REPORT

Nagoya, Japan
03-07 December

Technical Panel on Phytosanitary Treatments
December 2012

Food and Agriculture Organization of the United Nations

CONTENTS

1. Opening of the Meeting

[1] The Host, Mr Masato Fukushima, Director of Plant Quarantine Office, Plant Protection Division, Japanese Ministry of Agriculture, Forestry Fisheries Government of Japan (MAFF), welcomed the participants of the meeting of the Technical Panel on Phytosanitary Treatments (TPPT) to Nagoya. He underlined the importance of the International Plant Protection Convention (IPPC) work programme, and in particular, the importance of addressing wood packaging material treatment submissions in a practical and urgent manner. Mr Fukushima wished the participants a good and productive meeting.

1.1 Welcome by the IPPC Secretariat

[2] The IPPC Secretariat (hereafter Secretariat) thanked Mr Fukushima for hosting the meeting and also welcomed the participants. The panel members, Secretariat staff and invited experts introduced themselves and briefly described their positions and roles in their home organizations.

1.2 Election of the Chair

[3] The panel elected Mr Eduardo Willink as Chair.

1.3 Election of the Rapporteur

[4] The panel elected Mr Michael Ormsby as Rapporteur.

1.4 Adoption of the Agenda

[5] The panel members reviewed and adopted the agenda (see Appendix 1 to this report). One panel member expressed concerns about the possible difficulty in addressing all the items on the agenda because a relatively large number of members were not attending the meeting. The Secretariat explained that some new members had joined the panel and other absent members would be participating for certain parts of the meeting via modern technology, so there would be enough members and sufficient resources available to address all items on the agenda.

2. Administrative Matters

2.1 Documents list

[6] The panel reviewed and updated the documents list (see Appendix 2 to this report).

2.2 Participants list

[7] The Secretariat called attention to the participants list and the members reviewed their contact information. The members will also update it on the International Phytosanitary Portal (IPP - www.ippc.int/) (see Appendix 3 to this report).

2.3 Local information

[8] The organizer of the meeting provided further information and answered any logistical questions regarding the meeting and its location.

3. Updates from Relevant Bodies

3.1 Items arising from 2012 October Strategic Planning Group

[9] There were no items arising from the October 2012 Strategic Planning Group (SPG) meeting[1] for the panel to consider.

3.2 Items arising from 2012 October Bureau

[10] There were no items arising from the October 2012 Bureau meeting[2] for the TPPT to consider.

[1] Report of the 2012 October SPG meeting: https://www.ippc.int/index.php?id=125447

3.3 Items arising from 2012 November SC

[11] The following items arose from the 2012 November Standards Committee (SC) meeting[3] for the TPPT to consider.

Implementation of adopted phytosanitary treatments

[12] One major implementation issue of importance to the panel is the development of guidance for implementing adopted phytosanitary treatments (PTs). In June 2012, the Bureau decided that the development of this type of guidance should be under the remit of the IPPC Capacity Development Committee (CDC). At its November 2012 meeting, the SC reconsidered its decision from its November 2011 meeting regarding the development of guidance for phytosanitary treatments and modified the related task in all specifications. This task now requests the TPPT to consider implementation of the PTs by contracting parties, identify potential operational and technical implementation issues and then provide information and possible recommendations on these issues to the SC. The SC also requested the TPPT consider if standards are needed for various types of treatments (such as ISPM 18:2003, *Guidelines for the use of irradiation as a phytosanitary measure*).

[13] It was noted that guidance documents for PTs were developed primarily for use within the panel and would therefore not conflict with the Bureau's clarification. The panel questioned the responsibility of the CDC, what procedures the CDC will use when treatments are approved, how the additional information will be provided and what expertise the CDC should have to oversee the development or review of such guidance. There was concern among the TPPT about a review and approval process for this type of guidance because the CDC currently does not have a formal process. Hence, the TPPT will request that the CDC allow the TPPT to review such treatment guidance prior to the final approval by the CDC.

[14] It was further noted that the TPPT previously had proposed a concept to develop a database with descriptions of treatments and that this could be proposed again. The SC had requested the panel consider whether standards are needed for various types of treatments, and the panel discussed whether a database with descriptions of treatments, a standard, or treatment guidance should be developed. The proposals from the panel, which will be assigned to TPPT members at a later date, for the SC to review are located in Appendix 4 to this report.

