enter the Australian market. In the context of expressing some reservations about the suitability of Australian climatic conditions, he states that:

[256] Final IRA Report, Part B, p. 144, Table 34.
[257] Final IRA Report, Part B, pp. 129-145.
[258] Final IRA Report, Part B, pp. 24-33.
[259] Reply of Prof Latorre, q. 58. See, also: Reply of Prof Latorre, q. 69.
[260] Reply of Prof Latorre, q. 69.
[261] Reply of Prof Latorre, q. 69.

> 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.[262]

Further in relation to whether imports will coincide with leaf-fall, Prof Latorre refers to the fact that "[f]ruit importation (and inoculum availability) could occur when leaf scars are not present, reducing the probability of establishment and spread to zero."[263] Australia makes the following observations in response to the issue of timing.

169. First, the IRA Team considered that there were a range of available entry points for infection, apart from leaf scars, as illustrated by the following statement:

> Entry points for infection by *N. galligena* are available throughout most of the year (Swinburne,1975) with wound sites caused by leaf fall in autumn and leaf cracks from onset of spring bud burst presenting natural infection sites (Wiltshire, 1921; Wilson, 1966). Winter pruning cuts (Marsh, 1939) and lesions caused by other pathogens such as *V. inaequalis* and possibly woolly aphid injury present other entry points for infection (Swinburne, 1975; Brook and Bailey, 1965). Infection can also be initiated in the absence of wounds through natural openings for example, the calyx end of fruit or via lenticels (Swinburne, 1975; Bondoux and Bulit, 1959).[264]

While the IRA Team considered that leaf scars were likely to be the primary infection point, it is clear that they considered that there would be other entry points which would be available throughout the year.

170. Secondly, Australia clarifies that apples are available to consumers all year round in Australia. The IRA Team considered it unlikely that all of the imported New Zealand apples would be consumed as soon as they were imported, because Australian and New Zealand seasons coincide, and there is considerable capacity for apples to be stored in Australia for sale over time.[265]

171. Finally, in relation to the suitability of Australian climatic conditions, Australia refers to its earlier discussion and the further detailed climate analysis that BRS is presently undertaking.

iii. Proximity

[262] Reply of Prof Latorre, q. 58. (emphasis added). See, also: Reply of Prof Latorre, q. 69; Reply of Prof Swinburne, q. 58.

[263] Reply of Prof Latorre, q. 58. (emphasis added) Also: Reply of Prof Swinburne, qs. 73 & 84/85.

[264] Final IRA Report, Part B, p. 136. (emphasis added)

[265] See: Australia's first written submission, paras. 769-770.

172. Under the IRA Team's methodology "proximity" refers to the likelihood that a utility point is sufficiently close to a host plant in a particular exposure group to allow for a non-zero likelihood of transfer of bacteria to a host to occur.[266] At the outset, Australia emphasises that, in terms of European canker, the exposure groups of potential hosts that were of primary concern to the IRA Team related to commercial fruit crops, household and garden plants, and wild and amenity plants.[267] Further, Australia notes that the Panel's questions and the experts' replies appear to have conflated the proximity and exposure aspects of the Final IRA Report. These were separate components under the IRA Team's methodology.

173. In the context of analysing the proximity values for commercial fruit crops, the IRA Team reasoned as follows:

> All orchard wholesalers would be in close proximity to commercial fruit crops. 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 (for example, in a skip) near the packing house. …
>
> 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) into close proximity to both New Zealand apples and apple waste.[268]

174. Australia notes that both Prof Swinburne and Prof Latorre have expressed some doubts about the risk posed by orchard wholesaler waste.[269] However, Australia notes that after outlining the situation in the United Kingdom, Prof Swinburne states that "[i]f comparable practices are followed in Australia, it seems unlikely that fruit discarded at pack houses poses any great risk."[270] On this basis, Australia understands that Prof Swinburne accepts that there is at least some risk in relation to orchard wholesaler waste. If this is the case, then it appears that his position accords with the IRA Team's view that the probability of exposure of commercial crops to *N. galligena* from orchard wholesaler waste was "extremely low".[271] Similarly, Prof Latorre's statements that "[t]his possibility would be extremely unlikely"[272] but "cannot be

[266] Final IRA Report, Part B, pp. 29 & 129.

[267] Final IRA Report, Part B, p. 139, Table 33.

[268] Final IRA Report, Part B, pp. 130-131. (emphasis added)

[269] Reply of Prof Swinburne, q. 89; Reply of Prof Latorre, q. 89.

[270] Reply of Prof Swinburne, q. 89. (emphasis added)

[271] See also Final IRA Report, Part B, p. 139, Table 33 and p. 43, Table 12.

[272] Reply of Prof Latorre, q. 89.

denied"[273], also appears to be in line with the IRA Team's view. In Australia's view, this is an area that would require specific knowledge of apple distribution, marketing and waste management in Australia before experts can provide a complete view on this issue.

175. Finally, it seems that Prof Latorre considers that probability of exposure of commercial crops to *N. galligena* from orchard wholesaler waste "should be disregarded from the risk analysis."[274] In this regard, Australia recalls that it is not the role of the experts to advise whether they would have done the risk assessment in the same way as the IRA Team. Further, it is important to bear in mind that the experts were not asked to consider the other exposure groups.

iv. Exposure involves a sequence of events

176. Under the IRA Team's methodology one of the key factors in estimating the probability of establishment and spread is known as "exposure". As explained in the Final IRA Report:

> The term exposure refers to the likelihood of transfer of the pathogen from infested or infected apples to a susceptible host plant. This is a complex variable dependent on several critical factors. A sequence of events needs to be completed, and there must be successful exposure of host plants to *N. galligena* from infested or infected apples in order for European canker to establish in Australia. The pathogen must be able to survive in a viable state in or on fruit waste and must be transferred to a host plant receptive to infection, with environmental conditions conducive to infection being present.[275]

177. The IRA Team's analysis of exposure is set out in the Final IRA Report[276] and it has been flagged as one of the main scientific and technical issues by the experts in this dispute. Prof Swinburne usefully outlines the relevant sequence of events as follows:

> For such a pathway to exist fruit would not only have to develop visible rot, but also to form viable spores which can be distributed to new hosts. The 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. The formation of conidia on the surface of lesions does occur (Swinburne, 1975) …
>
> Conidia are dispersed by rain splash, over relatively short distances, especially so from ground level. Thus to successfully transfer infection fruit would have

[273] Reply of Prof Latorre, q. 91.

[274] Reply of Prof Latorre, q. 89.

[275] Final IRA Report, Part B, p. 134. (emphasis added) See also: Final IRA Report, Part B, p. 27.

[276] Final IRA Report, Part B, pp. 134-139.

> to be very close to a susceptible host and have the appropriate weather conditions.[277]

178. Similarly, Prof Latorre states that:

> Based on published scientific information, Australia assumes that fungal growth and fruit rot resume when fruit is removed from cool storage, sold to consumers and stored at room temperature. Therefore, rotted fruits discarded near susceptible hosts could be potentially (but not necessarily) a source of inoculum (mainly conidia) for infections in new areas. This conclusion is acceptable … [278]

179. Prof Swinburne indicates that the ability of "an apple shipped to Australia from New Zealand rotted with *N. galligena* … to act as vector of disease depend on the handling system on arrival."[279] This recognises that an expert view on such matters requires experts to have detailed knowledge regarding apple distribution and marketing in Australia.

v. Spore production and dispersal

180. According to the IRA Team's analysis of exposure:

> 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 (Swinburne, 1964). Dillon-Weston (1927) reported only three apples collected from a total of 700 mummified fruit from an English orchard infected with N. galligena cankers developed perithecia (0.4%) ...[280]

Although the IRA Team clearly considered both ascospores and conidia in relation to exposure, they were *primarily concerned with conidia*, and ascospores were only of minor significance to their analysis.[281]

181. Australia notes that according to Prof Latorre "[i]t is possible that perithecia play a minor role in the establishment and dissemination of *N. galligena* from rotted fruit".[282] Nevertheless, in Prof Latorre's opinion, there is only limited evidence regarding the role that perithecia (ascospores) on rotted fruit play, in the overall epidemiology of European canker.[283] In this

[277] Reply of Prof Swinburne, q. 58. (emphasis added) Also: Reply of Prof Swinburne, q. 69.

[278] Reply of Prof Latorre, q. 69. (emphasis added) Also: Reply of Prof Latorre, q. 71.

[279] Reply of Prof Swinburne, q. 69. Also: Reply of Prof Swinburne, q. 91.

[280] Final IRA Report, Part B, p. 135. (emphasis added)

[281] Final IRA Report, Part B, pp. 134-138.

[282] Reply of Prof Latorre, q. 70.

[283] Reply of Prof Latorre, q. 70.

regard Australia, reiterates that there are always data constraints when undertaking a risk assessment and that is why the IRA Team's expert judgment was important.

182. In addition, Australia notes that Prof Swinburne's statement that "[t]he formation of perithecia on fruit has been observed very rarely (Dillon-Western, 1927)"[284] accords with the IRA Team's view.[285] Prof Swinburne goes on to state that it is "most unlikely that ascospores would be formed or released from rotted fruit"[286] and as a result he appears to suggest that the IRA Team should not have considered ascospores in its exposure analysis.[287] As previously mentioned, the IRA Team was primarily concerned with conidia, and ascospores were only of minor significance to their analysis.

vi. Dispersal range

183. The IRA Team's analysis in relation to dispersal range of conidia was as follows:

> Transfer of European canker across borders or districts results from the movement of infected nursery stock (Cooke, 2003). Although wind disperses some conidia in the absence of rain (Swinburne, 1971b) they are mainly splash-dispersed (Munson, 1939). The most probable maximum distance for dispersal by rain splash is 10 m (Marsh, 1940) although one report suggests this might actually be as much as 125 m under stormy conditions (Swinburne, 1975). These studies relate to conidia produced from cankers on trees and the distances are likely to be far less for conidia originating from infected fruit on the ground.[288]

184. In this regard, Australia notes Prof Latorre's acknowledgement that "the reasoning in [the Final IRA Report] with respect to the dispersal range for conidia was objective and coherent and based on respected and qualified scientific sources".[289] In addition, Australia welcomes Prof Swinburne's statement that "[t]here are no studies that can accurately guide this judgement [as to the dispersal range of conidia from fruit rotting on the ground], but it is unlikely that this would be more than a few meters".[290] The IRA Team agreed that dispersal by "a few metres" was all that would be needed for a rotting apple in orchard wholesaler waste, or in a backyard compost heap, to transfer to a susceptible host plant. Accordingly, Australia can reassure

[284] Reply of Prof Swinburne, q. 58.

[285] Final IRA Report, Part B, p. 135.

[286] Reply of Prof Swinburne, q. 58. Also: Reply of Prof Swinburne, qs. 73 & 69.

[287] Reply of Prof Swinburne, q. 73.

[288] Final IRA Report, Part B, p. 135. (emphasis added)

[289] Reply of Prof Latorre, q. 73.

[290] Reply of Prof Swinburne, q. 73. See also Reply of Prof Swinburne, q. 89; Reply of Prof Latorre, q. 73.

