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International Plant Protection Convention

REPORT

Expert Working Group

Annex to ISPM 37: Criteria for determining host status of fruit to fruit flies based on available information (2018-011)

Virtual Meeting

17–28 January 2022

IPPC Secretariat

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CONTENTS

1. Opening of the meeting

1.1 Welcome by the IPPC Secretariat and introductions

[1] The IPPC Secretariat (hereafter referred to as "the secretariat") opened the meeting, welcomed all participants to the meeting of the Expert Working Group (EWG) on the Annex *Criteria for determining host status of fruit to fruit flies based on available information* (2018-011) to ISPM 37 (*Determination of host status of fruit to fruit flies*) and thanked them for offering to take part in the EWG.

[2] The participants all introduced themselves.

1.2 Presentation of the standard setting process and the role of participants

[3] The secretariat gave a presentation summarizing the standard setting process.[1] The secretariat also outlined the roles of the EWG participants, explaining that the experts contribute as global experts rather than as national or regional representatives.

[4] The Steward, Marina ZLOTINA (United States of America), pointed out that the text of the draft annex may differ fairly significantly from that drafted by the EWG once it reached the first consultation stage, and commented that if experts on the EWG had comments on the text at that stage, they could contact the IPPC contact point for their country with suggestions for amendments to be submitted as part of the normal consultation process.

[5] In response to questions, the secretariat explained that the length of the standard setting process is mainly dictated by the consultation process, but that this ensures transparency. It was anticipated, however, that the draft annex to ISPM 37 would be presented for adoption in 2024.

2. Meeting arrangements

2.1 Selection of the chairperson

[6] The EWG selected Aruna MANRAKHAN (South Africa) as chairperson.

2.2 Selection of the rapporteur

[7] The EWG selected Craig HULL (Australia) as rapporteur.

2.3 Adoption of the agenda

[8] The EWG adopted the agenda (Appendix 1).

3. Administrative matters

[9] The secretariat introduced the documents list (Appendix 2) and the participants list (Appendix 3), and invited participants to notify the secretariat of any information that required updating in the participants list or was missing from it. It was noted that Mr Marcoandre SAVARIS was unable to attend the meeting.

4. Review of the specification

[10] The steward introduced Specification 71 (*Criteria for determining host status of fruit to fruit flies based on available information*).[2] She outlined the scope and purpose of the draft annex and noted that if the EWG determined that certain tasks were not feasible and this altered the scope, this could be reported to the Standards Committee (SC) for consideration. One of the experts commented that the relationship between the scope described in Specification 71 and the pest risk analysis (PRA) process was not clear. Acknowledging this, the steward clarified that the aim was to produce guidance on how to determine host status for fruit flies based on information that already exists rather than by conducting experiments.

[1] 16_EWG_FF_2022_Jan.

[2] Specification 71: www.ippc.int/en/publications/89275/

[11] The steward continued her introduction to Specification 71 by outlining each of the nine tasks listed in the specification. She noted that if it proved impossible to identify consistent criteria for categorizing fruit as a natural host, conditional host or non-host (Task 4), then the EWG could report that to the SC, but the EWG did need to try to identify such criteria. She pointed out that section 2.2 of ISPM 8 (*Determination of pest status in an area*), referred to in Task 6, does not appear in the revised ISPM 8 adopted in 2021, but similar guidance is included in the associated IPPC implementation guidance instead;[3] guidance may also be found in a regional standard for North America.[4] The steward commented that Task 8, regarding the effect of the annex on the protection of biodiversity and the environment, was probably not relevant, as this task – which is a standard task for all ISPMs – is normally only relevant when drafting the core text of a standard. Finally, she confirmed that the potential implementation issues identified by the EWG under Task 9 would be captured in the steward's report to the SC, who would consider the issues and forward the issues they considered to be relevant to the Implementation and Capacity Development Committee (IC).

[12] The chairperson thanked the steward and invited questions from the EWG.

[13] In response to a question, the steward confirmed that if the EWG wished to propose changes to the core text of ISPM 37, for instance to propose new host categories, then the EWG could make these proposals to the SC for the SC to consider. However, the EWG took note of the fact that although adopted standards can be revised, it is a lengthy process as the standard (ISPM 37 in this case) would need to be opened up for revision and then follow the normal standard setting process.

[14] The Secretariat informed the EWG that ISPMs are drafted in English but are then translated into five other languages, so it is possible that a term such as "semi-natural", which is used in ISPM 37 to refer to field cages, greenhouses or bagged fruit-bearing branches in field trials, may be clearer in some languages than others. The steward pointed out that the Technical Panel for the Glossary reviews such issues when commenting on draft standards during the standard setting process.

5. Review of discussion papers

5.1 Process used in Germany to determine host status of fruit to fruit flies for plant health

[15] Peter BAUFELD (Germany) presented a summary of the process used to evaluate the host status of fruit flies in Germany and the wider European Union.[5] He explained that the European Food Safety Authority had generated a comprehensive worldwide list of non-European-Union Tephritidae (fruit fly) species and their hosts by screening the databases of the European and Mediterranean Plant Protection Organization (EPPO) and CABI, together with other sources such as the compendium of fruit fly host information published by the United States Department of Agriculture (USDA).[6] Countries in the European Union assess the host status of fruits for fruit flies using this database and the databases of EPPO, CABI and USDA.

[16] Looking ahead to the tasks set for the EWG, Mr BAUFELD commented on the possibilities for discussion about the three categories of hosts used in ISPM 37, especially regarding "conditional host", and added that it was also not clear in ISPM 37 whether "natural" meant "without any influence of humans" or simply meant "under field conditions", the former excluding an orchard, for example, and the latter including it.

[17] The chairperson thanked Mr BAUFELD and invited the EWG to comment.

[3] *Pest status guide*, Table 2: www.ippc.int/en/publications/90619/

[4] NAPPO (North American Plant Protection Organization). 2014. *Principles of pest risk management for the import of commodities*. Regional Standard for Phytosanitary Measures (RSPM) 40. Ottawa, NAPPO. 28 pp

[5] 04_EWG_FF_2022_Jan.

[6] USDA Compendium of Fruit Fly Host Information: https://coffhi.cphst.org/

[18] The EWG recognized the usefulness of sources such as databases, but acknowledged that when using them as a sole source of information, there was a need to exercise caution and be inquisitive. The EWG noted that some entries on databases are from sources such as newsletters and may rely on anecdotal evidence rather than scientific evidence. Entries on databases may also not be aligned with ISPM 37 categories, which can make them difficult to interpret. The EWG therefore noted that the reliability of information sources would form an important part of their discussions.

5.2 Host Suitability Index for polyphagous tephritid fruit flies

[19] Trace Christen HARDIN (United States of America) gave a presentation on the factors to consider when determining the host status of fruit flies, drawing upon two discussion papers: a published article by Follett, Haynes and Dominiak (2021) proposing a Host Suitability Index for polyphagous tephritid fruit flies,[7] and the pest risk assessment guidelines produced by USDA in 2012.[8]

[20] Mr HARDIN started by highlighting the need to review the host status of fruit flies every few years and summarized the reasons for such review: errors in the literature may be repeated; the host status of the same fruit species may vary; the host status may be unclear; and there are cases where a pest is associated with, but does not feed on, the commodity. He explained that different hosts vary in their ability to be a host and that host status was therefore a spectrum of abilities, ranging from highly attractive hosts supporting large numbers of fruit flies to poor hosts supporting low numbers. In the USDA guidelines, this spectrum was represented by subdividing hosts into "natural host" and "natural non-host" and by subdividing conditional hosts according to whether a non-host becomes a host or a host becomes a non-host. Follett, Haynes and Dominiak (2021) opted for a different approach and suggested a rating system for host status (the Host Suitability Index) based on the number of flies that emerge per kilogram of specific cultivars of fruits and vegetables when exposed to the pest. Under this system, hosts are rated in five categories: very poor, poor, moderately good, good and very good. Mr HARDIN noted that, in terms of risk management, a poor host may not need to be treated as severely as a good one. However, he highlighted the need to interpret the results of such studies with care – as it is the number of adults that emerge from the fruit that is critical, rather than the number of eggs, larvae or pupae – and explained that evidence from no-choice laboratory studies should not be considered as being equal evidence to field observations, because the duration and number of flies to which the fruit is exposed may be different.

[21] Mr HARDIN then introduced two flow charts showing the experimental pathway to determine host status of fruit flies. The first, by Cowley, Baker and Harte (1992),[9] set out a three-tier testing process, starting with laboratory tests of punctured fruit to test the ability of the fruit flesh to support the fruit fly, followed by laboratory tests of unpunctured fruits to test the ability of the fruit fly to penetrate the skin of the fruit, and finally studies on natural hosts, either by fruit sampling or, if needed, by use of semi-natural conditions such as field cage trials. The second, in ISPM 37, improved upon this by introducing the category of "conditional host", in addition to the "host" and "non-host" categories of Cowley, Baker and Harte (1992). Mr HARDIN commented that using a Host Suitability Index would take this one step further.

[22] In the final part of his presentation, Mr HARDIN considered the use of a Host Suitability Index as part of a systems approach. He explained that systems approaches are increasingly being used to access markets and that a Host Suitability Index could help identify candidate hosts for systems approaches. Poor or very poor host status could add a layer of security to hosts that are already subject to other measures in a systems approach.

[7] 05_EWG_FF_2022_Jan (Follett, P.A., Haynes, F.E.M. & Dominiak, B.C. 2021. Host suitability index for polyphagous tephritid fruit flies. *Journal of Economic Entomology*, 114: 1021–1034).

[8] See agenda item 5.3 for USDA pest risk assessment guidelines.

[9] Cowley, J.M., Baker, R.T. & Harte, D.S. 1992. Definition and determination of host status for multivoltine fruit fly (Diptera: Tephritidae) species. *Journal of Economic Entomology*, 85: 312–317.

[23] The chairperson thanked Mr HARDIN and invited the EWG to comment.

[24] The EWG welcomed the opportunity to discuss the Host Suitability Index and systems approaches, but also recognized that it was important to consider such concepts from a trade perspective, as well as from a scientific perspective, as ISPMs aim to facilitate safe trade and so are designed to both protect plant health and facilitate trade. The EWG noted that it can be difficult to obtain approval of new concepts in a regulatory context and that sometimes the text of an ISPM is not what would be proposed from a purely scientific perspective.

[25] With respect to the rating system depending on the number of flies emerging from host material, Mr HARDIN confirmed that the size of the fly was not taken into account but perhaps should be, and that perhaps the weight of the flies would be a good metric to use. The EWG also noted that some species of fruit fly only infest fruit at a rate of one larva per fruit, which would affect the number of flies emerging per kilogram of fruit and hence the host-status rating.