Criteria for prioritizing participants to receive travel assistance

[15] The Secretariat informed the panel about the new IPPC criteria for prioritizing participants to receive travel assistance to attend IPPC meetings. The Secretariat explained the changes and noted that, in the future, although the criteria changes from year to year, the criteria in place on the date the statement of commitment is signed will apply throughout the term of membership. For existing members, until they sign a new statement of commitment, the baseline will be the criteria in place in 2012. The panel was also informed that, based on a decision at the Seventh Session of the Commission on Phytosanitary Measures (CPM-7 (2012)), a new statement of commitment had been developed and that all TPPT members will be required to sign the new statement of commitment before the 2013 TPPT meeting.

Scientific session at CPM-8 (2013)

[16] The panel was informed that the Bureau had decided that the scientific session at CPM-8 (2013) will be related to the use of Probit 9. The Secretariat requested the panel to inform their national plant protection organizations (NPPOs) that the Secretariat will be making a call for speakers, noting that the topic is very relevant to several standards currently under development (e.g. *Criteria for treatments for wood packaging material in international trade* (2006-010) and phytosanitary treatments). The panel agreed to help solicit speakers in response to the call.

[2] Report of the 2012 October Bureau meeting: https://www.ippc.int/index.php?id=202500

[3] Report of the 2012November SC meeting: https://www.ippc.int/index.php?id=13355

Formal objections

[17] The Secretariat informed the panel that, according to the revised standard setting procedure[4], all International Standards for Phytosanitary Measures (ISPMs), including PTs, are subject to formal objections (FOs) prior to adoption. The CPM-7 (2012) had requested that the SC consider the issue of FOs and provide recommendations to the Bureau. In April 2012, the SC discussed FOs for PTs, but did not conclude the discussion. The Bureau again discussed FOs in June 2012, produced flow charts illustrating a proposed process for FOs and asked the Secretariat to develop further criteria for the different types of standards. At its November 2012 meeting, the SC reviewed the process proposed by the Bureau and Secretariat and provided further changes.

[18] The Secretariat noted that the FOs on draft ISPMs and PTs are submitted at least 14 days prior to CPM and that the proposed process may not be feasible in 14 days. The panel reviewed the FO criteria and process as proposed by the SC. The panel agreed to the criteria and the proposed process, but suggested that the examples given under the criteria for phytosanitary treatments should be removed because they were not as comprehensive as those listed in ISPM 28:2007 *(Phytosanitary treatments for regulated pests)*.

Engaging experts

[19] This issue is reported under section 9.5 of this report.

The TPPT:

(1) *asked* that the Secretariat provide an opportunity for the TPPT to review treatment guidelines or other material related to providing guidance on PTs prior to final approval by the CDC

(2) *asked* the Secretariat to consider, for the proposed *Criteria for phytosanitary treatments for formal objections*, that the examples given under the criteria for phytosanitary treatments should be removed because they were not as comprehensive as those listed in ISPM 28:2007.

3.4 Items arising and updates from other Technical Panels

Efficacy of methyl bromide treatments for wood packaging material with high moisture content

[20] The Technical Panel on Forest Quarantine (TPFQ) and the International Forest Quarantine Research Group (IFQRG) discussed this issue and the findings were presented to the SC at its November 2012 meeting. An extensive review of literature relating on the moisture content of wood had been done, and, in most cases, the moisture content of wood at the time of treatment with methyl bromide was likely to be at or lower than that used in the research to study the efficacy of methyl bromide on *Bursaphelenchus xylophilus* and *Anoplophora glabripennis*. The SC considered whether additional recommendations related to the moisture content of the wood should be added to ISPM 15:2009 *Regulation of wood packaging material in international trade*. The SC requested the TPFQ, to consider the issue, with input from the TPPT and IFQRG as appropriate, and provide the SC with concrete proposals. The TPPT was informed that the TPFQ will be meeting in June 2013 and will discuss the issue at that time. The TPPT agreed to discuss this again after the TPFQ consider this issue.

[21] The SC had requested the TPFQ to consider levels of efficacy for treatments on wood packaging material moving in international trade that were more suitable to the organisms being targeted. In response to this request, the TPFQ requested IFQRG to consider this issue, who in response developed the Cardiff Protocol, which describes a method to determine the required levels of efficacy for pests on wood packaging material (see Appendix 5 to this report). The TPPT agreed that the Cardiff Protocol would help to develop more appropriate treatment efficacy requirements for target pests.

[4] The CPM-7 (2012) revised and adopted the IPPC Standard Setting Procedure, see Appendix 5 of the CPM-7 (2012) report

The TPPT:

(3) *invited* the SC to note that the TPPT agreed that the Cardiff Protocol would help develop more appropriate treatment efficacy requirements for target pests.

3.5 Update from the IPPC Secretariat

3.5.1 Standard Setting

[22] The Secretariat informed the panel about the new standard setting process that had been adopted at CPM-7 (2012), highlighting the changes that may impact the TPPT.