Prof Latorre that the IRA Team did not "overestimate[e] the risk of establishment and spreads."[291]

vii. Inoculum dose

185. The IRA Team's analysis of the number of conidia required to initiate infection is set out in the Final IRA Report.[292] Australia understands that Prof Swinburne accepts this analysis as being objective and coherent and based on respected and qualified sources.[293] Further, Australia notes that according to Prof Swinburne, "[i]n theory one spore can initiate infection; in practice the probability of successful infection with one spore is very small."[294]

viii. The IRA Team's conclusion on exposure

186. The IRA Team's conclusion on exposure is set out in Table 33 of the Final IRA Report.[295] This table summarises the probabilities of exposure of *N. galligena* to susceptible host plants as a result of utility points discarding a single infested/infected apple. In this regard, Australia notes that the IRA Team's probabilities of exposure accord with Prof Latorre's view, as demonstrated his statement that:

> It is possible that asymptomatic but infected mature apples could develop symptoms and eventually sporulate during transit and commercialization in Australia. However, I would consider the probability of this event as extremely low to negligible.[296]

Moreover, Prof Latorre is of the view that the factors considered by the IRA Team in relation to exposure are "acceptable".[297]

(g) Consequences

Questions 60 and 86: overall rating; plant life or health rating; and control or eradication rating

i. Overall consequences

[291] Reply of Prof Latorre, q. 73.
[292] Final IRA Report, Part B, p. 136.
[293] Reply of Prof Swinburne, qs. 84/85.
[294] Reply of Prof Swinburne, qs. 84/85.
[295] Final IRA Report, Part B, p. 138-139.
[296] Reply of Prof Latorre, q. 65. (emphasis added). See also Final IRA Report, Part B, p. 43, Table 12.
[297] Reply of Prof Latorre, q. 85.

187. As a result of applying its expert judgment to the available evidence,[298] the IRA Team arrived at the following conclusion on the consequences of European canker:

> Based on the decision rule described in the methodology – that is, where the consequences of a pest with respect to one or more criteria are '**E**' – the overall consequences are considered to be 'moderate'. Therefore the overall consequences of *N. galligena* are '**moderate**'.[299]

188. At the outset, Australia wishes to emphasise that, under the IRA Team's methodology for the assessment of consequences,[300] the conclusion on consequences is dependent on the legitimacy of the impact scores assigned to the eight direct/indirect criteria for European canker.[301] This methodology is based on ISPM No. 11. Australia is concerned that Prof Swinburne and Prof Latorre do not appear to have reviewed the overall consequences rating on the basis of the IRA Team's methodology for consequences assessment. Instead, they appear to have undertaken their own independent assessment of consequences.

189. Australia notes that Prof Swinburne and Prof Latorre have expressed some doubts about the IRA Team's overall consequences rating.[302] In particular, they appear to consider that this rating is an overestimate, primarily because of their view that the *climatic conditions* in Australia are not conducive to European canker. In this regard, Australia refers to its earlier general discussion on climate and the further detailed climate analysis that BRS is presently undertaking.

190. In addition, there are a number of other aspects of Prof Latorre's reply on the IRA Team's overall consequences rating that are worth noting.[303]

191. First, he refers to the "experience of other apple producing countries" as a basis for his view that this rating is an overestimate.[304] However, Australia recalls that under the *SPS Agreement*, the consequences assessment in the Final IRA Report must be appropriate to Australia's circumstances, not the circumstances of other apple producing countries. In this regard, Australia reiterates that it is free of European canker.

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[298] Final IRA Report, Part B, pp. 145-150.

[299] Final IRA Report, Part B, p. 150. (emphasis added)

[300] Final IRA Report, Part B, pp. 35-40. This IRA Team's methodology for the assessment of consequences takes into account the guidelines for consequences analysis in ISPM No. 11.

[301] Final IRA Report, Part B, p. 145, Table 36.

[302] Reply of Prof Swinburne, q. 60; Reply of Prof Latorre, q. 60.

[303] Reply of Prof Latorre, q. 60.

[304] Reply of Prof Latorre, q. 60.

192. Secondly, despite his apparent concerns about the overall consequences rating, Prof Latorre makes the following statement that actually appears to accord with the IRA Team's conclusion on consequences:

> (i) European canker has been considered as a major disease of apples, proving economically important in Chile (Latorre et al., 2002), primarily because 2-3 fungicide applications are necessary each year to prevent infections through leaf scars. European canker has never limited the Chilean commercial production, although yields can be reduced and production cost increased. [305]

193. Thirdly, Australia disagrees with Prof Latorre's suggestion that removal of trees would be rare.[306] In Australia's circumstances, it is not uncommon for eradication activities to include removal of trees. For example, although a different disease, the 2004 outbreak of citrus canker in Queensland illustrates the rigorous approach of Australia's biosecurity authorities to eradication programs:

> During 2004 and 2005, all high-risk host plants of citrus canker were removed from the Pest Quarantine Area. This included about 490,000 commercial citrus trees, 4000 non-commercial (residential/domestic) citrus and ornamental host species, and 150,000 native citrus plants (*Citrus glauca*), in preparation for an 18-month 'host-free' period within the Emerald Pest Quarantine Area. [307]

194. Finally, Australia notes that Prof Swinburne does not appear to share Prof Latorre's view that varietal differences have a significant impact on the incidence of fruit rot.[308]

ii. Plant life or health

195. As a result of applying its expert judgment to the available evidence,[309] the IRA Team reached the following conclusion on the direct impact of European canker on plant life or health:

> The direct consequences on plant life are expected to be minor at the national level, significant at the regional level and highly significant at the district level [and the local level]. A rating of '**E**' was assigned to this criterion.[310]

196. Australia notes that Prof Swinburne and Prof Latorre have expressed some doubts about the IRA Team's direct impact score on plant life or health.[311]

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[305] Reply of Prof Latorre, q. 60.

[306] Reply of Prof Latorre, q. 60.

[307] Queensland Department of Primary Industries and Fisheries, National Citrus Canker Eradication Program, Program Summary, http://www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/4790_5290_ENA_HTML.htm (accessed April 200).

[308] Contrast: Reply of Prof Latorre, q. 60 with Reply of Prof Swinburne, q. 49, 54/55, 62/63 & 77/78/79.

[309] Final IRA Report, Part B, pp. 146-147.

[310] Final IRA Report, Part B, p. 146.

197. According to Prof Swinburne "a consequence rating 'C' would be more appropriate for the impact on plant health."[312] However, there is very little explanation as to how Prof Swinburne arrived at this conclusion. In any event, Australia recalls that, according to the WTO Appellate Body, it is not the role of the experts in WTO SPS disputes to: act as a risk assessor and undertake a *de novo* review; nor to advise whether they would have arrived at the same conclusion as the IRA Team.

198. In addition, Australia offers the following observations regarding Prof Latorre's concerns.

199. First, despite his doubts about the rating, Prof Latorre's statement that, "European canker is … one of the most economically damaging diseases of apple … a major disease of apple",[313] actually accords with the IRA Team's conclusion on consequences.

200. Secondly, Prof Latorre refers to the "general experience observed in other apple exporting countries where European canker is present" as a basis for his doubts about the IRA Team's direct impact score on plant life or health.[314] However, the consequences assessment in the Final IRA Report must be appropriate to Australia's circumstances, not the circumstances of other apple producing countries. In this regard, Australia again notes that it is free of European canker.

201. Thirdly, Australia clarifies that, contrary to Prof Latorre's understanding of the IRA Team's methodology for consequences assessment,[315] an impact score of 'E' does *not* imply irreversible damage at the national level.[316] Nor does it *necessarily* imply irreversible damage at the regional level[317] or at the district and local levels.[318]

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[311] Reply of Prof Swinburne, q. 60; Reply of Prof Latorre, q. 86.

[312] Reply of Prof Swinburne, q. 60.

[313] Reply of Prof Latorre, q. 86. (emphasis added)

[314] Reply of Prof Latorre, q. 86.

[315] Reply of Prof Latorre, q. 86.

[316] According to the IRA Team's methodology for consequences assessment: "An impact of 'minor significance' is not expected to threaten economic viability, but would lead to a minor increase in mortality/morbidity or a minor decrease in production. For non-commercial factors, the impact is not expected to threaten the intrinsic value of the criterion – though the value of the criterion would be considered to be disturbed. Effects would generally be reversible." Final IRA Report, Part B, p. 38. (emphasis added)

[317] According to the IRA Team's methodology for consequences assessment: "A 'significant' impact would threaten economic viability through a moderate increase in mortality/morbidity, or a moderate decrease in production. For non-commercial factors, the intrinsic value of the criterion would be considered as significantly diminished or threatened. Effects may not be reversible." Final IRA Report, Part B, p. 38. (emphasis added)

202. Fourthly, Australia is concerned that Prof Latorre may be too ready to dismiss the potential impact of the disease on the Australian domestic apple industry, in stating that European canker's:

> … economical effects (increased costs of winter pruning, fungicide treatments and the removal of stem lesions and infected branches; fruit yield reduction) can be absorbed by farmers with no major consequences to the farmer or to the local apple industry.[319]

Australia submits that he is not qualified to express an opinion as to whether economical losses could be absorbed by Australian apple growers. This would depend on the economic circumstances of individual growers and their production costs. Similarly, as far as Australia is aware, Prof Latorre does not have detailed knowledge as to the circumstances of the Australian domestic apple industry that would allow him to comment on whether production losses due to European canker would "threaten the economic viability of the [Australian] apple industry" at the regional, district and local levels.[320]

203. Fifthly, recent reports out of New Zealand support the IRA Team's rating of the direct impact of *N. galligena* on plant life or health. For example, the Hawkes Bay Emergency Management Group considers European canker to be one of the diseases that can cause *severe damage and production losses* in that area.[321] Another example is the Auckland and Waikato areas where *N. galligena* has had a *significant impact* on plants in apple orchards and nurseries for many years.[322]

204. Finally, in relation to the direct impact on plant life or health, Australia notes that the IRA Team considered that there were a large number of other host species of *N. galligena*, in addition to apples and pears.[323]

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[318] According to the IRA Team's methodology for consequences assessment: "A 'highly significant' impact would threaten economic viability through a large increase in mortality/morbidity, or a large decrease in production. For non-commercial factors, the intrinsic value of the criterion would be considered as severely or irreversibly damaged." Final IRA Report, Part B, p. 38. (emphasis added)

[319] Reply of Prof Latorre, q. 86. (emphasis added)

[320] Reply of Prof Latorre, q. 86. (emphasis added)

[321] **Exhibit AUS-82:** Hawkes Bay Emergency Management Group, *Pest or Diseases affecting Agriculture, Forestry or Horticulture.*

Website: http://www.hbemergency.govt.nz/Search/SearchResult_IDL=6_IDT=496_ID=1837_.html

[322] **Exhibit AUS-83:** Hortwatch (2002), Post-harvest Clean Up Sprays.

Website: http://www.hortwatch.com/library/post-harvest-clean.html

[323] Final IRA Report, Part B, pp. 117, 146-147; **Exhibit AUS-84:** Commonwealth Agricultural Bureaux International (2003) Crop Protection Compendium - Global Module, CAB International.