[26] One expert, Rui CARDOSO PEREIRA (invited expert), who had been the steward of ISPM 37, commented that the problems of getting the concept of a spectrum accepted were not new. He recalled that the guidance in ISPM 37 was based on the work of Aluja and Mangan (2008),[10] who had categorized host status from poor to good, just like Follett, Haynes and Dominiak (2021). The Technical Panel on Pest Free Areas and Systems Approaches for Fruit Flies (TPFF), when drafting ISPM 37, had wanted to incorporate this spectrum of host status, but the SC had decided against this because importing countries were only interested in whether a commodity was a host or not, not on a spectrum of host status. The draft text for ISPM 37 had prompted a very large number of comments from countries when submitted to consultation.

5.3 Host-status issues in pest risk analyses

[27] As background for the EWG's discussion, Marina ZLOTINA (United States of America) gave a presentation on a supplement produced by the USDA Plant Health Inspection Service in 2012, which gives guidelines on host-status issues in pest risk assessments.[11] The supplement provides a conceptual framework and covers all pest groups associated with fresh fruits and vegetables in trade.

[28] Ms ZLOTINA explained that the currently available standards for determination of host status of fruit flies are based on experimental design, but that information in the literature based on experiments may be inadequate. Terms used in the literature to describe host status are also not consistent, may not be aligned with ISPM 37 and can be difficult to interpret in terms of risk. She gave an overview of other problems that may be encountered when interpreting information in the literature, including errors in the literature, the fact that host status may be variable depending on host and pest biology, and instances where host status is unclear because of a lack of data, conflicting information, or reliance on data only from experimental hosts with no field data. She explained that although the terms "natural host" and "non-host" are often relatively clear and easy to interpret from the literature, "conditional host" is more difficult, and there may be great uncertainty when determining if a conditional host can be a host or non-host (the two subcategories of conditional host used in the supplement).

[29] Turning to the guidance on how to use information in the literature, Ms ZLOTINA showed a table from the supplement giving criteria for evaluating the reliability of evidence and a second table representing the continuum of host status from natural host to natural non-host in terms of the level of association between pest and host and the expected uncertainty. This continuum included four main categories (Type 1, natural host; Type 2a, conditional host (host); Type 2b, conditional host (non-host); Type 3, natural non-host), and within these categories, various terms used in the literature. She then presented a flow chart adapted from Aluja and Mangan (2008) that acts as a decision tree to guide the user to one of

[10] Aluja, M. & Mangan, R.L. 2008. Fruit fly (Diptera: Tephritidae) host status determination: Critical conceptual and methodological considerations. *Annual Review of Entomology*, 53: 473–502.

[11] 06_EWG_FF_2022_Jan.

the four categories of host status depending on the type of data or information available and the conditions under which the pest completes its life cycle.

[30] The chairperson thanked Ms ZLOTINA and invited the EWG to comment.

[31] One expert queried the fact that the flow chart in the USDA guidelines deemed experimental data as being sufficient to categorize a non-host, which was in contradiction to ISPM 37, which refers to natural and semi-natural conditions for non-hosts. Ms ZLOTINA confirmed, however, that she had presented the flow chart only as an example to spark discussion, rather than as a recommended model to use. Another expert added that laboratory tests may be sufficient for demonstrating non-host status but are inappropriate for determining natural-host status. Ms ZLOTINA pointed out that it was also necessary to consider uncertainty, as a determination of non-host status can be made with a fair degree of certainty based on laboratory data, but the uncertainty could be relatively high for a determination of "host" if just using laboratory data. The EWG also noted the relevance of the maxim "absence of evidence is not evidence of absence".

5.4 The criteria for determining host status of fruit to fruit flies

[32] Tatsuya INOUE (Japan) presented a discussion paper outlining the approach taken in Japan to the determination of host status of fruit to fruit flies and offering some thoughts on the reliability of information on host status and on the EWG's tasks.[12] He commented that there was nothing unique to the approach taken in Japan and explained that in some situations, such as market-access requests, host status was determined on an individual, case-by-case basis. In terms of the reliability of information in the literature, he expressed the view that sources by fruit fly experts (such as those listed in his paper) could be considered reliable, but that this may not be the case for other sources. He noted, however, that the host status itself may change as a result of changes in the distribution of fruit flies and fruit growing conditions.

[33] Mr INOUE then referred the EWG to the comments in his paper on the following EWG tasks:

- alignment of terminology between the categories used in existing published literature and those defined in ISPM 37 (Tasks 2, 4 and 5);
- development of guidelines for determining host status of fruit flies under specific conditions and their application to PRA and other activities (Task 3);
- guidelines for cases where fruit flies are found on a plant species that was previously not reported as a host (Task 3);
- development of guidelines for evaluating the validity and reliability of host information including sources of past information (Task 6); and
- evaluation of uncertain records (including conflicting opinions, inconsistencies in records) (Task 7).

[34] Regarding alignment of terminology, Mr INOUE's paper included a table listing the categories used in some of the key sources in the literature and providing suggestions as to the equivalent ISPM 37 category.

[35] The chairperson thanked Mr INOUE and invited the EWG to comment.

[36] The EWG welcomed the table showing the possible alignment between terms in the literature and those in ISPM 37 and looked forward to considering this carefully later in the meeting.

[37] The steward emphasized that although ISPM 37 is based on experiments, the annex to be drafted by the EWG was to be focused on the published literature, so a key issue was considering how to align the terms used in the literature with the terms in ISPM 37 to help risk analysts who do not have the luxury

[12] 07_EWG_FF_2022_Jan.

of conducting experiments or where decisions have to be taken quickly. She commented on the principle of uncertainty that is a key part of PRA, noting that an increase in uncertainty does not increase the risk.

5.5 Criteria for determining host status of fruit to fruit flies based on available information

[38] Aruna MANRAKHAN (South Africa) presented a paper discussing information from published host surveys for fruit fly pests in Africa and offering some suggestions regarding the criteria to be used for determining host status.[13]

[39] Ms MANRAKHAN explained that although there had been several host studies published regarding the host status of *Bactrocera dorsalis* in Africa, including in the peer-reviewed literature, some of these omitted important details such as the maturity stage of fruit, the condition of fruit or the fruit variety. A further series of studies had therefore been conducted, focusing on four commercial fruit commodities, which had determined that all four commodities were non-hosts at the stage at which they are harvested for trade. In the meantime, however, some restrictions on international trade had been placed on these commodities. As a second example, she described a case where one, unsubstantiated report of *Ceratitis quinaria* in citrus, published in a newsletter in 1966, had resulted in regulation of citrus without adequate justification. Follow-up surveys to confirm the host status of citrus for this pest had demonstrated that there was no natural infestation.

[40] Ms MANRAKHAN then set out a list of suggested criteria for determining natural-host and non-host status of fruit to fruit flies based on available information provided by field surveys, and drew the attention of the EWG to the "Guidelines for reporting fruit/vegetable infestations by fruit flies in nature", available as supplemental material to the paper by Aluja and Mangan (2008).

[41] There were no comments from the EWG.

5.6 The process and related problems for determining host status

[42] Zhihong LI (China) presented a paper discussing the process for determining host status of fruit to fruit flies and the main problems that have been encountered in the implementation of ISPM 37 in China.[14]

[43] She explained that the process used in China is in accordance with ISPM 37, with collaboration between national plant protection organizations (NPPOs), relevant universities and research organizations. The process involved the collection and analysis of existing information, the gathering of new data from surveillance and field trials, the determination of host status, qualitative and quantitative risk assessment of fruits, and the selection of phytosanitary measures in pest risk management. Identification of pest larvae and hosts included molecular techniques. Ms LI explained that one of the problems encountered was the lack of distinction between natural host, conditional host and non-host in much of the published literature. Surveillance and field trials could also take too long and be insufficiently representative, and there is the question of how to promote bilateral consensus on the results of surveillances and trials. Finally, there was the problem of how to determine the host status of fruits such as longan or lychee that are impenetrable by fruit flies when undamaged but have been found with large numbers of fruit flies present upon import when damaged. Ms LI confirmed that there is currently no domestic standard for the determination of host status of fruit to fruit flies in China.

[44] Ms LI finished by recommending that, in addition to establishing a convenient and effective method for determining the host status of fruit flies, the host status (and associated phytosanitary measures) of special hosts such as longan and lychee should be clarified and a global list or database of hosts of economically important fruit flies should be established.

[45] The chairperson thanked Ms LI and invited the EWG to comment.

[13] 08_EWG_FF_2022_Jan.

[14] 09_EWG_FF_2022_Jan.

[46] In answer to queries, Ms LI confirmed that molecular identification was used in China both for intercepted fruit and for surveys. Several diagnostic protocols using molecular methods had been published in recent years for fruit flies. She confirmed that molecular methods were used for both eggs and larvae, with the results being available within a day or so, but that the flies are also reared to adults. However, for species such as *B. dorsalis*, the generation time in China is one year, so rearing to adults takes a long time. She suggested that, in these cases, molecular methods may offer a fast alternative to rearing. One participant commented that, in some species, eggs may be present on fruit but may not develop into adults, which raised the issue of where investigative effort should be prioritized.

[47] The EWG noted that the question of whether fruits such as longan and lychee should be classed as conditional hosts rather than non-hosts was an interesting one. They recalled that ISPM 37 only covers undamaged fruit but noted that some information in the literature relates to damaged fruit, so there is still a need to know how to deal with such information. Ms LI confirmed that interceptions on longan and lychee fruit had been in both commercial shipments and passenger baggage, which prompted the suggestion from one participant that these fruits were conditional hosts. The possibility of the fruit flies being secondary invaders was also raised.

[48] The former steward of ISPM 37 confirmed that the TPFF had considered whether the standard should refer to "varieties" or "cultivars" of plants, but after consulting with experts had decided that "cultivars" was the correct term to use.

5.7 Criteria for determining host status of fruit to fruit flies based on available information

[49] Craig HULL (Australia) presented a discussion paper outlining Australian research on host status of fruit to fruit flies and Australia's use of international and regional standards.[15]

[50] Mr HULL introduced the Asia and Pacific Plant Protection Commission (APPPC) Regional Standard for Phytosanitary Measures (RSPM) No. 4,[16] which Australia has previously used when negotiating trade with some countries. A flow chart in the standard illustrated the host testing stages, starting with laboratory cage trials on punctured fruit and progressing to laboratory cage trials on punctured fruit and then field cage trials on unpunctured fruit. He explained that the resulting categories – "non-host", "conditional non-host" and "potential host" – were different to those used in ISPM 37 and did not involve the assessment of fruit on trees for determination of conditional hosts as was the case in ISPM 37. He commented that these differences meant that Australia needed to consider how to best communicate the ISPM 37 approach, including the new terminology, when negotiating or re-negotiating trade agreements.