Call for Treatments

[23] The Secretariat informed the panel that it had received six treatment submissions in response to the 2012 call for treatments.

Calls for Experts

[24] The Secretariat informed the TPPT about the SC e-decision regarding the call for TPPT experts. The SC placed Mr Guy Hallman (USA) and Mr Patrick Gomes (USA) on the TPPT to begin five-year terms in 2012. The SC agreed that Mr Andrew Parker (IAEA-FAO) be invited to TPPT meetings as an invited expert when irradiation treatments will be discussed. The panel and Secretariat welcomed the new members.

3.5.2 Communications

[25] There were no items for the TPPT to consider.

3.5.3 Information exchange

[26] There were no items for the TPPT to consider.

3.5.4 Capacity Development

[27] There were no items for the TPPT to consider.

3.5.5 Implementation review and Support System (IRSS)

[28] There were no items for the TPPT to consider.

4. Review of Treatments under the Topic *Wood packaging material treatments* (2006-015)

[29] The panel reviewed and updated the internal document *Working TPPT criteria for treatment evaluation*. In particular the panel updated the formula for calculating the efficacy dose (ED) (see section 4 of Appendix 6 to this report).

[30] During the evaluation of treatments, it was noted that submitters do not always respond to the panel's requests for more information and the panel considered how long it should wait for the results from submitters before it recommends to the SC that the treatment be removed from the *List of topics for IPPC standards*. In response to this, the panel developed the *TPPT procedure for evaluating phytosanitary treatments requiring additional information from submitters* (see Appendix 8 to this report). The panel also agreed that this procedure be attached to all official TPPT requests to submitters.

[31] The panel was concerned that the information is presented differently in each submission and that there are many misunderstandings by the submitters when submitting data, such as exactly what type of data are needed, etc. To help prevent this from occurring again, it was suggested that instructions be developed by the TPPT and provided during the call to assist in proper and complete submissions. Instructions will be developed with the Secretariat for review by the TPPT.

The TPPT:

(4) *invited* the SC to note that the *Working TPPT criteria for treatment evaluation*, for TPPT internal use only, has been updated

(5) *invited* the SC to note the *TPPT procedure for evaluating phytosanitary treatments requiring additional information from submitters* that will be attached to official TPPT requests to submitters.

4.1 HCN treatment of wood packaging material (2007-103)

[32] The TPPT had requested further data from the submitter, but sufficient information had not yet been provided to support the treatment. In addition, the research protocol (using surrogate species) is not adequate for PTs and the panel was concerned that the submitters did not have a clear understanding of what was required. The panel considered that this treatment will not be completed in the foreseeable future and recommended it be removed from the List of Topics for IPPC Standards.

[33] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(6) *recommended* that the SC removes the treatment *HCN treatment of wood packaging material* (2007-103) from the List of Topics for IPPC Standards.

4.2 Sulfuryl fluoride fumigation of wood packaging material (2007-101)

[34] While the lead considers sulfuryl fluoride (SF) fumigation a possible alternative to methyl bromide, he explained that submitters were unable to provide efficacy data based on Probit 9 because of technical difficulties in obtaining consistent replications. The lead noted that when the 2010 July TPPT evaluated the submission, it could only support a partial treatment schedule because the TPPT could not determine the level of efficacy of this treatment against *Bursaphelenchus xylophilus* for temperatures within a range greater than 18ºC and less than 30ºC. The submitter had informed the treatment lead that the TPPT-requested information should be made available to the TPPT in 2013. It was also noted that the United States Department of Agriculture (USDA) had revised the safety of SF on consumables (fruit for consumption) and considered that fluoride contamination would be a problem. This will likely reduce the applicability of SF in general and for wood packaging material when it is associated with a commodity.

[35] The TPPT agreed that the treatment *Sulfuryl fluoride fumigation of wood packaging material (2007-10*1) be reviewed at a future TPPT meeting because the panel expects to receive more information from the submitter.

4.3 Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for *Bursaphelenchus xylophilus*, Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material (2007-102)

[36] The treatment lead presented an update on the tre*atment and noted that the* TPPT positively considered this treatment when it was submitted because it could be a possible alternative to methyl bromide. The panel had requested more information from the submitter, identifying a number of issues that remain unanswered. In addition, the treatment lead had received some information that the registrant of this fumigant intended not to seek re-registration in the country that originally submitted this treatment, and, therefore, the submitter may not provide the additional requested information supporting this treatment.