(h) Miscellaneous

Question 51: area freedom and pest free places of production

205. Australia recalls its explanation that its principal measure for European canker is based on the concept of "pest free places of production" recognised in ISPM No. 10,[324] and is based on the objective of "sourcing apples for export from orchards free of disease."[325] This concept is distinct from "areas of low pest prevalence" (ISPM No. 22), but is related to "pest free areas" (ISPM No. 4).

206. Australia considers that the first half of Prof Latorre's response is not pertinent to the Panel's question, which is merely directed at trying to understand the nature of the principal measure required by Australia for European canker.

Question 62: Restricting imports to apples sourced from "pest-free places of production", to be determined by a single inspection of each exporting orchard and maintained through controls on the subsequent movement of nursery stock; or limiting imports to apples sourced from areas of "low pest prevalence", to be determined by inspection of a sample of orchards

207. Australia recalls its objection to the Panel posing this question to the experts[326], on the basis that New Zealand has not pursued a claim that either of the purported "alternative" measures referred to in the question are alternative measures for European canker within the meaning of Article 5.6.[327] As previously noted, the Panel may not make New Zealand's case.

208. Australia notes that Prof Latorre did not comment on the key issue with respect to potential alternative measures – that is, whether such alternative measures would achieve Australia's ALOP. Similarly, Prof Swinburne did not answer the Panel's question in respect of the two "alternative" measures referred to therein.

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[324] Australia's responses to the Panel's questions after the first meeting, q. 35 & 36; Final IRA Report, Part B, pp. 153 & 155.

[325] Final IRA Report, Part B, p. 155.

[326] Australia's letter to the Panel, 19 December 2008: Attachment, draft question 59.

[327] In relation to Australia's measures for European canker, New Zealand explicitly limited its claim under Article 5.6 to the "alternative" measure of restricting imports to mature, symptomless apples. See: New Zealand's first written submission, para. 4.491.

Question 63: Restricting imports to "mature, symptomless apples"

209. Although Prof Latorre did not address the key issue of whether restricting imports to "mature, symptomless apples" would achieve Australia's ALOP, his response that "[e]xporting only 'mature asymptomatic apples' from New Zealand would disregard the fact that latent infection may occur on a mature apple fruit"[328], confirms Australia's explanation for why such a measure would not be suitable.[329]

210. Australia notes that Prof Swinburne provided views on what alternative risk management measures may be appropriate, and that in doing so, his reply went beyond the scope of both questions 62 and 63. The Panel's question was directed only at whether New Zealand's proposed alternative measure of limiting imports to "mature, symptomless apples" would achieve Australia's ALOP (which is New Zealand's sole claim in this regard[330]). Neither the Panel nor the experts may make New Zealand's case. Accordingly, Australia submits that the Panel should not consider Prof Swinburne's response to the extent that it goes beyond the issue of whether "mature, symptomless apples" would be an appropriate risk management measure. Relevant to this issue, Prof Swinburne agreed with Australia that the latent infection of apples with European canker may not be visible at the time of inspection.[331]

211. Therefore, the views of both experts support Australia's position that restricting imports to "mature, symptomless apples" would not achieve Australia's ALOP.

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[328] Reply of Prof Latorre, q. 63.

[329] Australia has previously explained that restricting imports to mature, symptomless apples would not address the IRA Team's key concern with respect to European canker – that is, that imported apples may be latently infected with the pest. See: Australia's responses to the Panel's questions after the first meeting, q. 138.

[330] See: New Zealand's first written submission, para. 4.491.

[331] Prof Swinburne stated:

> New Zealand relies on the contention that if fruit of the varieties to be traded were infected during development the disease would become visible at or before they reach harvestable-maturity and that consequently there would never be quiescent (latent) infections that could not be eliminated before shipment. Experience elsewhere indicates that this is not correct…

(Reply of Prof Swinburne, q. 62/63.)

Question 91: The implications of repacking at rural packing houses in close proximity to orchards

212. As previously advised, the IRA Team reasoned that the proportion of apples going to orchard packing houses would make very little difference to the probability of entry, establishment and spread for European canker because the major risk for this pest is associated with the end consumer and not the distribution pathway.[332] Dr Sgrillo referred back to his reply to Question 46 in which he indicated that whether fruit was repacked at orchard packing houses had no significant implications. In respect of European canker, Australia notes that Professor Latorre provided no explanation for his opinion that "the impact of repacked fruits can be minimized if fruit is exported in retail-ready packs".[333]

D. QUESTIONS SPECIFIC TO APPLE LEAFCURLING MIDGE (ALCM)

(a) Australia's general comments

213. In Australia's view, the expert advice offered by Prof Cross in response to the Panel's questions relating to ALCM confirms that the IRA Team's assessment of the risks associated with ALCM is objectively justifiable on the basis of the limited scientific evidence available. Generally speaking, Australia considers that the replies of Prof Cross provide little, if any, support to New Zealand's claims of error by the IRA Team in its ALCM risk assessment.

214. Before commenting on the detail of the replies below, Australia considers that the advice from Prof Cross highlighted two matters of critical importance to the Panel's consideration of whether the Final IRA Report represents a valid risk assessment for ALCM.

215. First, Prof Cross emphasised the lack of good quality and/or definitive scientific evidence available on all of the key biological issues in dispute: that is, the prevalence of viable ALCM on New Zealand apples[334], the conditions and nature of ALCM diapause[335], the effects of cold

[332] See: Australia's responses to the Panel's questions after the first meeting, q. 99; Final IRA Report, Part B, pp. 25-26 & 145.

[333] Reply of Prof Latorre, q. 91.

[334] Reply of Prof Cross, qs. 97 & 99.

[335] Reply of Prof Cross, q. 94(i) & (viii).

storage on the insect's survival[336], the time and conditions required for adult development and emergence[337], and the insect's flight range[338]. Indeed, on a number of points, Prof Cross considered that the existing data was inadequate to resolve the issues.[339] Dr Sgrillo also observed that the data available was inadequate in many respects.[340]

216. Prof Cross' comments in this regard make it clear that there is considerable scientific uncertainty on a number of key steps in the pathway which were required to be assessed by the IRA Team in order to determine the likelihood of entry, establishment and spread of ALCM in Australia.[341] In addition to the paucity of evidence available, Prof Cross recognised that matters such as the prevalence of viable ALCM on New Zealand apples and the time required for adult development and emergence may vary considerably between seasons and in different environmental conditions.[342]

217. Secondly, the responses of Prof Cross imply that a 600-unit inspection *alone* would be insufficient risk management to achieve Australia's ALOP.[343] This supports the IRA Team's view that SPS measures are warranted for ALCM.

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[336] Reply of Prof Cross, q. 94(i), p. 2.

[337] Reply of Prof Cross, q. 94(i).

[338] Reply of Prof Cross, q. 94(iii) & (vi).

[339] See: Reply of Prof Cross, qs. 94(i), (iii), (viii), 97 & 103.

[340] See: Reply of Dr Sgrillo, qs. 104, 108 & 111.

[341] In respect of the challenges associated with scientific uncertainty, Australia refers the Panel to: Australia's first written submission, paras. 232-233.

[342] Reply of Prof Cross, qs. 94(i), 97 & 100.

[343] In his Reply to q. 120, Prof Cross stated that:

> The requirements for a 3000 fruit inspection or for fruit fumigation are clearly restrictive and alternative measures coupled with a 600 fruit inspection would be preferable provided they met Australia's ALOP. (emphasis added)

While Prof Cross is not called upon to advise on the appropriate risk management for ALCM, Australia notes that Prof Cross implicitly agrees with Australia that a 600-unit inspection alone would not achieve Australia's ALOP.

Similarly, in his Reply to q. 105, Prof Cross stated that:

> If higher value, fruit is retail ready in packs or cartons ready for sale held in cold stores and redistributed to markets with minimal breaks in the cold chain and there were minimal losses resulting in disposal of fruits in the vicinity of orchards, the potential risks in this scenario are very low: There would be virtually no opportunity for leaf midge adults to emerge, mate, exit the pack house and locate a susceptible apple tree. A 600 fruit sample size would be very adequate to give a very minimal risk from disposal of small numbers of fruits by consumers etc in gardens or near orchards etc.

This response suggests that a 600 fruit sample would only be adequate if a measure restricting imports to "retail ready" apples was also imposed.

218. Finally, as the Panel appointed only one expert in respect of ALCM, Australia recalls the concerns it previously raised in respect of potential diversity of scientific opinion.[344] Further, Australia notes that Dr Deckers offered comments on the questions relating to ALCM. As Australia was only consulted about the appointment of Dr Deckers as a potential expert on fire blight, and not on ALCM, Australia submits that the Panel should only rely on his advice to the extent that it remains within his field of expertise.

(b) Australia's specific comments on the experts' replies

Question 94: The IRA Team's evaluation of: (i) the conditions for adult emergence of ALCM; (ii) the number of ALCM generations per year; (iii) the flight range of ALCM; (iv) the adult life span of ALCM; (v) the climatic factors in respect of ALCM spread; (vi) the host range and conditions required for ALCM egg laying; (vii) the absence for the need for a vector for ALCM to be able to spread from its initial location; and (viii) the life stage in which ALCM could enter Australia on export apples imported from New Zealand

219. In his detailed reply to this question, Prof Cross concluded that the IRA Team's analysis of all of the various biological issues listed was "objective and credible".[345]

220. Australia notes that many of the opinions of Prof Cross directly contradict New Zealand's arguments on key issues. For example, in respect of New Zealand's arguments on diapause and potential adult emergence of ALCM in Australia, Prof Cross commented:

> [New Zealand's] assertions seem to be based on an assumption that cold storage of apples would either kill individuals that were pupating or perhaps force them into diapause, though no evidence to support this has been supplied. Indeed, if pupae were killed by exposure to cold, then ALCM's existence would be threatened by post diapause cold periods in spring.[346]

221. In respect of New Zealand's claim that ALCM can only fly 30 metres[347], Prof Cross stated that:

> The 30 m distance (over 3 generations) given in Suckling et al (2007) (NZ exhibit 15) is based on the decline in shoot infestation rates in new apple trees adjacent to an old established planting in a sex pheromone mating disruption trial, a situation which is not directly analogous to the situation required for the

[344] Australia's letter to the Panel, 20 November 2008.

[345] Reply of Prof Cross, qs. 94(i)-(viii), 103. (emphasis added)

[346] Reply of Prof Cross, q. 94(i), p. 2.

[347] See: New Zealand's first written submission, paras. 4.123, 4.353.

> risk assessment of a mated female flying to a distant host. It does not indicate that females are only able to fly a maximum of 30 m.[348]

222. In respect of whether Australia's climate would be suitable for ALCM spread, Prof Cross stated that:

> ALCM can tolerate quite a wide range of climates and it is inevitable that conditions conducive to ALCM establishment and spread are present in several, perhaps many areas of Australia, especially in areas where the climate is favourable to apple growing.[349]

223. Accordingly, Prof Cross' replies to this question support Australia's contention that New Zealand has failed to establish any serious flaws with the IRA Team's evaluation of the potential establishment and spread of ALCM.