[51] Mr HULL confirmed that the Australian NPPO uses a range of databases when determining host status, including some from Australian state and territory governments. However, much of the information in the latter is not published, some of the data are very old, and there are differences between states in the approach taken, which can make it difficult to interpret the data. Mr HULL referred to an Australian website on the identification of fruit flies but explained that there was still a lot of work to do regarding the host status of the various species. He commented on a few of the issues arising from research into hosts status, including the hybridization of fruit fly species, changes in the distributional range of species, and practical questions on aspects such as sample size for which there is no guidance.

[52] Mr HULL finished his presentation with one further issue faced by Australia. He explained that because the Queensland fruit fly is found only in Australia and a few islands in the Pacific, other countries are not very familiar with it, which can mean that such countries scrutinize exports from Australia to a greater extent than they would do otherwise.

[15] 10_EWG_FF_2022_Jan.

[16] APPPC (Asia and Pacific Plant Protection Commission). 2005. *Guidelines for the confirmation of non-host status of fruit and vegetables to tephritid fruit flies*. Regional Standard for Phytosanitary Measures (RSPM) 4. Bangkok, APPPC and FAO Regional Office for Asia and the Pacific. v + 18 pp.

[53] The chairperson thanked Mr HULL and invited the EWG to comment.

[54] In response to queries, Mr HULL confirmed that the required sample size varies from country to country, but the Australian NPPO tries to avoid a Probit-9 level, as this would be too onerous. The EWG noted that Probit-9 would need 100 000 fruits to be checked.

[55] Regarding the hybridization of endemic species, Mr HULL confirmed that the consensus view of the Australian NPPO was that *Bactrocera aquilonis* and *Bactrocera tryoni* are separate species, but that in some places there is evidence that they are sympatric and able to hybridize. The EWG noted the difficulties that arise when the names of species change, as historical records for the species may not be identified. The steward recalled that the IPPC *Pest status guide* included some guidance on taxonomic revisions.[17]

5.8 Are the criteria for determining host status of fruit to fruit flies not covered by ISPM 37?

[56] Rui CARDOSO PEREIRA (invited expert) presented a discussion paper posing the question of whether the criteria for determining host status are covered by ISPM 37.[18]

[57] Giving the wider regulatory context, Mr CARDOSO PEREIRA began by pointing out that ISPM 37 is one of three ISPMs on fruit flies, the others being ISPM 26 (*Establishment of pest free areas for fruit flies (Tephritidae)*) and ISPM 35 (*Systems approach for pest risk management of fruit flies (Tephritidae)*). He explained that, since the reorganization of fruit fly standards in 2018, ISPM 35 now incorporated the content of the former ISPM 30 (*Establishment of areas of low pest prevalence for fruit flies (Tephritidae)*), which had been revoked. Turning to ISPM 37, he showed the flow chart that describes the various steps in the process for determining host status, leading to the three categories of host status ("non-host", "natural host" and "conditional host"). He explained that the draft annex to ISPM 37 was designed to give further guidance on paths A and B in the flow chart, which related to the evaluation of host status based on existing information. These paths resulted in the categories "non-host" or "natural host".

[58] Mr CARDOSO PEREIRA highlighted three major constraints for host determination using existing information: the use of non-peer-reviewed literature, which may contain inaccurate or insufficient information (e.g. whether pests were trapped or in fruit on trees); incorrect taxonomic identification of plant species and cultivars, because of a lack of botanical expertise among entomologists and a lack of information for cultivars; and the fact that a plant species can be a host in some geographical situations but not in others, this mainly relating to polyphagous species. He gave an example of the latter from his own personal experience, concerning Jerusalem cherries.

[59] Mr CARDOSO PEREIRA finished by referring the EWG to some key references: Aluja and Mangan (2008), which had been the basis for ISPM 37; the *Fruit sampling guidelines for area-wide fruit fly programmes* published jointly by FAO and the International Atomic Energy Agency (IAEA) in 2019 (a link to which was available in Appendix 2 of ISPM 26);[19] and the associated e-learning course on the IAEA website.[20] He also showed a short animated video produced jointly by IAEA and FAO, which explained in simple terms how fruit fly standards can help producers gain market access.[21]

[60] The chairperson thanked Mr CARDOSO PEREIRA and invited the EWG to comment.

[17] *Pest status guide*: www.ippc.int/en/publications/90619/

[18] 17_EWG_FF_2022_Jan.

[19] www.iaea.org/sites/default/files/ca5716en.pdf

[20] IAEA e-learning: https://elearning.iaea.org/m2/course/index.php?categoryid=50

[21] *Fruit fly standards can help gain market access* [video]: www.iaea.org/newscenter/multimedia/videos/fruit-fly-standards-can-help-gain-market-access

[61] In response to queries, Mr CARDOSO PEREIRA confirmed that the example he had given of Jerusalem cherries had not been published. This prompted the EWG to note that although personal communication was classed as being in the "lowest reliability" category in the USDA guidelines, the personal experience of fruit fly experts can be very helpful.

[62] The EWG also noted the usefulness of the fruit fly sampling guidelines produced by the Joint IAEA/FAO Programme.

5.9 Process and some criteria for determining host status of fruit to fruit flies based on available information

[63] Jocelyn BERRY (New Zealand) presented a discussion paper outlining the process that the New Zealand NPPO uses to determine the host status of fruit to fruit flies and discussing some areas of uncertainty.[22]

[64] Ms BERRY explained that, whereas general guidance was available for determining host status, there was no specific guidance for determining host status based on available information. Such determinations were generally carried out by the NPPO on an ad hoc basis, either to underpin the issuing of a new import health standard for a commodity from a particular country or as stand-alone technical advice. She added that where there is disagreement with an exporting country, the exporting country is encouraged to provide supporting evidence.

[65] Ms BERRY explained that the NPPO uses information from a variety of sources in making the host-status determinations, but most of the literature searches are on international platforms largely or solely in the English language, which can result in relevant information being missed. She emphasized the need, when using interception data, to consider the circumstances in which the interception was made.

[66] Finally, she highlighted the need for consistency in terminology and referred to the confusion that can arise with the term "conditional host". She speculated that many regulators used the term "conditional host" to mean the same thing as the Type 2b category of the USDA guidelines ("conditional host (non-host)") rather than the ISPM 37 definition.

[67] The chairperson thanked Ms BERRY and invited the EWG to comment.

[68] In response to queries, Ms BERRY confirmed that further to the detection of *Drosophila suzukii* in orange fruit, orange fruit was still considered by New Zealand to be a non-host, because all the reports of infestation related to fallen and probably overripe fruit. The conditions for import, however, had been made more stringent and included the requirement that the fruit is undamaged. The EWG noted that no commercial fruit should be shipped in a damaged condition and that conditions can be set in import regulations for fruit to be green and immature, to be commercially produced, not picked up from the ground, without soil, and so on. However, they also recognized that setting the appropriate import conditions can be difficult as the pest risk may differ depending on the type and extent of damage to the fruit.

[69] Ms BERRY and the representative from the IC (also from New Zealand) confirmed that although there are no fruit fly species of economic concern in New Zealand, there are sometimes incursions and the NPPO responds to these. There is a strong fruit fly research community, with links to other researchers worldwide.

[70] Regarding the language of information sources, the EWG acknowledged that English can be a language barrier, particularly in local plant protection stations. One participant called for greater collaboration to allow translation of relevant papers between English and Chinese, and vice versa, and other participants commented that graduate students are often engaged to help with such work.

[71] The EWG noted the difficulties that can arise when interpreting data on interceptions because, for some pests, entry does not necessarily mean that there is a pathway and hence establishment (e.g. there may

[22] 19_EWG_FF_2022_Jan.

not be a suitable host in the country). One participant suggested that host status should perhaps be "undetermined" in such cases. Ms BERRY commented on the need to consider this issue, because if a fruit fly is detected in New Zealand, for example, it triggers a very expensive response even if there is no suitable host.

[72] The EWG recognized the importance of the international exchange of information about interceptions, but noted that this was lacking in some cases. Language was therefore not the only barrier to the use of existing information: the international exchange of information was also an issue.

5.10 Resources and background papers

[73] The following resources and background papers were received by the EWG:

- Peru: Nonhost status of commercial sweet granadilla (*Passiflora ligularis*) in Peru to *Ceratitis capitata* (Diptera: Tephritidae) and *Anastrepha fraterculus*[23]
- Brazil: Oviposition of fruit flies (Diptera: Tephritidae) and its relation with the pericarp of citrus fruits[24]
- Brazil: Citrus fruits and the Mediterranean fruit fly[25]
- Sri Lanka: Fruit flies and their potential hosts in Sri Lanka[26]
- Argentina: Determination of the condition of lemons as host of *Ceratitis capitata* and *Anastrepha fraterculus*[27] and
- Suriname: Host plants of the carambola fruit fly, *Bactrocera carambolae* Drew & Hancock (Diptera: Tephritidae), in Suriname, South America.[28]

6. Development of text for the draft annex to ISPM 37

[74] The secretariat drew the attention of the EWG to the reference documents for drafting ISPMs: the *IPPC style guide*, ISPM 5 (*Glossary of phytosanitary terms*) and the *Guidelines for a consistent ISPM terminology* (in the *IPPC procedure manual for standard setting*).[29] The secretariat highlighted the need for consistency in the use of terms, both within the draft annex to ISPM 37 and with other ISPMs. When drafting the annex, if a suitable term was available in ISPM 5 then that term should be used; new terms could be defined in the annex or, if they could be used in other ISPMs, proposed for inclusion in ISPM 5. The secretariat explained that the preferred terms for expressing the level of obligation were "should" and "may", and confirmed that as there was no template for annexes to ISPMs the EWG was free to choose the structure of the annex.

[23] 11_EWG_FF_2022_Jan (Dolores, O.S., Layme, J.M. & Huaynate, C.C. 2020. *Journal of Economic Entomology*, 113(3): 1158–1175).

[24] 12_EWG_FF_2022_Jan (Dias, N.P., Nava, D.E., Garcia, M.S., Silva, F.F. & Valgas, R.A. 2018. *Brazilian Journal of Biology*, 78(3): 443–448).

[25] 13_EWG_FF_2022_Jan (Papadopoulos, N.T., Papachristos, D.P. & Ioannou, C. 2015. *Acta Horticulturae*, 1065: 1009–1018).