Questions 97, 99 and 100: The level of ALCM-infestation of New Zealand apples

224. Prof Cross emphasised that "[t]he sources of data on occupancy and viability of ALCM in cocoons on New Zealand apples are very sparse … and the data is inadequate for an objective and credible assessment."[350] Prof Cross agreed with Australia that the data presented in Rogers *et al*. (2006)[351] is unsound and is "not sufficient for a reliable estimate of [the ALCM viability] parameter or of its variability."[352]

225. Prof Cross recognised that the proportion of viable ALCM on New Zealand apples at harvest may vary considerably between seasons and locations.[353] Prof Cross emphasised that the levels of viable ALCM on New Zealand apples:

> … is likely to be a very variable parameter, due to variations in the availability of shoot growth and temperature and rainfall patterns as well as geographical and topographical variations. Better data is required.[354]

Prof Cross also considered that parasitism by *Platygaster demades* is "a significant though highly variable factor."[355] As Australia has previously noted[356], the probability values selected by the IRA Team took into account the potential for seasonal and climatic variation.

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[348] Reply of Prof Cross, q. 94(iii), p. 3. (emphasis added)

[349] Reply of Prof Cross, q. 94(v), p. 4.

[350] Reply of Prof Cross, q. 97.

[351] **Exhibit NZ-17**: Rogers *et al*. (2006), and **Exhibit NZ-102**: Rogers (2008).

[352] Reply of Prof Cross, q. 97.

Also, see: Australia's response to the Panel's questions after the first meeting, q. 87.

[353] Reply of Prof Cross, q. 100, 108.

[354] Reply of Prof Cross, q. 100. (emphasis added)

226. Prof Cross confirmed that the IRA Team took into account the August 2005 data[357], relating to the period 2001-2004, which he considered to represent the most accurate probability of importation calculated by the IRA Team as it was based on the better set of available data[358] (recalling that the IRA Team separately assessed the probability of entry, establishment and spread for ALCM on the basis of two different sets of conclusions for the probability of importation[359]).

227. Australia disagrees with Prof Cross that the August 2005 data can be termed "good quality data".[360] The Panel will note the scant information provided by New Zealand in respect of the August 2005 data, set out in Exhibit AUS-90.[361] New Zealand was unable to provide clear information on both the results and the inspection methodology employed for determining the infestation of apples or clear detail about what exactly was found (ie. unoccupied or occupied cocoons, or cocoons containing live insects). Nevertheless, the IRA Team accepted New Zealand's request that it take into account the August 2005 data and indeed it used that information to calculate an alternate probability of importation.[362] Although, as Prof Cross suggested[363], reliance upon the August 2005 data may have been more appropriate than reliance upon the more dated published information, the August 2005 data itself was not free of uncertainty.

228. On the basis of recent advice from New Zealand in respect of the August 2005 data, Prof Cross took the view that "the fruit was not subject to mitigation procedures or handled in any way to reduce the incidence of ALCM cocoons."[364] In response to the experts' earlier request for factual clarification of this issue, New Zealand had advised that no mitigation

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[355] Reply of Prof Cross, q. 100.

[356] See: Australia's responses to the Panel's questions after the first meeting, q. 88.

[357] In response to q. 97, Prof Cross stated that:

> Good data provided by NZ from endpoint inspection of 4,556,564 fruit over the years 2001-2004 from which a total of 7297 occupied cocoons were found is presented in Table 40 of IRA and used to set appropriate values for the probability of importation. (emphasis added)

[358] Reply of Prof Cross, q. 99.

[359] See: Final IRA Report, Part B, pp. 165-166, 183 & 187.

[360] Reply of Prof Cross, qs. 97, 98 & 114.

[361] See: **Exhibit AUS-90**: Pipfruit NZ (2005).

[362] See: Final IRA Report, Part B, p. 166.

[363] See: Reply of Prof Cross, qs. 97, 98, 99, 108 & 114.

[364] Reply of Prof Cross, q. 98, p. 8. Also, see: Reply of Prof Cross, q. 114.

procedures for ALCM took place in *packing houses*.[365] But New Zealand's advice that "[n]o mitigation procedures are used to reduce the incidence of ALCM on apples exported by New Zealand",[366] failed to acknowledge the effects of its Integrated Fruit Production program on ALCM levels in *orchards*, which it has previously raised itself.[367]

Question 98: Whether the proportion of apples shipped from New Zealand to Australia in packages ready for retail use (i.e., retail-ready), compared with the proportion shipped from New Zealand to Australia in bulk, subject to packaging prior to retail sale, is relevant for the assessment of the likelihood of entry, establishment or spread of ALCM

229. In respect of the IRA Team's view that a certain proportion of fruit may be handled by orchard packing houses for regrading and repacking, Prof Cross contended that "if no fruit were handled in this way at the 7 orchard wholesalers or the urban wholesaler, *the high risks should be excluded from the IRA*."[368] Australia considers that there was no basis for the IRA Team to assume that *no imported fruit* from New Zealand would be handled at orchard packing houses, and thereby exclude consideration of the associated risks as suggested by Prof Cross. As noted by the IRA Team[369], New Zealand refused to rule out the use of other modes of trade and undertake to only export "retail ready" apples. Consequently, the IRA Team made no assumptions as to the mode of trade and considered two potential scenarios (as recognised by Prof Cross): first, that 95%-99.9% of apples would be distributed only to urban wholesalers (associated with apples ready for direct distribution to retailers, which Australia understands as "retail ready"); and second, that 70%-100% of imported apples would be distributed to orchard packing houses.[370]

230. It is notable that even when it was assumed that 95%-99.9% of apples would be imported "retail ready", the IRA Team calculated that enough ALCM-infested apples would still arrive at orchard packing houses at the same time and place to pose a risk that an establishment event

[365] See: New Zealand's letter to the Panel, 17 February 2008, q. 2(b).

[366] New Zealand's letter to the Panel, 17 February 2008, q. 2(b).

[367] See: New Zealand's first written submission, fn. 187; **Exhibit NZ-45**: New Zealand Pipfruit Integrated Fruit Production Manual.

[368] Reply of Prof Cross, q. 98, p. 9. (emphasis added)

[369] See: Final IRA Report, Part B, p. 9.

[370] See: Final IRA Report, Part B, pp. 171-172.

might occur.[371] According to New Zealand itself[372], only three adult insects in the same place at the same time are required for a high chance of mating to occur and so potentially start a population.

231. Prof Cross expressed the view that the data set out in Table 42 of the Final IRA Report "should be discarded as it relies on old inadequate published data."[373] Australia advises that the data set out in Table 42 is based on the probability of importation of around 4.1% (mean) that the IRA Team derived from the existing published data. That information was used to separately derive one of the two estimates of risk for ALCM calculated by the IRA Team. Therefore, the IRA Team's continued consideration of this data did not have an impact on the overall outcome that the unrestricted risk was above Australia's ALOP (with respect to both the older published data, and the August 2005 data).[374] Accordingly, there was no "weighing" of the respective merits of the two sets of data (as suggested by Prof Cross[375]) – they were kept apart by the IRA Team and used to derive two entirely separate estimates of unrestricted risk.

232. Australia considers that its response to Question 99 after the first substantive meeting should also be taken into account in any further consideration of this question.[376]

[371] See: Australia's first written submission, para. 778; Final IRA Report, Part B, Table 43 at p. 174, Table 45 at p. 179.

[372] New Zealand's first written submission, para. 4.126.

[373] Reply of Prof Cross, q. 98, p. 8.

[374] See: Final IRA Report, Part B, pp. 165-166, 173-174, 183, 187.

[375] Prof Cross stated:

> Australia does not appear to have challenged the quality or provenance of the August 2005 data presented in IRA Table 40 but continues to give the old estimates (based on much more limited data) equal weight.

(Reply of Prof Cross, q. 98.)

[376] See: Australia's responses to the Panel's questions after the first meeting, q. 99.

Question 104: Whether standard statistical techniques support the view that a 600 fruit sample would provide 95% confidence that no more than 0.5% (1 in 200) fruit have cocoons, and whether an infestation level of 0.5% of apple fruit with ALCM cocoons would be enough to initiate an ALCM population

i. Whether an infestation level of 0.5% would be enough to initiate an ALCM population

233. While Prof Cross and Dr Sgrillo had different opinions about the relevant parameters, they both concluded that at a 0.5% infestation rate, sufficient infested apples would be located at the same place at the same time in Australia for an adult of each sex to be present on occasions. To assist the Panel, Australia outlines their respective approaches below.

234. In respect of New Zealand's claim that "an infestation level of 0.5% would not be enough to initiate a colony"[377], Prof Cross expressed the view that:

> An infestation level of 0.5% of apple fruit with ALCM cocoons would be enough to initiate an ALCM population providing a sufficiently large number of fruits were disposed of within the female flying distance of an apple tree.[378]

In his considerations, Prof Cross suggested that, after allowing for reduced viability and parasitism and the protracted emergence relative to the short life span, a 0.5% infestation rate would correspond to an actual effective infestation rate of 0.1% or even 0.05%. He then went on to conclude that:

> [A] 0.5% infestation rate of occupied cocoons would have a 5% chance of initiating an infestation if perhaps 500-1000 fruits were discarded in one place within the female flight range of a susceptible host.[379]

235. Australia notes two key values used in Prof Cross' calculation. First, the calculated number of fruit required (500–1000) is based on having a 5% chance of a pest of each sex being present together. Secondly, only 10% to 20% of the original occupied cocoons will contribute to this because of non-viability and time of emergence.

236. By contrast, Dr Sgrillo estimated that:

[377] New Zealand's first written submission, para. 4.137.

[378] Reply of Prof Cross, q. 104, p. 12. (emphasis added)

[379] Reply of Prof Cross, q. 104, p. 15. (emphasis added)

> These numbers generates proportion of 0.15 and 0.25, respectively, of infected fruits with viable pupae. The number of fruits necessary to obtain 3 viable cocoons if estimated dividing 3 by the proportions (0.15 and 0.25) what generates 20 and 12 fruits respectively. Finally if 0.5% of the population is infested then it will be necessary 4,000 and 2,400 fruits disposed in the same place and almost in the same time, respectively, to generate 1 pair of adults that could mate.[380]

Australia notes the same two key values for Dr Sgrillo's calculations. While not explicitly stated, the calculated number of fruit required (2,400–4,000) is based on having a 60% chance of a pest of each sex being present together. The value of 60% comes from New Zealand's claim that an average of three viable cocoons will have a 60% chance of a male and female among them.[381] Dr Sgrillo's calculations are based on three viable insects. The second key value is that between 15% and 25% of occupied cocoons were considered to be viable.