[26] 14_EWG_FF_2022_Jan (Warshamana, I.K., Chithrapala, N.H.M.S., Dissanayake, D.M.S.K, Jayalatharachchi, D.M.S.K. & Wickramaarachchi, W.A.R.T. (unpublished).).

[27] 15_EWG_FF_2022_Jan (Gastaminza1, G., Augier1, L., Villagrán1, M. E., Villagrán1, M.F. & Willink, E. 2007. In: *Moscas de los frutos y su relevancia cuarentenaria en la citricultura del noroeste de Argentina: Once años de investigaciones 1996–2007*, Capítulo IX. Tukumán, Argentina, Estación Experimental Agroindustrial Obispo Colombres).

[28] 18_EWG_FF_2022_Jan (Van Sauers-Muller, A. 2005. *Neotropical Entomology*, 34(2): 203–214).

[29] *IPPC style guide*: www.ippc.int/en/publications/132/; ISPM 5: www.ippc.int/en/publications/622/; *IPPC procedure manual for standard setting*: www.ippc.int/en/core-activities/ippc-standard-setting-procedure-manual/

[75] The EWG noted that the four definitions in ISPM 37 had been proposed by the TPFF for inclusion in ISPM 5, but this proposal had not been accepted because the terms were not sufficiently applicable to other ISPMs.

6.1 Brainstorming session to develop the outline of the ISPM

[76] The EWG considered the issues that needed to be included in the annex. These included guidance on: how to align host-status terminology from the literature with the terminology used in ISPM 37 categories; the determination of the three ISPM 37 categories of host status (conditional host, natural host and non-host); and the application of these three categories in pest risk analysis and (for conditional hosts) in surveillance.

[77] The EWG also noted that they would need to consider implementation by contracting parties.

[78] **Overall structure of the annex.** The secretariat and steward confirmed that, unlike for the core text of an ISPM, there is no fixed structure for annexes, but suggested that it might be useful to start with an Introduction to explain the purpose of the annex and possibly its scope. The sections that followed could then provide the requirements, forming a clear distinction between the background information (in the Introduction) and the requirements (in the rest of the annex). The secretariat also confirmed that an annex is a prescriptive part of an ISPM and there should be no conflict between requirements in the annex and those in the core text. The EWG referred to the guidance on annexes in the *IPPC procedure manual for standard setting*,[29] and referred to annexes of other ISPMs between sessions to see examples of the content and structure of annexes.

[79] **Review of ISPM 37 & Specification 71.** The EWG reviewed the text of ISPM 37, to give the context to the draft annex. They noted that the standard covered fruit in the botanical sense, including fruits such as tomato and melon that are sometimes called vegetables. In response to a query, the steward clarified that "fruit" in this context excludes stalks. The EWG noted that the scope only covered undamaged fruit and was also limited to tephritid fruit flies.

[80] The EWG noted the definitions given in the standard for the terms "host status", "natural host", "conditional host" and "non-host".

[81] The EWG noted that inconsistencies in terminology, which are mentioned in the Background section of ISPM 37, were an important issue to consider for the draft annex and related to Task 2 of Specification 71.

[82] The EWG noted that the General requirements section of ISPM 37 outlined the steps in the determination of host status, with Step A (categorization as a non-host based on existing information) and Step B (categorization as a natural host based on existing information) being the relevant steps for the draft annex because they rely on existing information. The steward pointed out that the goal for the EWG should therefore be to provide guidance to help NPPOs implement Steps A and B.

[83] Turning to Specification 71, the EWG noted that the annex should outline the criteria that should be used when evaluating evidence in order to determine the host status of fruit to fruit flies. The steward commented, however, that if it proved impossible to develop criteria, then the EWG could perhaps draft guidance on developing criteria.

[84] The former steward of ISPM 37 commented that, as well as considering the draft annex in the context of the core text of ISPM 37, it was also important to consider it in the context of the suite of three ISPMs on fruit flies (ISPM 26, ISPM 35 and ISPM 37). He explained that the aim of the recent reorganization of fruit fly standards had been that the three ISPMs would be seen as a single approach.

[85] **Outline structure of the annex.** Drawing upon their discussions so far, the EWG drafted a provisional structure for the annex, to be modified if needed as they elaborated the content. This included an Introduction, sections giving guidance on the various aspects of determining host status, and finally a References section.

[86] Noting that IPPC style is to avoid using "guidelines" or "guidance" in the title of an ISPM, the EWG omitted such words from the section headings in the provisional structure, given that the content of ISPMs is guidance anyway (albeit guidance that takes the form of requirements) and so it is not necessary to use these words in the headings. The steward clarified, more generally, that where IPPC style was to avoid certain terms, the most important point was to ensure that the meaning was clear.

6.2 Elaboration of the text of the draft annex to ISPM 37

[87] The EWG elaborated the content of the draft annex through a combination of discussion and drafting during the virtual sessions and provision of comments and amendments between sessions. The EWG modified the structure of the draft annex as appropriate as the draft text developed. In drafting the content, the EWG was mindful that the annex should not affect the principles incorporated in the core text of ISPM 37.

Introduction

[88] The EWG drafted an introduction to the annex, drawing upon text from Specification 71. This explained the reason for the annex, its purpose and its scope.

[89] **Reason and purpose.** When describing the reason for the annex and its purpose, the EWG noted that inconsistencies in terminology can lead to trade disputes between NPPOs and so part of the purpose for the annex was to help avoid these. The EWG included text from Specification 71 listing several examples of activities for which NPPOs may use published information on fruit fly host status.

[90] The EWG decided against having a separate subsection on Purpose, as they had incorporated the purpose into the general text of the Introduction.

[91] **Scope.** One participant sought clarification on whether the host-status terms in ISPM 37 could be modified if needed. The EWG noted that Task 5 of Specification 71 tasked the EWG with aligning terms used in the literature with those used in ISPM 37, but it also said that the EWG could propose new host categories if appropriate. So, if the EWG wished to propose changes, it could. The EWG recalled, however, the point made earlier that this would take a long time as the standard would need to be opened up for revision and the revision would need to follow the normal standard setting process. The secretariat confirmed that changes to the host-status terms in ISPM 37 could not be made as ink amendments (which is a quicker process), as ink amendments should not significantly affect the content of the ISPM. The ISPM would therefore need to be opened up for revision. The steward queried whether a revision of the standard would be needed if it was just the definitions of the terms that needed amending rather than the actual terms. However, the EWG acknowledged that their task was to draft an annex to help alignment with the terms in ISPM 37, so focused on this for the rest of the meeting.

[92] **Target audience.** The EWG agreed that the draft annex would be directed at NPPOs but not third-party entities authorized to perform phytosanitary actions on behalf of an NPPO or regional plant protection organizations (RPPOs), as the IPPC (i.e. the Convention) is implemented through the NPPOs of the contracting parties to the Convention and so the responsibility for host-status determination always lies with the NPPOs.

[93] **Examples of terms used in the literature.** The EWG considered whether to include, in the Introduction, examples of terms used in the literature, but decided against this to avoid any impression that the list was intended to be exhaustive. They did, however, agree later in the meeting to include examples in the introductory paragraph to the section on aligning host-status terminology (see section below on Reclassifying host status based on the elements in the ISPM 37 definitions).

Host-status terminology in available literature and alignment with host-status categories in ISPM 37

[94] **Reclassifying host status based on the elements in the ISPM 37 definitions.** The EWG drafted an introductory paragraph to the section on host-status terminology, explaining that terms in the literature describing host status do not always align with those defined in ISPM 37. They created a table giving some examples of terms found in the literature (see section below on Table of terms in the literature

compared with ISPM 37 terms), but also agreed to include some of the more common examples in the introductory paragraph of this section, in case the table was removed from the annex during its development. They noted that if the table were to be retained, these examples in the body text would not be needed. In the examples in the body text, the EWG listed "host" first because it was the most general example.

[95] The EWG included a requirement that, when the host status of a fruit species or cultivar is given using a term other than those defined in ISPM 37, the host status should be reclassified into one of the three host-status categories in ISPM 37 based on the elements contained in the respective definitions of these categories. The EWG considered whether the annex needed to make it clear that it is NPPOs that do the reclassifying, but decided that this was not necessary.

[96] The EWG then set out a list of the elements for each of the three host-status categories, derived from the definitions in ISPM 37. These would be the elements to look for when analysing existing information to determine host status.

[97] **Natural host.** The EWG listed only one element for this category: complete development of the target fruit fly from egg to viable adult in attached fruit free from any mechanical or natural damage under natural conditions.

[98] The EWG considered whether natural-host status could be determined on the basis of only one fruit fly specimen emerging and developing into an adult. Noting that conditional-host status can be determined in such a case according to ISPM 37, the EWG concluded that the same principle would apply also to natural hosts. They therefore provisionally referred to "egg" and "adult" in the singular, subject to editorial review.

[99] Regarding the fruit being attached, the EWG noted that if there was no requirement for the fruit to be attached, then this could allow host status to be determined from fruit that had fallen to the ground. They noted that ISPM 37 stipulates that fruit needs to be attached for field trials, but acknowledged that in the literature there is often no indication of whether the fruit was on the tree or on the ground. One participant commented that, in such cases, the record would have a high level of uncertainty, so it would be unlikely to lead to a determination of natural host, as to do so could result in trade disputes. The EWG also noted that phytosanitary import requirements often specify that fruit must be harvested from the tree. In the end, the EWG decided to include a requirement for the fruit to be attached, but noted that this may be an issue meriting further consideration by the SC.

[100] The EWG used the phrase "free from any mechanical or natural damage" rather than "intact" for clarity and for consistency with the wording used in ISPM 37 (albeit in relation to field trials). They noted that the requirement for fruit to be undamaged was only referred to in ISPM 37 in the context of surveillance and field trials, and not specifically in relation to natural-host status, although the physiological condition of fruit was mentioned in the general context of evaluating data. They were therefore not certain whether to include a requirement for fruit to be undamaged for the determination of natural host. They concluded that this was an issue that may merit further consideration by the SC, but that in the meantime they would include the requirement in the draft annex.

[101] The EWG referred to "natural conditions" rather than "naturally occurring conditions" for consistency with ISPM 37.

[102] The EWG considered whether to add text to emphasize that infestation in itself was not sufficient to qualify a plant as a natural host, as complete development to the adult stage was also required, but decided it was not needed.

[103] **Conditional host.** The EWG listed two elements for this category, both of which applied. For the first, the EWG agreed that there should be evidence of infestation and the experimental conditions should be clearly described in the information being analysed. They noted that not all published studies would have been conducted under the conditions described in ISPM 37, and that guidance was therefore needed

on how to deal with such information, but recognized that this would be outside the scope of the current definition of "conditional host".

[104] For the second element, the EWG agreed that there needed to be complete development of the target fruit fly from egg to viable adult in attached fruit free from any mechanical or natural damage under semi-natural field conditions as set out in ISPM 37. They referred to the fruit as being free from any mechanical or natural damage because ISPM 37 required test fruit in field trials to be undamaged. The EWG noted that if there was not complete development under semi-natural conditions, then the fruit would be classed as a non-host.

[105] The EWG considered adding a third element for this category, to be listed between the two others, requiring there to be incomplete or no development of the target fruit fly from egg to viable adult under natural conditions. They decided against this, however, as they considered that the two elements needed for a determination of conditional host were evidence of infestation and complete development under semi-natural conditions.

[106] **Non-host.** The EWG listed two elements for this category: incomplete or no development of the target fruit fly from egg to viable adult in attached fruit free from any mechanical or natural damage under naturally occurring conditions; or no development of the fruit fly from egg to viable adult in laboratory experiments or field trials under semi-natural field conditions as set out in ISPM 37.

[107] **Table of terms in the literature compared with ISPM 37 terms.** Further to Tasks 2 and 5 of Specification 71, the EWG created a table giving examples of terms for host status that appear in the literature, alongside the suggested equivalent ISPM 37 host-status category.

[108] The EWG compiled this table by first creating a longer list of terms used in the literature alongside the corresponding references and associated notes. By analysing the information provided in the references and their own expert judgement, the EWG then attempted to allocate each term to one of the ISPM 37 categories. Before embarking on this, the EWG noted that, when making their judgements, it was important to consider whether a fruit fly can complete its life cycle on the fruit, the conditions under which a fruit may become a host to a fruit fly, whether a complete pathway is available (as if there are no suitable hosts or conditions for establishment, then a pest may enter an area but it would not be able to establish), and uncertainty. The EWG drew material from Mr INOUE's discussion paper (agenda item 5.4), a list of terms from the literature provided in the USDA 2012 guidelines (agenda items 5.2 and 5.3), the APPPC RSPM 4 (agenda item 5.7), and other references known to the participants.

[109] The EWG found that some terms from the literature were unambiguous and could be allocated to one of the three ISPM 37 categories with low uncertainty, whereas for others there was more uncertainty. For some terms, more than one ISPM 37 category could apply or it was impossible to allocate the term to an ISPM 37 category. The term "conditional non-host" proved to be challenging and prompted a fair degree of discussion by the EWG (see later in this report).

[110] Returning to the table later in the meeting, the EWG simplified it along the lines of the table of pest status terms in the IPPC *Pest status guide*,[30] so that it just comprised two columns: one with the terms from the literature and the other with the suggested equivalent term from ISPM 37, without giving descriptions of the terms, references or additional notes. They also removed those terms that had proved too difficult to allocate to an ISPM 37 category. The EWG included the table in the annex and added associated introductory text to make it clear that the use of terms other than those defined in ISPM 37 should be avoided.

[111] When discussing the table during its creation, the EWG recognized that ISPMs tend to contain conceptual guidance rather than examples and there was also precedence for tables based on expert judgement being removed from standards during the standard setting process and incorporated into the associated implementation guidance instead (e.g. the table on reliability of information, moved from the

[30] *Pest status guide*, Appendix 2: www.ippc.int/en/publications/90619/

draft revision of ISPM 8 to the associated IPPC *Pest status guide*). The EWG therefore considered whether to include the table in the annex, include it as an appendix to the annex, or suggest that it be included in future implementation guidance (if any). The secretariat confirmed that although it is unusual for an ISPM annex to have an appendix, it is not impossible: the SC considers such cases on a case-by-case basis. The EWG agreed, however, to include the table in the annex to provide examples of aligned terms, pending consideration by the SC.

[112] **"Conditional hosts" and "conditional non-hosts".** During the EWG's initial compilation of the table of terms, they spent some time discussing the terms "conditional host" and "conditional non-host" in greater detail. The participants shared their understanding of the two terms and their experience of how the terms are used, revealing a range of different ways of interpreting and using these terms. The former steward of ISPM 37 and the secretariat explained that there had been much discussion about the term "conditional host" during the development of ISPM 37: "non-natural host", "semi-natural host" and "conditional host" had all been used at various points in the development of the standard, all relating to the same concept, and concerns about the term had resulted in the draft standard being presented for adoption three times before it was finally adopted. The final decision had been to use "conditional host" rather than using both "conditional host" and "conditional non-host", because "conditional host" was intended as the opposite of "natural host" and the focus was on a non-natural host becoming a host under specific conditions. The former steward of ISPM 37 confirmed that "conditional host" had been used instead of "non-natural host" to convey the idea that these plants could be hosts in certain situations (e.g. when detached from the tree) and because the term was used frequently in the literature.

[113] The secretariat sought clarification on an apparent gap in the ISPM 37 guidance, as the General requirements of ISPM 37 did not appear to allow for the possibility of determining conditional hosts from existing information at the outset, even if there was evidence from surveillance or experimental studies that met the requirements for such studies given in ISPM 37. In response, the steward recalled that ISPM 37 was mainly developed to provide standardized guidance on experimental studies, as such guidance was lacking, so the emphasis was on that rather than on using existing information. She clarified, however, that Task 2 of Specification 71 charged the EWG with aligning terms from the literature with all three of the categories used in ISPM 37, including "conditional host". The EWG also noted that Step C in the General requirements of ISPM 37 referred to the "potential to become infested", but with no indication of how this potential should be determined. Regardless of any apparent inadequacies in ISPM 37, the EWG therefore focused on the tasks set in Specification 71, working on the assumption that conditional-host status could be determined from existing information.

Criteria for the determination of host status

[114] The EWG drafted a section on the criteria to use when evaluating existing information to determine host status, with one subsection for each of the three ISPM 37 terms. In drafting these subsections, the EWG was mindful that the annex should primarily help NPPOs with Steps A and B described in the General requirements of ISPM 37, which concern the use of existing information, and noted that information in the literature could encompass a wider range of conditions than those described in the core text of ISPM 37, as the bulk of ISPM 37 focused on field trials under semi-natural conditions. Each of the three subsections contained a list of criteria to serve as a checklist of the information that risk analysts should look for in the existing literature. The concept of uncertainty was raised at various points in the EWG's discussions, and the EWG drafted a section on this later in the annex.

Criteria for the determination of natural-host status

[115] The EWG agreed that, for the determination of natural-host status, the criteria for evaluation would concern the following: the accuracy of identification of the plant species or cultivar; the area sampled; the presence of the target fruit fly species in that area; the condition of the fruit; the fruit-collection conditions; the fruit-sampling method; the fruit-handling procedures; the method for dissecting fruit and for rearing fruit flies; the accuracy of identification of the fruit fly species reared from fruit; the number of adult fruit fly specimens reared; the viability of emergent adults; and the presentation of fruit fly rearing results.

[116] **Identification of the plant species and cultivar.** The EWG agreed that as well as a criterion for the identification to be accurate, both the scientific name and the authority for the plant species should be available to ensure that it was clear to which taxon the information on host status related. The EWG considered whether to refer to a *valid* scientific name, but decided against this as there could be more than one valid name. The EWG agreed that the term "plant" was more appropriate than "fruit" when referring to species (i.e. "plant species") and noted that this should apply throughout the annex.

[117] The EWG listed examples of the types of evidence that would be needed to support the accuracy of plant identifications, these including the references used, verification by a specialist taxonomist, molecular identification and voucher specimens.

[118] **Area sampled.** The EWG agreed that it was useful to know the location of the site from where fruit were sampled, as pest species sometimes behave differently and infest different hosts in different places. The EWG noted that this was relevant not only to natural hosts but also to conditional hosts, particularly polyphagous species. The EWG noted that some countries require the registration of orchards that export, but agreed that there was no need for orchard registration details to be mentioned in the annex, as they were not relevant to the determination of host status.

[119] The EWG agreed that, although it was rare to find information on orchard management practices in the literature, where such information exists it would be useful for the determination of host status as it could reduce uncertainty. The EWG noted that this related to commercial orchards rather than fruit grown in other situations.

[120] The EWG noted that the presence of other natural hosts or of conditional hosts, whether cultivated or not, in the area sampled or in its vicinity would also be relevant to the determination of host status.

[121] **Evidence of presence of target fruit fly species in the sampled area.** The EWG agreed that evidence of presence of the target fruit fly species in the sampled area would be useful for a determination of natural-host status, noting that this might be particularly relevant when there are multiple fruit fly species present in an area.

[122] **Condition of the fruit.** The EWG agreed that it would be useful to know the maturity of the fruit and the condition of the skin or rind when determining host status. The EWG noted that sometimes ripeness is described in terms of a numerical scale.

[123] **Fruit collection conditions.** The EWG agreed that it would be useful to know whether the fruit had been picked from the fruit plant or from the ground, and whether this was in a commercial or non-commercial environment. The EWG noted that, in the draft annex, the word "plant" should be used rather than "tree", as the fruit plant may not be a tree.

[124] **Fruit sampling method.** The EWG agreed that it would be useful to know the number and location of fruit plants sampled in an orchard and the number of fruits sampled per plant. The EWG discussed whether to add more detail, but concluded that this was not necessary.

[125] **Description of fruit-handling procedures.** The EWG agreed that the fruit-handling procedures in question may relate to various stages of fruit production, such as harvest, post-harvest processing and treatment, and transportation. The EWG noted that the post-harvest processing (or post-harvest treatments) included activities such as washing, chlorine dipping and waxing of fruits rather than phytosanitary treatments.

[126] **Fruit dissection method and fruit fly rearing method.** The EWG agreed that it would be useful to have information on the method by which fruits are dissected to determine infestation and the method by which fruit flies are subsequently reared to evaluate their development to adults.

[127] **Identification of fruit fly species reared from fruit.** The EWG agreed that not only was accurate identification of the fruit fly species required, but it would also be useful to know the method of identification – for example, the use of identification keys, photographs, molecular methods or

verification by a specialist taxonomist – and whether voucher specimens were available. The EWG considered whether to refer to morphological methods solely in the context of "cryptic species" (species complexes that can only be identified with molecular methods and not with morphological methods), but decided against this as the use of molecular methods for other species may still be helpful in reducing uncertainty.

[128] **Number of adult fruit fly specimens reared.** The EWG agreed to refer to the number of fruit fly specimens per weight of fruit as well as per fruit, as both these metrics are used in the scientific literature.