237. Although Prof Cross and Dr Sgrillo considered different but overlapping ranges for the proportion of occupied cocoons that could contribute to a mating pair (10–20% compared to 15–25%), and although they use a different likelihood that one adult of each sex would be present (5% compared to 60%), the number of apples that need to be present at the one time under both versions is not excessive – ie. less than 4,000. Prof Cross' fruit numbers are less than Dr Sgrillo's because they are based on a lower chance (5% compared to 60%) of a male and female. Australia recalls that the IRA Team did not consider that the infestation rate would be as high as 0.5%[382], and that it also concluded that a correspondingly larger number of apples would need to be together in order for establishment to occur. Nonetheless, the conclusion to be drawn from both experts is that it would be possible for an adult of each sex to be present on occasions.

ii. Determining the proportion of viable insects

238. Prof Cross set out a list of factors "relevant in the consideration of the risk of establishment of ALCM". Among them, he separately listed the following:

> 2. The proportion of these occupied cocoons that contain viable ALCM
> 3. The proportion of ALCM that are parasitized by *Platygaster demades*.[383]

[380] Reply of Dr Sgrillo, q. 104, p. 18. (emphasis added; footnote omitted)

[381] See: New Zealand's first written submission, para. 4.126.

[382] The August 2005 data indicated an infestation range of 0.1%-0.38%. See: Final IRA Report, Part B, pp. 166 & 173-174 (Tables 42 & 43).

[383] Reply of Prof Cross, q. 104, p. 13.

Australia disagrees with Prof Cross that these are two factors that should be considered separately. In Australia's view, a cocoon that contains an insect that has been parasitized by *P. demades* should not be considered as a cocoon containing a viable ALCM. Therefore, all that is required is an assessment of whether a cocoon contains a viable ALCM (which would take into account the effects of potential parasitism by *P. demades*). Accordingly, Australia does not consider it appropriate to apply reduction factors of both 50% (for viability) and 30% (for parasitism) as Prof Cross suggested[384], when determining the importation rate of viable ALCM.

iii. The biology of ALCM

239. Australia notes that Dr Sgrillo's biological comments in response to this question are of a general nature, relating to establishment of insects, and are not specific to the biology of ALCM. This falls outside the field of expertise for which he was appointed. In any event, in respect of Dr Sgrillo's comments regarding the potential for the insects to disperse before they find a mate[385], Australia understands that ALCM males will seek out females and mate before the females disperse. This view is supported by the findings of Cross and Hall (2009)[386] and Smith *et al.* (2005).[387]

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[384] Prof Cross stated:

> The 600 fruit sample would provide 95% confidence that no more than 0.5% (1 in 200 fruit) have occupied cocoons, but the actual infestation rate would be reduced by a factor 0.5 x 0.7 for reduced viability and parasitism …

(Reply of Prof Cross, q. 104, p. 15; emphasis added)

[385] See: Reply of Dr Sgrillo, q. 104.

[386] Cross & Hall (2009) stated:

> Adult apple leaf midge emerge from the soil, the males a short time before females. A likely explanation for the strong effect of trap height on catches is that, after emergence, males stay at ground level or close to it on ground herbage until attracted by females which also emerge mainly from the soil.

Exhibit AUS-124: Cross JV and Hall DR (2009), "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: 139–144.

[387] Smith *et al*. (2005) stated:

> Under our laboratory conditions, observations have shown that *D. mali* tend to mate less than one hour after eclosion (unpublished data). This was also the case for *D. mali* in New Zealand (Harris et al. 1999). Their ability to mate quickly is due to their ability to synchronize their emergence both temporally (Figs. 1 and 2) and spatially (Fig. 1). The tendency for females to remain on the ground until they are mated keeps virgin adults close in space and decreases the time required to find a mate.

Heath JJ, Zhang A, Roelofs WL, & Smith RF (2005), "Flight Activity and Further Evidence for a Female-Produced Sex Pheromone of the Apple Leaf Midge, *Dasineura mali,* in Nova Scotia", *Northeastern Naturalist* 12(1) 93-102, pp. 100 & 101. [Reference attached to Dr Sgrillo's replies to questions]

240. Finally, Australia notes that, in respect of the proportion of viable ALCM on New Zealand apples, Dr Sgrillo recognised that "the data is not fully reliable", because it "is not representative of the average New Zealand conditions."[388]

Question 108: Importation step 2 and the level of ALCM-infestation of New Zealand apples

241. In relation to the comments of Prof Cross that the IRA Team should have relied exclusively on the August 2005 data (set out in Table 40 of Part B of the Final IRA Report),[389] Australia refers the Panel to its comments on the reply to Question 98, above.

242. Australia also notes the opinion of Prof Cross that "Figures X and Y [sic] in Australia's exhibit 51 also present good quality data on the incidence of ALCM cocoons on fruit".[390] This data again supports Australia's contention that there is high variability in infestation levels in New Zealand. For example, in respect of one variety (Royal Gala), up to 5.38% of fruit was infested with ALCM in the 2002 season.

243. In relation to the comments of Dr Sgrillo on the probability range selected by the IRA Team for Importation step 2[391], Australia refers the Panel to its comments on Questions 109 and 110, below. Also, as previously explained[392], the data available was scant and the IRA Team had to exercise its expert judgment to select a probability range appropriate for the whole of New Zealand, in relation to which it could be confident that the potential for seasonal and climatic variation in ALCM infestation levels was accounted for. In any event, the IRA Team relied upon the August 2005 data to derive a separate alternate probability of importation.[393]

Questions 109 and 110: The likelihood that apples picked would be infested with ALCM evaluated at Importation step 2

244. Prof Cross considered that the IRA Team's analysis at Importation step 2 "doesn't appear to have … taken into account [the work of Rogers *et al*. (2006)] when fixing the probability

[388] Reply of Dr Sgrillo, q. 104, p. 18.

[389] Reply of Prof Cross, q. 108.

[390] Reply of Prof Cross, q. 108. Australia presumes that Prof Cross meant to refer to Figures Y and Z, as Figure X relates to the field incidence of black spot which is unrelated to ALCM.

[391] Reply of Dr Sgrillo, q. 108.

[392] See: Australia's responses to the Panel's questions after the first meeting, q. 88.

[393] See: Final IRA Report, Part B, p. 166.

values in the summary analysis of importation step 2."[394] Australia has explained in detail why the IRA Team did not consider the work of Rogers *et al.* (2006) to be a reliable source of information[395] – a point on which Prof Cross himself agreed.[396]

245. The IRA Team factored in the potential that a proportion of cocoons on New Zealand apples would not contain viable ALCM by using a triangular distribution at Importation step 2, which skewed the distribution towards the lower end of the likelihood range and thereby gave less weight to the maximum value selected.[397] As previously explained[398], the most likely value of 5% chosen by the IRA Team reflects the fact that a large proportion of cocoons (around 60%) may not contain viable ALCM.

246. In any event, as explained above, the IRA Team's analysis under Importation step 2 had no impact on its alternate probability of importation conclusion which was based on the August 2005 data, and not on its analysis of Importation steps 1-8.[399]

Questions 101, 111 and 112: The potential for ALCM-contamination during picking and transport evaluated at Importation step 3

247. As Prof Cross observed[400], reliance upon the August 2005 data to derive a probability of importation means that the IRA Team's analysis of potential contamination during picking and transport at Importation step 3 is irrelevant. New Zealand's arguments in respect of the IRA Team's analysis of Importation steps 2, 3 and 8 do not undermine the IRA Team's conclusion that the probability of importation may be in the range 0.1%-0.38%, because that conclusion was based on the August 2005 data and not on the IRA Team's analysis of Importation steps 1-8.

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[394] Reply of Prof Cross, q. 109.

[395] Australia's first written submission, paras. 730-735; Australia's response to the Panel's questions after the first meeting, q. 87.

[396] Reply of Prof Cross, q. 97.

[397] See: Final IRA Report, Part B, p. 160; Australia's first written submission, para. 729.

[398] See: Australia's responses to the Panel's questions after the first meeting, q. 88.

[399] See: Final IRA Report, Part B, pp. 165-166.

[400] Prof Cross stated:

> The leaf material does therefore pose some limited additional risk of increasing the frequency of fruit contamination by ALCM compared to the situation just prior to picking. However, the August 2005 endpoint inspection data will have already taken that into account with respect to the fruits. … [I]f the use of NZ Aug 2005 end point inspection data is accepted, no additional risk should be attributed as it is already taken into account.

(Reply of Prof Cross, q. 101, p. 11.)

Question 113: Importation step 8

248. Prof Cross stated that "[t]here appears to be a fundamental disagreement between the parties as to whether a second inspection would be carried out".[401]

249. Pursuant to the methodology used in the Final IRA Report, the analysis under Importation step 8 was specifically directed to the potential impact of "on-arrival minimum border procedures" on the survival of the pest. As previously explained, the IRA Team conducted its analysis of the probability of importation for all pests on the basis that no risk reduction measures (such as inspection) would be considered in its *unrestricted* risk analysis[402]; the potential effects of a 600-unit inspection were evaluated by the IRA Team later in its *restricted* risk analysis.[403] Furthermore, as previously advised,[404] pursuant to the recommendations of the Final IRA Report, there will be no 600-unit inspection by AQIS *on-arrival* in Australia, because the consignments are to be *pre-cleared* in New Zealand.[405] The reply of Prof Cross does not raise doubts as to the legitimacy of the IRA Team's approach and/or recommendations in this regard. His assumptions as to the IRA Team's approach were correct when he stated that:

> Australia's evaluation of importation step 8 seems to suggest there would only be minimum border procedures and that there would be no second inspection, the values of 0.9 being given to account for possible natural mortality.[406]

250. Prof Cross also considered that:

> If there is a second mandatory independent border inspection of 600 fruits were done then this is essentially the same as a total inspection of 1200 apples. … So a second inspection would reduce the likelihood by a factor of 2, giving a probability factor for this stage of 0.5 not including any other mortality factors. This is not far from the value of 0.46 given in para 3.346 of NZ FWS (calculated on an assumption of an infestation level of 0.13%) and appreciably lower than the mid point value of 0.9 given in importation step 8 of Australia's IRA.[407]

[401] Reply of Prof Cross, q. 113, p. 18.

[402] See: Australia's responses to the Panel's questions after the first meeting, q. 148; Australia's first written submission, paras. 750-751; Final IRA Report, Part B, p. 23.

[403] See: Final IRA Report, Part B, pp. 188-192.

[404] See: Australia's responses to the Panel's questions after the first meeting, q. 148.

[405] See: Final IRA Report, Part B, p. 314.

[406] Reply of Prof Cross, q. 113, p. 19.

[407] Reply of Prof Cross, q. 113, p. 18.

From a technical perspective, Australia has concerns with the basis on which this comparison has been made. Prof Cross compared the effects of *two* 600-unit inspections (that would be part of a *restricted* risk estimation) to the IRA Team's probability value of 0.9 (most likely)[408] for Importation step 8 in its *unrestricted* risk estimation.[409] However, the effect of any inspections, and/or any other mitigation measures, would be reflected in the consideration of the *restricted* risk estimation. In Australia's view, the two estimates cannot be compared.

Question 114: The IRA Team's decision not to limit itself to the August 2005 data indicating the level of ALCM infestation of export quality New Zealand apples

251. As Australia explained in its comments to the Panel on the draft proposed questions to the experts[410], New Zealand has not raised an argument that the IRA Team should have limited its consideration in respect of the probability of importation to the August 2005 data. As New Zealand has not raised such an argument, Australia submits that Prof Cross' response to this question should not be taken into account by the Panel.