[129] **Viability of emergent adults.** The EWG recognized that just because an adult fruit fly emerges from a fruit does not necessarily mean that it is viable. They discussed what was meant by "viability"; for example, whether it simply referred to a fruit fly being alive upon emergence, or the length of time it was alive, or its ability to reproduce. The former steward of ISPM 37 recalled that "reproductive adult" was used in the draft standard at one point in its development, but the final term used in the adopted standard was "viable adult". The EWG noted that the term "reproductive" is less ambiguous than "viable" and reproductive ability is perhaps more pertinent to host status then merely the ability to live, as if a fruit fly is not able to reproduce it will not be able to establish. However, the EWG noted that it is not possible to determine reproductive ability by the appearance or behaviour of fruit flies, so it would be difficult to assess reproductive ability when conducting surveillance or upon interception of fruit flies at borders. There may therefore be insufficient detail for a proper evaluation of reproductive ability and the degree of uncertainty would be high. Furthermore, the term used in ISPM 37 was "viable adults", not "reproductive adults". Giving a wider perspective, the secretariat also pointed out that when viability is considered by the Technical Panel on Phytosanitary Treatments, it is taken to encompass aspects such as the ability to fly (as indicated by deformed wings), as well as reproductive ability.

[130] The EWG therefore agreed to use "viability" and agreed that, in the context of host-status determination, the relevant components of viability to mention were longevity, fecundity (for consistency with ISPM 37, which mentioned female fecundity) and flight ability. They later added the size of the emergent adult to this list and considered changing "viability" to "quality" or "condition" to avoid any appearance of tautology in the phrase "viability of emergent adults", but ultimately decided that "viability" was acceptable.

[131] The EWG noted that, when conducting surveillance for host-status determination, it would be useful if adult fruit flies were kept for a few days to assess viability. However, they recognized that it was outside the scope of the annex to specify requirements for surveillance or experimental studies, as the aim of the annex was to help NPPOs when they have to rely solely on existing information. The EWG noted that, when using existing information, risk analysts would need to use their discretion to judge the level of uncertainty, depending on the data available.

[132] **Presentation of fruit fly rearing results.** The EWG discussed the published sources of information that may be used to determine natural-host status, but recognized that this was generic to all three categories of host status. They therefore put generic guidance on the reliability of different sources of information in a later section of the annex (see section below on Criteria for assessing quality, validity and reliability of available information) and limited the criterion for natural-host status to the clear presentation of fruit fly rearing results.

Criteria for the determination of conditional-host status

[133] **Potential sources of uncertainty.** The EWG started drafting this subsection by compiling a list of potential sources of uncertainty that may be associated with evidence of fruit fly rearing from a plant species or cultivar. These included: unconfirmed identification of the plant species or cultivar; unconfirmed origin of the fruit from which the fruit fly was reared; interception of the fruit fly species in a fruit commodity previously not reported as a natural host; unspecified cultivar of the plant species, maturity stage of the plant species or cultivar, or damage status of the fruit; a poor description of fruit handling procedures and the fruit fly rearing method; a lack of information on verification of fruit fly specimens using referenced keys, the opinion of a taxonomist, or referenced molecular identification methods; a lack of information on the fruit fly infestation rate or sample size; and no deposition of

voucher specimens. The EWG noted that, in risk analysis, data are evaluated and uncertainty assessed, but there can never be zero uncertainty.

[134] **Criteria for the determination of conditional-host status.** Later in the meeting, the EWG returned to the text for this subsection on conditional-host status and redrafted it to give criteria for a positive determination of conditional-host status rather than a list of potential sources of uncertainty. This revised text also omitted methodological criteria, as the EWG simply referred instead to the conditions set out in ISPM 37.

[135] In line with the elements identified from the ISPM 37 definition, the EWG agreed that, for a determination of conditional-host status, there should be evidence of both infestation by the target fruit fly under described conditions and development of the fruit fly to viable adults using field trials under semi-natural conditions as set out in ISPM 37, and this evidence (including the methodological details and results) should be published.

[136] The EWG then identified the criteria that should be met to demonstrate infestation. These were: the accurate identification of the plant species or cultivar; the accurate identification of the target fruit fly species reared from fruit; and the presence of any life stage of the target fruit fly in the fruit species or cultivar under semi-natural or naturally occurring conditions. The EWG considered whether to refer to semi-natural conditions or to naturally occurring conditions in relation to the presence of the target fruit fly, but agreed that both applied.

[137] The EWG agreed that supporting evidence should be available for all the infestation criteria. The EWG agreed that, when evaluating information on presence of the fruit fly, consideration should be given to the condition of the plant species or cultivar and to the environmental conditions, although they recognized that this information may not be available. When considering fruit condition, the EWG considered whether to refer the absence of visible damage or symptoms of infestation by other insects or pathogens. The EWG noted, however, that although ISPM 37 only covers undamaged fruit, risk analysts have to consider the information that is available, and so may still consider data relating to damaged fruit but would take the damage into account and assess the uncertainty of the host-status determination as being high. Acknowledging this, the EWG concluded that the best option was simply to omit any reference to damage or symptoms and simply refer to fruit condition.

[138] **Fruit species or cultivar new to an area.** The EWG considered whether, when a fruit species or cultivar is new to a particular area and has not been exposed to a fruit fly species in that area, the host status of the fruit could be considered for its potential to be a conditional host until confirmed otherwise. The EWG recognized that the same question would also arise if a fruit fly species were to be introduced into a country where there were fruit plants to which it had not been exposed historically. Regarding plants new to an area, the EWG discussed whether the fruit crop would need to remain free of infestation for a minimum of two growing seasons in order to be determined as a non-host in that area, but noted that reference to growing seasons would only be applicable to temperate regions, and it was also difficult to be too specific about the length of time, given the variety and spread of potential host plants and the fact that sometimes it can be difficult to prove how long a host plant has been present. The EWG therefore concluded that it was better to refer to "a reasonable period".

[139] Upon further reflection, however, the EWG recognized that the use of "conditional host" in this context would be different to that described in ISPM 37, and that the issue in question was one of uncertainty rather than one of needing to use the term "conditional host" or indeed creating a new "unverified host" category. Where there is high uncertainty, an NPPO could still determine the host status as one of the three ISPM 37 categories but say it was with high uncertainty. Alternatively, the NPPO could seek further information from surveys or field trials. The EWG noted that the level of uncertainty is used to help select the appropriate phytosanitary measures during pest risk management and that countries have the option of applying provisional measures in situations where there is a current lack of adequate information.

[140] In the light of this discussion, the EWG therefore decided against including text on this issue under the section on conditional status and to consider it later when discussing uncertainty more generally.

[141] **Difficulties with the ISPM 37 definition of "conditional host".** The EWG's discussion about how to deal with plants that are new to an area led to a wide-ranging discussion on the perceived difficulties with the definition of "conditional host" in ISPM 37 and the standard's focus on field trials under semi-natural conditions. The EWG acknowledged that there was a disconnect between the narrow definition in ISPM 37 and the broader concept used by some countries, which encompassed all situations where plants act as hosts under certain conditions but not in others. Noting that Specification 71 allowed for new categories of host status to be proposed, the EWG considered whether a host status of "unverified" would be helpful for situations such as a plant new to an area, but the steward cautioned against this as it is not a term that appears commonly in the literature. She commented, however, that the EWG could propose that the definition of "conditional status" in ISPM 37 be amended to detach it from a reliance solely on field trials as described in the standard.

[142] The former steward of ISPM 37 reiterated that, during the development of ISPM 37, the original term used by the EWG had been "non-natural host", in opposition to "natural host", but this had then been changed to "conditional host". The main discussion about "conditional host" had focused on the need to limit "conditional host" as being based on field trials with fruit on the tree rather than on laboratory experiments. He confirmed, however, that the use of "conditional host" to describe a plant that is new to an area and for which the host status cannot yet be determined would not be the ISPM 37 use of this term. He also reminded the EWG that, in ISPM 37, the use of existing information mainly relates to Steps A and B of the host-status determination process.

[143] Looking at the way forward, the secretariat commented that if it proved impossible to develop the annex without amendments also being made to ISPM 37, then the EWG could propose such changes to the SC and propose that ISPM 37 is opened up for revision, but this would slow the progress of the annex considerably as the annex could not be developed in isolation of the revision to ISPM 37. The alternative was to develop the annex following the current ISPM 37 definitions, as per Specification 71, and to propose to the SC that changes be made to ISPM 37 (and the annex) in due course.

[144] The EWG agreed to proceed with development of the annex following the terms as described in ISPM 37, with the possibility of proposing a new host category to the SC (not to be included in the annex), an amended definition for "conditional host", or both. In the end, however, they were unable to discuss this further because of time constraints.

Criteria for the determination of non-host status

[145] The EWG agreed that a determination of non-host status may be based on existing information from surveillance (by fruit sampling) or existing information from field trials under semi-natural conditions conducted as set out in ISPM 37. Noting that ISPM 37 said that laboratory tests may be sufficient for demonstrating non-host status, the EWG also agreed that, in the absence of information from field trials, information on non-host status may be derived from laboratory test results.

[146] **Information from surveillance.** The EWG agreed that, when using information from surveillance, the criteria for evaluation would concern the following: the accuracy of identification of the plant species or cultivar; the area sampled; the presence of reproductively mature adults of the target fruit fly species in that area; the condition of the fruit; the fruit-collection conditions; the fruit-sampling method; the fruit-handling procedures; the method for dissecting fruit and for rearing fruit flies; and the presentation of fruit fly rearing results. The EWG recognized that some of the criteria were the same as those for evaluation of information for natural-host status, but agreed that it was better to list all criteria pertaining to non-host status together, rather than simply listing those that were different to the criteria for natural -host status.

[147] The EWG discussed whether to mention hybrids when referring to the accurate identification of plant species or cultivars. They noted that ISPM 37 uses "cultivar" not "hybrids", and agreed that names of hybrids were covered under the concept of plant species name.

[148] The EWG discussed whether the results of fruit fly rearing would need to indicate "absence of infestation *or* zero viable fruit fly adults reared" or "absence of infestation *and* zero viable fruit fly adults reared", and concluded that "or" was the correct interpretation of ISPM 37.

[149] **Information from field trials.** The EWG agreed that there was no need to include a list of criteria to be used for evaluation of information from field trials under semi-natural conditions, as the requirements for such trials were already described in the core text of ISPM 37. The EWG therefore simply referred to the need for the methodological details and results to be published. They noted that, to have low uncertainty, the conditions used in such studies would need to be the same as those described in the core text of ISPM 37 for the conduct of field trials under semi-natural conditions. They also agreed that there was no need for researchers to carry out additional studies if the existing information was sufficient.