252. In any event, whether or not the IRA Team limited itself to the August 2005 data did not affect their ultimate conclusion that the unrestricted risk relating to the August 2005 data was above Australia's ALOP, and required a 3000-unit inspection to address that risk.[411]

[408] See: Final IRA Report, Part B, p. 165.

[409] Also, Australia assumes that Prof Cross meant to refer to paragraph 4.346 of New Zealand's first written submission in the above quoted statement, and not paragraph "3.346". Australia notes that New Zealand's calculations in paragraph 4.346 related to the effects of *one* 600-unit inspection being taken into account at Importation step 2, rather than two such inspections as Prof Cross has suggested.

[410] Australia's letter to the Panel, 19 December 2008, Attachment: Australia's comment to q. 114.

[411] See: Final IRA Report, Part B, pp. 183, 187, 190.

Question 115: Whether adult emergence of ALCM from diapause may take place in seasons other than spring

253. Australia notes that Prof Cross largely confirmed Australia's submissions in respect of suitable environmental conditions and emergence.[412] Australia also refers the Panel to its previous comments on the potential for infested New Zealand apples to be present in Australia during spring.[413]

Question 122: The likelihood and implications of New Zealand apples being repacked at rural packing houses in close proximity to orchards, in respect of ALCM

254. In relation to ALCM, Prof Cross commented that the IRA Team "did not consider the case of retail ready fruit".[414] Australia disagrees and refers the Panel to its comments in relation to Questions 98 and 120, as well as the Final IRA Report.[415]

Questions 107 and 118: The relevance of the experience of Chinese Taipei in respect of the potential establishment of ALCM in Australia

255. In respect of New Zealand's reliance upon its apple exports to Chinese Taipei as evidence that ALCM will not establish in Australia[416], Prof Cross commented that:

> Because of the unsuitable climate of Chinese Taipei, New Zealand's experience in exporting apples to [Chinese Taipei] should not be used to draw conclusions about the risks of importation into Australia.[417]

Question 102: The effects that cool storage of apples has on attached ALCM cocoons, specifically relating to the delayed developmental stage of diapause

256. Australia disagrees with Prof Cross that the relatively low probability of establishment which results from viable insects requiring "a prolonged period of emergence … after transport to Australia" was not taken into account by the IRA Team.[418] On the contrary, the IRA Team reasoned as follows:

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[412] See: Australia's first written submission, paras. 759-771.

[413] See: Australia's first written submission, paras. 768-770.

[414] Reply of Prof Cross, q. 122.

[415] See: Final IRA Report, Part B, pp. 171-172.

[416] New Zealand's first written submission, para. 4.133.

[417] Reply of Prof Cross, q. 107. This is confirmed in Prof's Cross response to q. 118.

[418] Reply of Prof Cross, q. 102.

> If mature larvae or pupae survive cold storage or controlled atmosphere storage, adults could emerge from the pupal stage after the apples have been taken out of 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.
>
> A stakeholder claims that key factors for the termination of pupal diapause in New Zealand include critical day length and subsequent temperatures. First adult emergence in New Zealand is synchronised with unfurling young apple shoots and Tomkins *et al*. (2006) report emergence of overwintered adult midge from mid-September to mid-November. Pupal development time to adult emergence is claimed to be 30 days at a constant 23ºC (MAFNZ, 2006a) based on field collected pre-pupae reared in the laboratory so it is certainly unrealistic to take 30 days as a minimum. Fluctuating temperatures in the field mean that pupal development time could be shorter or longer than 30 days and until further data sets are available it is unwise to rely upon pupal development times at such unrealistic temperatures.
>
> The adult lifespan of both sexes ranges from 2 to 6 days under laboratory conditions. Field observations indicate adults only live for a few days in the wild. Both the adult male and female have wings and are able to fly. …
>
> Apple leafcurling midge reproduces sexually. A successful transfer of apple leafcurling midge from infested/infected fruit to a host means that an emerged female would need to attract a male with which to mate, and then lay her eggs on a susceptible host plant during the two to six days of her adult lifespan. A sufficient number of eggs would need to survive and hatch for a successful transfer to occur.[419]

257. It is clear from the above passage that the IRA Team fully appreciated the many uncertainties and small likelihoods associated with the potential of ALCM to establish in Australia.

Question 105: The inadequacy of an inspection and treatment system based on a 600 fruit sample to manage the risk for ALCM

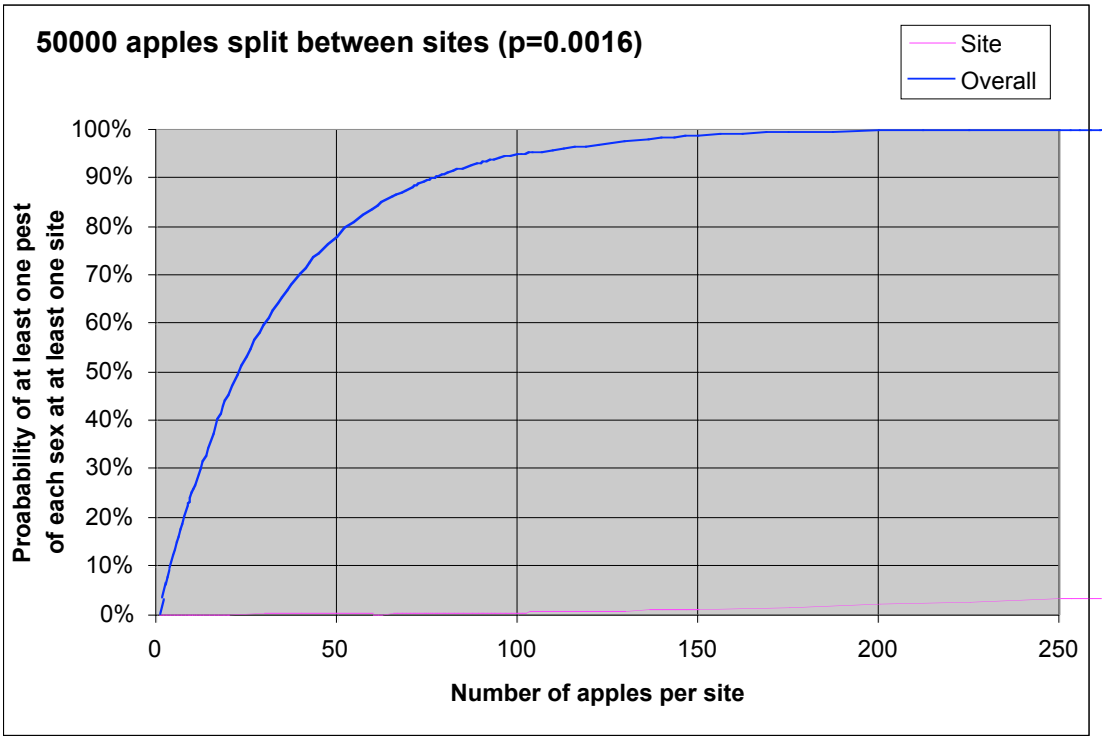
258. The response of Prof Cross covered two import scenarios: retail ready packs and bulk bins.[420] But his answer did not mention the ALCM-infestation rate of New Zealand apples which is the key determinant as to whether or not a 600 fruit sample would reduce the risk adequately to achieve Australia's ALOP.[421]

[419] Final IRA Report, Part B, p. 171.

[420] Reply of Prof Cross, q. 105.

[421] See: Final IRA Report, Part B, pp. 188-190; Australia's responses to the Panel's questions after the first meeting, q. 141.

259. In circumstances where apples are imported "retail ready" (as Australia understands that term), and are not distributed in bulk bins, there would still be a small likelihood of a pest of each sex being together at the same place at the same time. The graph below, based on 50,000 apples with an infestation rate of 0.16%, shows that halving the number of apples together at a site (and doubling the number of sites) does not half the chance that there will be at least one site with a pest of each sex. For example, the chance of a mating pair being together is about 95% where there are 100 apples at each of 500 sites, and then only reduces to 78% where there are 50 apples at each of 1,000 sites.



260. Finally, Australia notes that Prof Cross did not consider that a 600-unit inspection would be sufficient risk management without additional measures being imposed.[422]

[422] The opinion of Prof Cross that a 600 fruit sample may be adequate was on the basis that all fruit would be imported "retail ready in packs or cartons ready for sale held in cold stores and redistributed to markets with minimal breaks in the cold chain and there were minimal losses resulting in disposal of fruits in the vicinity of orchards". (Reply of Prof Cross, q. 105.)

Question 117: The likelihood of spread of ALCM in Australia, with respect to climatic conditions

261. Prof Cross considered the IRA Team's analysis of the probability of spread to be "objective and credible".[423] Also, in contradiction of New Zealand's claim[424], Prof Cross confirmed that, "the IRA did not assume that ALCM would spread to all areas of Australia where apples are grown commercially or domestically and the overall assessment is correct."[425]

Questions 96 and 119: The IRA Team's assessment of the potential consequences of an ALCM incursion in Australia

262. Prof Cross concluded that the IRA Team's assessment of the consequences of an ALCM incursion in Australia was "objective and credible".[426]

Question 120: the IRA Team's view that an inspection of a 600 fruit sample from each import lot would not achieve Australia's ALOP for ALCM

263. Australia notes Prof Cross' comment that the IRA Team's conclusions as to unrestricted risk should be "recalculated for two different importation scenarios" in respect of whether apples would be imported "retail ready". However, given that New Zealand refused to rule out modes of trade other than the export of only "retail ready" apples[427], there was no basis for the IRA Team to assume that only "retail ready" apples would be imported. In this regard, Australia refers the Panel to its comment on Question 98 above.

264. Also, the reasoning of Prof Cross appears to be based on his view that restricting imports to "retail ready" apples would be an appropriate risk management measure. In Australia's view, this is outside the scope of the Panel's question. The only "alternative" measure referred to in the Panel's question was the 600-unit inspection that has been claimed by New Zealand. Australia respectfully considers that Prof Cross' response should have been limited to

[423] Reply of Prof Cross, q. 117. Also, see: Reply of Prof Cross, q. 94(v).

[424] New Zealand argued that: "if ALCM were ever to become established in Australia, it is highly unlikely that it would become successfully established in all of the areas where apples are grown commercially and where apple trees are grown in domestic gardens." (New Zealand's first written submission, para. 4.365.)

[425] Reply of Prof Cross, q. 117.

[426] Reply of Prof Cross, q. 96.

[427] See: Final IRA Report, Part B, p. 9.

consideration of this purported alternative measure, when it is taken alone (ie. without any additional measure that all imports must be "retail ready").

265. Australia notes, however, that Prof Cross implicitly confirmed the IRA Team's conclusion that the "alternative" measure put forward by New Zealand – that is, a 600-unit inspection by itself – would not be sufficient to manage the risks associated with ALCM to achieve Australia's ALOP.[428]

(c) Concluding remarks on experts' replies on ALCM

266. As indicated above, Australia considers that the comments of the experts support Australia's contention that New Zealand has failed to establish any serious flaws with the IRA Team's assessment of the risks associated with ALCM.

E. QUESTIONS SPECIFIC TO JAPANESE NASHI PEARS

267. In Australia's view, the experts' replies regarding Japanese nashi pears confirms that the risks (that is, likelihood and consequences) associated with the importation of apples from New Zealand and the importation of nashi pears from Japan differ. Accordingly, the expert advice confirms that it is appropriate for Australia to have different measures in place for these two products. Australia considers that the experts' replies provide no support to New Zealand's claims that Australia applies arbitrary or unjustifiable distinctions in levels of protection which result in discrimination or a disguised restriction on trade.

268. Before turning to the specific experts' replies, Australia notes that the significantly different volumes of trade involved in the respective products – a matter of critical importance to the consideration of risk[429] – was not specifically addressed by the experts' replies on Japanese nashi pears. However, as Dr Sgrillo observes in relation to the risk assessment questions, "risk is directly proportional to the volume imported".[430] Prof Latorre similarly recognises that as the

[428] Prof Cross referred to "alternative measures coupled with a 600 fruit inspection would be preferable provided they met Australia's ALOP." (Reply of Prof Cross, q. 120, p. 22; emphasis added)

[429] See: Australia's first written submission, paras. 994-997; Australia's responses to the Panel's questions after the first meeting, q. 101.

[430] Reply of Dr Sgrillo, q. 137.

volume of trade increases, so too does the likelihood of a biological event occurring.[431] Accordingly, the relatively small volume of trade in Japanese nashi pears[432] compared with the expected large import volumes of New Zealand apples should also be borne in mind by the Panel when drawing on the experts' replies.

269. Finally, Australia recalls its concern that the Panel should not have asked questions in relation to this issue given that none of the experts were appointed with respect to expertise in Japanese Erwinia or brown rot.

Question 12. What is your understanding as to how the likelihood of entry, establishment and spread into Australia of Japanese Erwinia associated with Japanese nashi pears could be compared to that of *Erwinia amylovora* associated with New Zealand apples? Is there a sound scientific basis for New Zealand's argument that there are comparable risk profiles at issue in the case of Japanese Erwinia and *Erwinia amylovora*, considering also the potential biological and economic consequences?

270. Dr Deckers notes that Japanese Erwinia only affects pears, a distinction which "will of course have consequences for the global risk evaluation".[433]

271. Dr Paulin also notes that Japanese Erwinia:

> …is present only in the Hokkaido Island. This allows Australia to import fruits from an other area, remote from Hokkaido. This is a clear and objective difference between *Erwinia*/Japan, and *E. amylovora*/New Zealand situations.[434]

272. The above differences identified with respect to likelihood *and* consequences confirm that Japanese Erwinia and *Erwinia amylovora* clearly have different risk profiles. Further, Australia recalls its comments on volume of trade above.

Questions 61: Can the likelihood of entry, establishment and spread of brown rot associated with Japanese nashi pears be compared to that of European canker associated with New Zealand apples? Are there respected and qualified scientific sources to support New Zealand's argument in para. 4.443 of its FWS that there is a higher risk profile for

[431] Reply of Prof Latorre, q. 137.

[432] Australia's first written submission, paras. 994-997.

[433] Reply of Dr Deckers, q. 12. See also: Reply of Dr Paulin, q.12.

[434] Reply of Dr Paulin, q. 12. (original emphasis)

Japanese nashi pears in the context of brown rot than for New Zealand apples in the context of European canker? Please comment on whether the economic and biological impact for the Australian agriculture industry may be different if M. fructigena (brown rot) were to establish in Australia than if European canker were to establish in Australia.

273. Prof Latorre notes that if nashi pears are only imported from pest-free areas in Japan, then "the likelihood of the entrance of *M. fructigena* drops down considerably, to negligible".[435] Prof Swinburne also recognises the reduction in risk associated with pest-free areas.[436]

274. The above difference identified by the experts with respect to likelihood confirms that brown rot and European canker clearly have different risk profiles. Further, Australia recalls its comments on volume of trade above.

F. GENERAL QUESTIONS

Question 4. Based on the relevant parts of Australia's IRA, and Parties' arguments, what is your understanding as to the exact level of involvement of AQIS in audits and inspections required by Australia in regard to fire blight, European canker and ALCM?

275. As Australia noted in its comments on the proposed questions, Australia does not consider this to be an appropriate question for the experts selected by the Panel because none of the experts have expertise in Australia's quarantine practices, including the nature of the requirement regarding AQIS involvement. In this regard, Australia does not consider that the Panel should require expert assistance to determine whether Australia imposes the requirement as stated by Australia.

276. Australia's concerns are borne out by the experts' replies, which indicate that the experts may not have fully appreciated the nature of the audit requirement. For example, Prof Swinburne indicated that he understands that it is:

> …presumably the intention that during this 'Preclearance' phase AQIS officers would work alongside their MAFNZ counterparts, and be directly involved in

[435] Reply of Prof Latorre, q. 61.

[436] Reply of Prof Swinburne, q. 61.

> all inspections…[A]fter gaining this initial experience the role of AQIS officers would be reduced to that of systems auditors.[437]

277. However, Australia has clarified the nature of the requirement,[438] noting that the AQIS requirement consists of a systems audit *only*, and do not require AQIS officers to "work alongside their MAFNZ counterparts, and be directly involved in all inspections" as suggested by Prof Swinburne. For example, Australia clarified the requirements, as follows:

> …"Pre-clearance" means that the normal on-arrival verification requirements are undertaken outside Australia and may include fruit inspection.
>
> Accordingly, the reference to orchard inspections and verification of packing house procedures in the text should be taken to be linked to auditing requirements which AQIS officials may separately undertake while present in New Zealand to conduct pre-clearance…
>
> …it is not proposed that AQIS officials be involved in all orchard inspections or packing house operations to satisfy auditing requirements. Rather, systems audits would be conducted.[439]

278. Dr Paulin noted that:

> [I]t is not exaggerated from Australia, at least in the first trade, to be willing to obtain the best possible view on the way the proposed measures are applied at the field and packinghouse levels. Even if as I understand, AQIS usually behave in a more confident way towards other imports from New Zealand.[440]

279. Dr Paulin clearly recognises the importance of the AQIS involvement requirement. In regard to his comment that AQIS usually behaves in a "more confident way towards other imports from New Zealand", Australia has previously identified situations in which it *does* impose similar requirements with respect to other imports from New Zealand:

> Australia does require a similar AQIS involvement in systems audits of orchard inspections for pest freedom, verification of packing house procedures and fruit inspection and treatment for stone fruit from New Zealand to Western Australia.[441]

Question 5. Based on the relevant parts of Australia's IRA, and Parties' arguments, what is your understanding as to whether Australia requires a systems audit of 100% of survey

[437] Reply of Prof Swinburne, q. 4 (emphasis added). Dr Paulin appears to have a similar understanding: Reply of Dr Paulin, q. 4.

[438] Australia's first written submission, paras. 151-155; Australia's responses to the Panel's questions after the first meeting, qs. 47, 48, 49, 51 and 52.

[439] Australia's responses to the Panel's questions after the first meeting, q. 48.

[440] Reply of Dr Paulin, q. 4.

[441] Australia's responses to the Panel's questions after the first meeting, q. 51.

teams in the field in the first year and 100% of all packing houses, as New Zealand argues in R 46? How would this requirement compare with those applied by other Members facing similar risks and situations?

280. As Australia noted in its comments on the proposed questions, Australia does not consider this to be an appropriate question for the experts selected by the Panel because none of the experts have expertise in Australia's quarantine practices, including the nature of the requirement regarding AQIS involvement. In this regard, Australia does not consider that the Panel should require expert assistance to determine whether Australia imposes the requirement as stated by Australia.

281. Nonetheless, Dr Schrader recognised that Australia has clarified the nature of its systems audit requirement, stating that "Australia intends to audit each survey team, but not each member in each survey team".[442] Dr Schrader, however, noted two queries, to which Australia is happy to respond.

282. First, Dr Schrader queried the meaning of the term "sufficient members of each team":

> [T]he amount of members of the survey team being audited is not quantified – Australia only states that "sufficient members of each team…" will be audited. Therefore, in an extreme scenario, Australia could conclude, that the team has to be audited in total as it would otherwise not be sufficient…"[S]ufficient" is an arbitrary term and quite vague.

283. Australia notes that during any audit, it is the responsibility of the auditor to be satisfied that the systems, processes and procedures in place are being followed at an appropriate level of competency by those persons identified as having responsibility for the designated tasks. For example, in auditing a survey team, an auditor could examine training records, and the training program, to establish whether team members had received adequate instruction on how to detect disease symptoms in a field situation. However, to satisfy itself that the instruction had been effective and that survey team members are competent, the auditor would need to observe and question a selection of team members during an actual survey. It would be a rare occurrence where an auditor needed to observe and question an entire survey team to satisfy themselves that there was an appropriate level of competence.

284. Second, Dr Schrader queries the meaning of the term "100% of packing houses":

[442] Reply of Dr. Schrader, q. 5.

> I see a discrepancy in the clarification of 100% audits of survey teams and the explanation, what 100 % of packing houses means. The explanation given by Australia, that "a "100% audit of packing houses" means that each packing house will be audited by AQIS officers while they are present undertaking fruit inspections for pre-clearance" is not in line with the explanation given regarding the contrast between a "100% audit of survey teams" and "the audit would include 100% of survey teams". It should be clarified, whether this formulation should be in line with the formulation for survey teams, i.e. "the audit would include 100% of packing houses."[443]

285. Australia notes that, as suggested by Dr Schrader, the term "100% of packing houses" means that "the audit would include 100% of packing houses". Further, the audit would only include 100% of packing houses that were processing fruit *for export to Australia*. As Australia has previously explained:

> [A] "100% audit of packing houses" means that each packing house will be audited by AQIS officers while they are present undertaking fruit inspections for pre-clearance. During the Australian officials visit to New Zealand in June 2007, a New Zealand official expressed a view that, at least initially, there was likely to be one, perhaps two packing houses in each apple production region that specialise in packing apples for Australia. [444]

286. Australia further notes that if there were a larger number of packing houses than as suggested by the New Zealand official, AQIS would review the number of packing houses that would require a site audit, in consultation with New Zealand. In this regard, Australia notes that there is a mechanism set out in the Final IRA Report for reviewing the import conditions.[445]

287. In relation to the question of how this requirement compares to other Members' requirements, Australia notes Dr Deckers' comment that "[a]n audit of the different existing quality systems at the different levels by AQIS looks normal".[446]

Question 142. Please comment on whether the alternative measure proposed by New Zealand relating to inspection by AQIS officials, verification of standard commercial practice and provision of packing house details imposed by Australia on the importation of apples would achieve Australia's ALOP. How does this measure compare to the relevant requirements identified by Australia's IRA in terms of risk mitigation? Under what

[443] Reply of Dr Schrader, q. 5.

[444] Australia's responses to the Panel's questions after the first meeting, q. 53.

[445] Final IRA Report, Part B, p. 325.