[150] **Laboratory tests.** The EWG agreed that, when using information from laboratory tests, the criteria for evaluation would concern the following: the accuracy of identification of the fruit fly species used in the tests; the origin of the colony; the method for rearing fruit flies; the quality of the fruit flies used (e.g. developmental rates and survival, mating period, oviposition period, fecundity); the physiological condition of the fruit fly females used (e.g. mating status and age); the accuracy of identification of the plant species or cultivar used; the absence of pesticides and other phytosanitary products on or in the fruit that could negatively affect oviposition behaviour; the condition of the fruit; the natural infestation rate of the fruit species or cultivar used; the laboratory trial method used; the method for dissecting fruit and for rearing fruit flies in the case of infestation; and the presentation of fruit fly rearing results.

[151] The secretariat queried whether the fruit needed to be at a certain maturity stage for the laboratory tests or the maturity stage just needed to be known in order to interpret the results. The EWG confirmed that it was the latter.

[152] The EWG considered whether to refer to the "skin" or the "rind" of the fruit in the context of fruit condition, or both, and asked the IPPC editor to check this when editing the draft annex.

[153] The EWG noted that it was important that artificial diets were the correct diet and so referred to "proven artificial diets".

[154] With regard to the fruit being free from pesticides and other products that could negatively impact on the oviposition behaviour of the female fruit flies tested, the EWG discussed how best to refer to the other products, which was intended to refer to products such as wax or oils, and decided to use "other phytosanitary products".

Application of host status

[155] Noting Task 3 of Specification 71, which sought an "explanation of how conditional host status should be considered in practical terms for activities such as survey or pest risk analysis", the EWG considered the application of host status for all three of the ISPM 37 host-status categories. The EWG initially drafted a separate subsection for each host-status category, placed after the evaluation criteria for that category. Later in the meeting, however, the EWG recognized the overlap between these subsections and consolidated them into one section of the draft annex, condensing the text in the process.

[156] The EWG noted that the applications of host status would include activities such as PRA, biosecurity analysis and surveillance. Information on host status and the assessment of pest risk from PRA could be used to inform the planning of surveillance and monitoring, the prioritization of species to focus upon, the selection of plant protection measures necessary for safe trade, and decisions about which commodities require export restrictions during incursions. The EWG recognized, however, that the meaning of "biosecurity" – which in this case was intended to encompass market-access and post-border activities – may not be clearly understood. They therefore agreed to use the same text as in Specification 71, referring to "activities such as PRA, pest free areas, the design of import and export programmes, eradication, surveillance, pest records, and more".

[157] **Pest risk analysis.** The EWG agreed that the host status of a fruit to a fruit fly should be considered at each stage of a PRA: in the initiation stage, to help when identifying pests and pathways; in the pest risk assessment stage, when estimating the probability of introduction and spread and the associated impacts (which would give the pest risk); and in the pest risk management stage, when evaluating and selecting options for phytosanitary measures. The EWG also agreed that information on host status should be used in pest risk communication, including activities such as consultations or the sharing of information on host status.

[158] The EWG agreed that there was no need to refer to pest categorization separately as this was included within the pest risk assessment stage and it was sufficient to refer to that.

[159] With regard to pest risk assessment, the EWG discussed whether to refer to the magnitude of the associated potential economic consequences (as per the Glossary definition of "pest risk" for quarantine pests) or to "assessment of impacts" to incorporate the environmental impacts. They recalled that, according to ISPM 2 (*Framework for pest risk analysis*), environmental impacts are considered as part of economic impacts, but agreed that in the context of this list of applications, "assessment of impacts" was acceptable.

[160] **Non-host status.** The EWG noted that, when a PRA is conducted for import of a fruit species or cultivar that is a non-host, the PRA can be stopped, either at the initiation stage of a PRA or at the pest categorization step of the pest risk assessment stage. They noted that knowledge of non-host status would inform NPPO decisions on which commodities do not require phytosanitary measures to be applied by exporting countries, which commodities do not require export restrictions during incursions, and which hosts do not need to be targeted for surveillance, but decided against including this detail in the draft annex.

[161] **Conditional-host status.** The EWG agreed that the pest risk of a conditional host should be considered to be lower than that of a natural host when infested by the same species of fruit fly and the phytosanitary measures selected should be commensurate with the assessed level of risk. The EWG recognized that phytosanitary measures being commensurate with the risk applies to all phytosanitary measures, in line with the general principles of the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures, but thought that the point needed to be highlighted in relation to conditional hosts.

[162] **Surveillance.** The EWG discussed what guidance to give regarding the application of host status in surveillance. They considered what level of detail to provide but concluded that it was sufficient simply to say that host status should be used to establish and maintain pest free areas in accordance with ISPM 4 (*Requirements for the establishment of pest free areas*) and ISPM 26.

Criteria for assessing quality, validity and reliability of available information

[163] The EWG noted that available information on hosts status has varying levels of quality, validity and reliability.

[164] **Quality.** The EWG agreed that the quality of information should be assessed based on the design of the method used (including sample size and replication), the presentation of results and the expertise of the contributors.

[165] **Validity.** The EWG agreed that the validity of the information should be assessed in terms of its completeness in relation to the criteria listed in ISPM 37 and in the draft annex for determination of host status. The EWG agreed that key pieces of information that should be available are the identification of the fruit species or cultivar and the fruit fly species by taxonomists or trained specialists, the specification of the fruit origin and condition, and the deposition of voucher specimens.

[166] **Reliability.** The EWG noted that the quality and validity of the information would influence its reliability. The EWG discussed the reliability of different types of information sources and referred to the table on this in the IPPC *Pest status guide*. The EWG noted the usefulness of the table, but also

recognized that ISPMs do not normally refer directly to guidance in implementation guides, as such guides are not subject to the same level of scrutiny as standards. The table in question had also been excluded from ISPM 8 because it could not be verified. The EWG therefore drafted some general text, drawing upon the guidance in the *Pest status guide* but without citing it.

[167] The EWG agreed that pest reports from NPPOs (or entities authorized by NPPOs) should be considered as being of higher reliability, as should peer-reviewed scientific publications in indexed scientific journals and books authored by experts in fruit fly research. In both cases, the quality of information would be reinforced if it were complete in relation to the criteria for host-status determination. The EWG acknowledged that the reliability of peer-reviewed publications would vary, depending on whether it was a primary (e.g. research article) or secondary (e.g. review article) source and the context provided (the contextual information allowing the validity of the host-status determination to be judged).

[168] The EWG noted that the reliability of databases varies, from those that require all entries to be validated by an expert to those reliant on community science. One participant expressed a view that personal communications from a fruit fly expert should be considered to be of higher reliability, but noted that the USDA guidelines listed unpublished personal communications as being of low reliability. In both these cases, the EWG noted that the table of reliability in the IPPC *Pest status guide* provides guidance: it lists expert opinion as being of higher reliability and distinguishes between different categories of databases and websites in terms of their reliability. In drafting the text for the annex, however, the EWG focused only on those databases and websites that were considered of higher reliability in the *Pest status guide* – those of the IPPC Secretariat, NPPOs, RPPOs and relevant national government authorities.

[169] The EWG agreed that community science information and newsletters should be considered as being of lower reliability. They used the term "community science" rather than "citizen science" in recognition of the move away from the use of the latter term in some regions.

[170] The EWG agreed that multiple reports from independent sources or authors should be considered more reliable than single reports.

[171] **Uncertainty.** Turning from general issues of quality, validity and reliability, the EWG considered some specific cases where uncertainty may arise in the determination of host status. These included cases where: a plant species or cultivar is introduced into an area where a fruit fly species is present, or a fruit fly species establishes in a new area and encounters plant species that are new to it; one or both parents of a newly developed hybrid or cultivar are natural or conditional hosts; there is a taxonomic change in a fruit fly or a plant species; common names for plants or fruit flies are used; or there is a new official interception record lacking sufficient supporting information.

[172] Recognizing the uncertainty that would arise when species or cultivars grown for the first time in an area where there are fruit flies, the EWG considered at what point a more certain host status could be determined. They recalled their discussion earlier in the meeting (when discussing conditional-host status) about whether non-host status could be determined if at least the first two growing seasons are without observation of fruit fly infestation. They noted that orchards or fields could be monitored with lure or traps to check that fruit flies are present in the area, given that commercial orchards may have pest management methods that preclude infestation even if flies are present. The EWG also noted, however, that there are many compounding factors that could determine whether a species or cultivar is a host or not and specifying a minimum of only two seasons could be problematic for regulators. They concluded, therefore, that it was not possible to include any guidance on this issue in the draft annex.

[173] Regarding hybrids, the EWG recognized that the approach to host-status determination may vary between different countries, but may involve consideration of the host status of the two parent plants. The EWG noted that ISPM 37 refers only to "cultivars" and not to "hybrids", but decided that mention of hybrids was relevant in this context, so that it was clear that the plant concerned was a cross between two different taxa. The EWG agreed that where one or both parent species of a newly developed hybrid are known natural or conditional hosts, the host status of the hybrid should be considered for its potential

as a natural or conditional host until confirmed otherwise. The EWG discussed whether to include more detail, but took the steward's advice that this was not necessary in an ISPM.

[174] Regarding taxonomic changes, the EWG noted that changes in taxonomy can affect our understanding of species concepts and also require risk analysts to be careful to ensure that species with the same name in the literature are indeed the same species. This is further complicated by the fact that there is not always universal acceptance of new species concepts, resulting in different people using different classifications. The EWG noted that if a fruit fly species is split into two or more species, or if two fruit fly species previously thought to be different are synonymized, then the resulting species is likely to have a different host range. One participant also speculated on whether the evaluation of the host status of a plant species would change if a host species is moved into a new genus that has not previously included any fruit fly hosts; as previously, however, the EWG decided to keep the annex text general and not include too much detail.

[175] The EWG considered whether to mention the uncertainty that may arise in cases where there is no phenological overlap in the field between the fruit being at a suitable stage of maturity and the presence of fruit flies at a suitable stage for oviposition (e.g. when a plant bears fruits at one time of year in one region, but at another time of year another region). The EWG agreed, however, that this was similar to the situation where a plant species is introduced to an area, for which they had drafted text earlier in this part of the annex. The EWG therefore agreed not to refer to a lack of phenological overlap.

[176] Regarding interception records, the EWG agreed to refer to cases where essential information, such as the life stage of the fruit fly or whether it was found infesting the fruit, may be lacking or unconfirmed. They considered whether to also refer to fruits such as longan and lychee that have been regarded as non-hosts but have been frequently associated with interceptions of fruit flies by some countries when the fruit is damaged. The EWG noted, however, that this did not fit with the text drafted about insufficient information in interception records and was outside the scope of the core text of ISPM 37, which does not cover damaged fruit. They therefore agreed not to refer to it in the draft annex.