[446] Reply of Dr Deckers, q. 5.

circumstances, if at all, could this alternative measure proposed by New Zealand achieve Australia's ALOP?

288. Australia recalls its objection to this question being put to the experts on the basis that the Panel would be making the case for New Zealand.[447] The dispute under Article 5.6 in respect of the "AQIS involvement" measure relates to whether New Zealand has identified an alternative to the measure at all. Australia has advised that the "alternative" put forward by New Zealand is actually the same measure which Australia already requires (ie. systems audits by AQIS officers of the inspections, treatment and packing house procedures carried out by New Zealand).[448] Any difference in opinion between the Parties in that regard is a question of fact for resolution by the Panel itself.

289. Furthermore, in respect of other aspects of the Panel's question, the "AQIS involvement" measure is not directed at achieving Australia's ALOP *itself* – rather, it acts to support those principal measures which do aim to directly reduce risk.

290. To the extent that any of the experts suggested alterations or variations to the existing measures, Australia considers that such suggestions should not be considered by the Panel, because the only "alternative" measures that may be considered by the Panel are those in relation to which New Zealand has pursued a claim.

Questions 47, 92 and 106. Is the requirement identified in Australia's IRA that a packing house provide details of the layout of the premises, sufficiently justified by the scientific evidence relied upon?

291. Australia recalls its objection to the Panel posing these questions to the experts[449], on the basis that New Zealand has accepted that *all* of Australia's measures are based on the Final IRA Report[450]. Therefore, the only appropriate lines of enquiry for the Panel relate to whether the Final IRA Report is a valid risk assessment and whether the measures are more trade-restrictive than required within the meaning of Article 5.6.

[447] Australia's letter to the Panel, 19 December 2008: Attachment, draft question 141.

[448] See: Australia's first written submission, paras. 1106-1108. Also, see: Australia's responses to the Panel's questions after the first meeting, qs. 47, 48, 52.

[449] See: Australia's letter to the Panel, 19 December 2008: Attachment, draft question 106.

[450] New Zealand's first written submission, paras. 4.403-4.404; New Zealand's responses to the Panel's questions after the first meeting, q. 117, para. 257.

292. Furthermore, as previously explained[451], the basis for imposing the ancillary measures is inextricably connected to the basis of the related principal measures, and therefore Australia does not consider it appropriate to attempt to isolate the technical justification behind a single ancillary measure, as the Panel's question has effectively done.

293. The replies of the various experts to this question indicate that they may not have understood the reason behind Australia's imposition of this requirement. It is not designed to reduce risk itself[452] and it is not imposed for scientific purposes[453] – nor is there any requirement that it should be. Rather, the measure is intended to facilitate the verification of packing house procedures by AQIS officers and thus make such on-site verification more efficient and swift, and therefore less costly to New Zealand exporters.[454]

Question 130. Does Australia's IRA provide an objective and coherent assessment of the likelihood and implications of New Zealand apples being repacked at rural packing houses in close proximity to orchards, when assessing the risks related to fire blight, European canker and ALCM? Was such assessment made with proper methodological rigour?

294. The response of Prof Latorre related to European canker only. Prof Latorre appears to have misunderstood what the figures 0.1-5% and 70-100% in his reply refer to. Rather than relating to the probability of a particular biological event occurring (such as transfer, dispersal or establishment), as Prof Latorre apparently assumed[455], the figures correspond to the estimated

[451] See: Australia's responses to the Panel's questions after the first meeting, qs. 15,17, 19 & 20.

[452] Dr Deckers stated: "It is not clear which risk Australia wants to reduce with this measure." (Reply of Dr Deckers, q. 92.)

[453] Prof Latorre stated: "At present, there are no scientific reports demonstrating the spread of European canker at packing houses." (Reply of Prof Latorre, q. 92.)

[454] See: Australia's first written submission, para. 963; Australia's responses to the Panel's questions after the first meeting, q. 15.

[455] Prof Latorre stated that:

> [P]robability from 0.1 to 1.0 was assigned in the highest scenario. Probability of one would mean that if a single apple fruit had visible sporulating lesions of *N. galligena* and was repacked (or discharged?) at the packing houses, *N. galligena* would invariably spread to the nearest apple trees. If so, this is hard to believe. If apples were repacked at rural packing houses in close proximity to the orchards, I would expect that chances of dispersal and establishment of *N. galligena* to increase slightly.

(Reply of Prof Latorre, q. 130.)

proportion of apples that may be sent to orchard packing houses.[456] Australia notes that the Panel's question did not properly direct the experts to the Final IRA Report.

Question 125. In the light of internationally recognised and accepted practice and standards for risk assessment in horticultural products that are traded internationally, does a proper risk assessment need only evaluate measures that reduce or otherwise manage risk? Can or should risk assessments also evaluate or consider measures that do not, by themselves, have the objective of reducing risks?

295. Australia considers that the experts' replies to this question to be of limited assistance to the Panel because the question relates to a legal issue. Furthermore, Australia notes that the source of its obligations in the context of this dispute is the *SPS Agreement* only.

296. The reply of Dr Sgrillo focussed on the specific obligations of parties to the *International Plant Protection Convention* (IPPC) – in particular, the obligation that measures be "technically justified".[457] Similarly, Australia understands Dr Schrader's comment that "all potential measures that are proposed for managing the risk, either principal or designed to implement the principal measures, should be evaluated"[458], is connected to her understanding of the technical justification requirement set out in the IPPC.

297. Australia notes that, like the *SPS Agreement*, the relevant obligations in the IPPC are specifically limited to a defined group of measures: that is, "phytosanitary measures". According to Article II of the IPPC, "phytosanitary measure" is defined as: "any legislation, regulation or official procedure having *the purpose to prevent the introduction and/or spread of pests*" (emphasis added). This definition is similar to the definition of "SPS measure" in the *SPS Agreement*, in that it relates to measures that have the *purpose* or *objective* of *preventing* the introduction or spread of pests. That is, the definition of "phytosanitary measure" concerns only those measures which are intended to be *active* in the reduction of risk.[459] Australia's arguments on this matter relate to measures which do not fall within the definition of "SPS measure" when

[456] See: Final IRA Report, Part B, pp. 25-26, 145; Australia's responses to the Panel's questions after the first meeting, q. 99.

[457] Reply of Dr Sgrillo, q. 125.

[458] Reply of Dr Schrader, q. 125, p. 6.

[459] See: Australia's responses to the Panel's questions after the first meeting, qs. 21, 24.

taken alone[460], and they similarly would most likely not fall within the IPPC's definition of "phytosanitary measure".

298. Australia notes that Prof Latorre appeared to take a different view:

> To my understanding, risk assessment analysis should only consider measures that are directly related to reducing the risk of entrance, establishment and spread of a new pest or disease in a new geographical area.[461]

299. In any event, as previously explained, Australia considers that the technical justification for its ancillary measures flows from the technical justification for its principal measures, and New Zealand has accepted that *all* of Australia's measures are based on the Final IRA Report.

Questions 48, 93, 123 and 139: Whether, from a technical perspective and as described in Australia's IRA, the 17 specific measures that have been challenged by New Zealand can be distinguished as either principal or ancillary, or as either measures active in risk reduction, or measures designed to implement or support active measures

300. Prof Latorre recognised that the majority of the measures at issue in this dispute are imposed "to implement or support active measures", as opposed to being "active in risk reduction" themselves.[462] Prof Latorre further explained that:

> [P]hytosanitary measures which act directly to lower the risk of entrance, establishment and spread … should be considered as principal measures, while those measures implemented to support any active measure (principal measures) should be regarded as ancillary measures. The latter measures make sense only if principal measures exist.[463]

301. Dr Paulin and Prof Swinburne also recognised that some of the measures challenged by New Zealand could be considered as being in support of active measures, rather than as measures active in risk reduction.[464]

302. Similarly, Dr Sgrillo acknowledged that the ISPMs recognise "methods and operations designed to implement and support phytosanitary measures"[465], and commented that:

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[460] See: Australia's first written submission, paras. 854, 863-869; Australia's responses to the Panel's questions after the first meeting, q. 23.

[461] Reply of Prof Latorre, q. 125. (emphasis added)

[462] Reply of Prof Latorre, q. 93.

[463] Reply of Prof Latorre, q. 139. (emphasis added)

[464] Reply of Dr Paulin, q. 48; Reply of Prof Swinburne, q. 93.

[465] Reply of Dr Sgrillo, q. 140.

> [T]he measures could be technically distinguished supposing that the "principal" measures are the ones having the direct purpose to prevent the introduction and/or spread of quarantine pests and that the "ancillary" measures support, verify and operationalise the principal measures.[466]

303. Dr Schrader considered that there can be "independent and dependent measures" on the basis of the recognition of "systems approaches" in ISPM No. 14. Australia notes, however, that the notion of a "systems approach" refers to the application of more than one measure active in the reduction of risk measure – ie. at least two "principal" measures.[467] Australia's notion of "ancillary" measures is they are not aimed at the reduction of risk, *per se*,[468] and so it is probably not appropriate to refer to them as "dependent measures" within the meaning of ISPM No. 14. Australia's measures for fire blight employ a systems approach (with two principal measures), but its measures for European canker and ALCM envisage only one principal measure.[469]

Question 141. Please comment on whether, in general, "ancillary" and "principal" measures can share a common scientific basis. Does the scientific justification of an ancillary measure necessarily depend on whether its related principal measure is found to be scientifically justified?

304. Prof Latorre responded that "ancillary measures and principal measures can share a common scientific basis", and that "the justification of the ancillary measures depends on the existence of scientifically justified principal measures."[470]

305. Dr Sgrillo considered that:

> Some times the "principal" and "ancillary" measures can share the same technical justification. Measures that confirm or inspect other measures could share the same scientific justification.[471]

306. Similarly, Dr Deckers implicitly acknowledged that ancillary measures could share the same scientific basis as their related principal measures, when he stated that "the ancillary measures don't share always a common scientific base with the principal measures".[472]

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[466] Reply of Dr Sgrillo, q. 139.

[467] Specifically, ISPM No. 14 states that: "A systems approach requires two or more measures that are independent of each other, and may include any number of measures that are dependant on each other." (ISPM No. 14, p. 166.)

[468] See: Australia's responses to the Panel's questions after the first meeting, q. 21, 24.

[469] See: Australia's responses to the Panel's questions after the first meeting, q. 15.

[470] Reply of Prof Latorre, q. 141.

[471] Reply of Dr Sgrillo, q. 141.

307. The analysis of Dr Schrader appears to have assumed that "ancillary" measures could be considered "SPS measures" or "phytosanitary measures" within those respective definitions, and thus are required to be "technically justified". In its comment on Dr Schrader's reply to question 125, above, Australia explained that such an assumption does not take into account Australia's submission that the "ancillary" measures challenged by New Zealand do not fall within the definition of "SPS measure" when taken alone. In any event, Dr Schrader's analysis indicates that there is nothing in the *SPS Agreement* which prevents the technical justification of an ancillary measure being closely related to or dependent on that of a related principal measure.[473]

[472] Reply of Dr Deckers, q. 141.

[473] Reply of Dr Schrader, q. 141.