[177] The EWG considered whether to add unreliability of plant and fruit fly identification to the list of cases where uncertainty may arise, but decided against this as they had already included a requirement for accurate identification earlier in the annex text.

[178] Acknowledging that there is always some degree of uncertainty, the EWG drafted a general requirement that the results of analysis should always be accompanied by a determination of the level and areas of uncertainty.

[179] The EWG asked the IPPC editor to check the level of obligation ("should", "may", "will", etc.) in this section of the annex.

References

[180] When compiling the initial, more comprehensive, table of host status terms found in the literature, the EWG began to compile a list of the sources of information cited in the table. The EWG retained this references list in the draft annex, even after the citations in the table were removed, but did not discuss it further because of time constraints.

Impacts on biodiversity and the environment

[181] In accordance with Task 8 of Specification 71, the EWG drafted the following text for a section on the impacts of the draft annex on biodiversity and the environment, drawing upon similar sections in adopted ISPMs:

> This annex may contribute to the protection of biodiversity and environment by helping countries in determining the host status of a fruit species or cultivar to a fruit fly. A proper classification of a host status of a fruit species or cultivar to a fruit fly may help countries to identify risks associated with the fruit fly and appropriate options to adequately mitigate risks while protecting biodiversity and the environment.

[182] After discussion, however, the EWG agreed that it would not be appropriate to include this section in the draft annex, as annexes to ISPMs do not generally include such a section and the addition of the annex to ISPM 37 would not change the impacts of that standard on biodiversity and the environment. The EWG considered, therefore, that it would be better for such a section to be in the core text of ISPM 37, which currently does not have such a section: the same text could be used, but with the word "annex" replaced by "ISPM".

Potential implementation issues

[183] The EWG agreed to submit comments about potential implementation issues to the secretariat by Tuesday 8 February. No comments were received.

[184] The EWG noted that contracting parties are invited to comment on potential implementation issues during consultation.

[185] The EWG:

(1) *invited* the SC to consider the section on Impacts on biodiversity and the environment, drafted in this meeting, for inclusion in the core text of ISPM 37 when next opened up for revision.

7. Any other business

[186] There was no other business.

8. Close of the meeting

[187] The chairperson thanked the EWG members for all their hard work, the steward of the draft annex and the former steward of ISPM 37 for their guidance, and the secretariat for their support.

[188] In return, the steward and the secretariat thanked the chairperson for her skilful chairing of the meeting.

[189] The other participants expressed their thanks and the chairperson closed the meeting.

Appendix 1: Agenda

	Agenda Item	Document No.	Presenter
1.	**Opening of the Meeting**		
1.1	Welcome by the IPPC Secretariat Introductions	–	IPPC Secretariat
1.2	Presentation of the standard setting process Roles of the Participants	16_EWG_FF_2022_Jan	IPPC Secretariat
2.	**Meeting Arrangements**	–	
2.1	Selection of the Chairperson	–	IPPC Secretariat
2.2	Selection of the Rapporteur	–	CHAIRPERSON
2.3	Adoption of the Agenda	01_EWG_FF_2022_Jan	CHAIRPERSON
3.	**Administrative Matters**	–	
3.1	Documents list	02_EWG_FF_2022_Jan	IPPC Secretariat
3.2	Participants list	03_EWG_FF_2022_Jan	IPPC Secretariat
4.	**Review of Specification**		ZLOTINA (Steward)
4.1	Review of Specification and Considerations for the development of the draft Annex on the ISPM 37	Specification 71 - Annex Criteria for determining host status of fruit to fruit flies based on available information	ZLOTINA
5.	**Review of discussion papers**	–	CHAIRPERSON
5.1	Process to determine host status of fruit to fruit flies in my country for plant health	04_EWG_FF_2022_Jan	BAUFELD
5.2	Host Suitability Index for Polyphagous Tephritid Fruit Flies	05_EWG_FF_2022_Jan	HARDIN
5.3	Host status issues in PRAs	06_EWG_FF_2022_Jan	ZLOTINA
5.4	The criteria for determining host status of fruits to fruit flies	07_EWG_FF_2022_Jan	INOUE
5.5	Criteria for Determining Host Status of Fruit to Fruit Flies Based on Available Information	08_EWG_FF_2022_Jan	MANRAKHAN
5.6	The process and related problems for determining host status	09_EWG_FF_2022_Jan	LI
5.7	Criteria for Determining Host Status of Fruit to Fruit Flies Based on Available Information	10_EWG_FF_2022_Jan	HULL
5.8	Are the Criteria for determining host status of fruits to fruit flies not covered by ISPM 37?	17_EWG_FF_2022_Jan	PEREIRA
5.9	Process and Some Criteria for determining host status of fruit to fruit flies based on available information	19_EWG_FF_2022_Jan	BERRY
5.10	Resources and background papers • Peru: Nonhost Status of Commercial Sweet Granadilla (*Passiflora ligularis*) in Peru to *Ceratitis capitata* (Diptera: Tephritidae) and *Anastrepha fraterculus* • Brazil: Oviposition of fruit flies (Diptera: Tephritidae) and its relation with the pericarp of citrus fruits • Brazil: Citrus Fruits and the Mediterranean Fruit Fly • Sri Lanka: Fruit flies and their potential hosts in Sri Lanka • Argentina: Determination of the condition of lemons as host of *Ceratitis capitata* and *Anastrepha fraterculus* • Suriname: Host Plants of the Carambola Fruit Fly	11_EWG_FF_2022_Jan 12_EWG_FF_2022_Jan 13_EWG_FF_2022_Jan 14_EWG_FF_2022_Jan 15_EWG_FF_2022_Jan (Eng/Es) 18_EWG_FF_2022_Jan	IPPC Secretariat/ ALL
6.	**Development of text for the draft annex to ISPM 37** *Reference documents:*		CHAIRPERSON

	• *IPPC Style Guide and annotated templates (particularly Part 1, sections 2, 3 and 5)*	Link to the IPPC Style Guide	
	• *ISPM 5 (Glossary of phytosanitary terms)*	Link to ISPM 5	
	• *Guidelines for a consistent ISPM terminology (Section 3.3.2 of the IPPC Procedure Manual for Standard Setting)*	Link to the IPPC Procedure Manual for Standard Setting (2020-2021)	
6.1	Brainstorming session to develop the outline of the ISPM	ISPM 37 (Determination of host status of fruit to fruit flies (Tephritidae))	CHAIRPERSON / ALL
6.2	Elaboration of the text of the draft Annex to ISPM 37	Link to the Annotated template for draft ISPMs	ALL
7.	**Any Other Business**	–	CHAIRPERSON
8.	**Close of the Meeting**	–	IPPC Secretariat / CHAIRPERSON

Appendix 2: Documents list

DOCUMENT NO.	AGENDA ITEM	DOCUMENT TITLE	DATE POSTED / DISTRIBUTED
Administrative Documents			
01_EWG_FF_2022_Jan	2.3	Provisional agenda	2021-11-29 2021-12-02 2021-12-06
02_EWG_FF_2022_Jan	3.1	Documents list	2021-11-30
03_EWG_FF_2022_Jan	3.2	Participants list	2021-11-30
Review of discussion papers			
04_EWG_FF_2022_Jan	5.1	Process to determine host status of fruit to fruit flies in my country for plant health	2021-11-29
05_EWG_FF_2022_Jan	5.2	Host Suitability Index for Polyphagous Tephritid Fruit Flies	2021-11-29
06_EWG_FF_2022_Jan	5.3	Host status issues in PRAs	2021-11-29
07_EWG_FF_2022_Jan	5.4	The criteria for determining host status of fruits to fruit flies	2021-11-29
08_EWG_FF_2022_Jan	5.5	Criteria for Determining Host Status of Fruit to Fruit Flies Based on Available Information	2021-11-29
09_EWG_FF_2022_Jan	5.6	The process and related problems for determining host status	2021-11-29
10_EWG_FF_2022_Jan	5.7	Criteria for Determining Host Status of Fruit to Fruit Flies Based on Available Information	2021-11-29
11_EWG_FF_2022_Jan	5.10	Peru: Nonhost Status of Commercial Sweet Granadilla (*Passiflora ligularis*) in Peru to *Ceratitis capitata* (Diptera: Tephritidae) and *Anastrepha fraterculus*	2021-11-29
12_EWG_FF_2022_Jan	5.10	Brazil: Oviposition of fruit flies (Diptera: Tephritidae) and its relation with the pericarp of citrus fruits	2021-11-29
13_EWG_FF_2022_Jan	5.10	Brazil: Citrus Fruits and the Mediterranean Fruit Fly	2021-11-29
14_EWG_FF_2022_Jan	5.10	Sri Lanka: Fruit flies and their potential hosts in Sri Lanka	2021-11-29
15_EWG_FF_2022_Jan	5.10	Argentina: Determination of the condition of lemons as host of *Ceratitis capitata* and *Anastrepha fraterculus*	2021-11-29
16_EWG_FF_2022_Jan	1.2	Presentation of the standard setting process Roles of the Participants	2021-11-30
17_EWG_FF_2022_Jan	5.8	Are the criteria for determining host status of fruits to fruit flies not covered by ISPM 37?	2021-11-29
18_EWG_FF_2022_Jan	5.10	Host Plants of the Carambola Fruit Fly	2021-12-02
19_EWG_FF_2022_Jan	5.9	Process and Some Criteria for determining host status of fruit to fruit flies based on available information	2021-12-06
Other documents / links			
Specification 71 - Annex Criteria for determining host status of fruit to fruit flies based on available information	4.1	Review of Specification and Considerations for the development of the draft Annex on the ISPM 37	2021-11-29
Link to the IPPC Style Guide	6	IPPC Style Guide and annotated templates (particularly Part 1, sections 2, 3 and 5)	2021-11-29
Link to ISPM 5	6	ISPM 5 (Glossary of phytosanitary terms)	2021-11-29
Link to the IPPC Procedure Manual for Standard Setting (2020-2021)	6	Guidelines for a consistent ISPM terminology (Section 3.3.2 of the IPPC Procedure Manual for Standard Setting)	2021-11-29
ISPM 37 (Determination of host status of fruit to fruit flies (Tephritidae))	6.1	Brainstorming session to develop the outline of the ISPM	2021-11-29

Link to the Annotated template for draft ISPMs	6.2	Elaboration of the text of the draft Annex to ISPM 37	2021-11-29

Appendix 3: Participants list

A check (✓) indicates confirmed attendance at the meeting

	Participant role	Name, mailing address, telephone	Email address
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