The TPPT:

(7) *agreed that a final notice letter be sent to the submitter of th*e treatment *Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for* Bursaphelenchus xylophilus, *Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material* (2007-102) and that the treatment be reviewed once further information is provided by submitter.

4.4 Heat treatment of wood packaging material using dielectric heating (2007-114)

[37] The treatment lead provided an update on the treatment. Due to concerns about the practical implementation of the treatment, the SC had placed the adoption of this treatment on hold while waiting for more detailed operational guidance. The SC agreed, however, to keep this treatment included in the revision to Annex 1 *Approved treatments associated with wood packaging material* of ISPM 15:2009, which the SC has recommended for adoption at CPM-8 (2013). The treatment lead noted that the TPPT, TPFQ and the IFQRG have been developing guidance material to support the implementation of this treatment for ISPM 15:2009. As requested by the SC, the Secretariat had formally sent the guidance material to the IPPC Implementation Officer in November 2012 for further development, along with the name and contact details of a potential author to finalize the guidance material. The TPPT noted that any guidance or training material for a standard should not be released before the adoption of the standard.

The TPPT:

(8) *recommended* to the SC that guidelines or training material for all standards should not be released prior to the formal adoption of the standard.

5. Review of Treatments under the Topic *Irradiation treatments* (2006-014)

[38] Four new irradiation treatments had been submitted in response to the 2012 Call for Treatments.

[39] The panel discussed some issues related to irradiation treatments. A panel member introduced a document that was drafted from discussions at the Third Research Coordination Meeting (RCM) of CRP D62008 on the Development of Generic Irradiation Doses for Quarantine Treatments, at Buenos Aires, Argentina, 15-19 October, 2012. The document attempts to answer many of the questions related to generic treatments and the use of older data generated under less-than-optimal experimental conditions. It was noted that most irradiation research is carried out using a small number of pests because it can be difficult to obtain a large number of pests for research due to the reproductive capabilities of certain pests (e.g. *Anoplophora glabripennis*), quarantine regulations, etc. Another key issue identified by the panel is the treatment endpoint and its suitability to international trade. An endpoint for irradiation treatments of no adult emergence would be impractical for some pest species, including Lepidoptera, because living adults can emerge even after treatment.

[40] The panel also agreed that the maximum dose measured during a confirmatory test should be considered during treatment evaluation as the treatment level, and that all radiation treatment submissions must include details of dosimetry used, including dose distribution and dosimetry uncertainty.

5.1 Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity (2007-105)

[41] This treatment is a generic dose of 400Gy radiation for all insects (Arthropoda: Insecta) except Lepidoptera pupae and adults (Insecta: Lepidoptera) in any host commodity. Because the treatment lead was unable to attend the meeting, the Secretariat explained that this treatment was submitted in 2007 and official requests for additional information were sent to the submitter in 2009, 2011 and 2012. However, the submitter could not provide sufficient data to support a generic treatment for all insects. It was noted that the Joint FAO/IAEA Coordinated Research Project (CRP) research programme was working on this issue and that their research may help provide needed data. However, during discussion, the panel decided that it would be more productive to develop several treatments for smaller taxa (e.g. the family or genus level). The panel recommended that the SC remove this treatment from the List of Topics for IPPC Standards.

[42] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(9) *recommended* that the SC removes *Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity* (2007-105) from the List of Topics for IPPC Standards.

5.2 Generic irradiation for eggs and larvae of Lepidoptera (2012-008)

[43] This treatment prescribes a minimum absorbed dose of 250Gy to prevent adult emergence of eggs and larvae of Lepidoptera in all fruits and vegetables that are hosts of Lepidoptera. The treatment lead presented the submission and noted that supporting documents for the treatment are based on historical, published or updated data for 35 species of Lepidoptera. The endpoint is the prevention of the emergence of normal adults that are able to disperse. One member pointed out that infestation rates for Lepidoptera may be much lower than for fruit flies and that an endpoint of no normal adults emerging and unable to disperse would present no danger of an adult being detected in surveillance traps that could trigger a phytosanitary response. No efficacy level could be derived from the supporting literature and the panel could not determine what should be an appropriate efficacy level.

[44] The panel agreed that the evidence, while providing some generic support for the proposed treatment, does not provide a complete argument in support of the submission. A more supportive argument would be, for example, a more complete research project to conduct comparative experiments to identify the most tolerant species from the order Lepidoptera with confirmatory trials on those species. One member noted that the enormity of such a research experiment could preclude its completion.

[45] Refer to Appendix 12 for the TPPT evaluation of the treatment.

[46] The panel agreed that the treatment should not be added to the List of Topics for IPPC Standards and recommended the submitter re-submit this proposal along with the requested in TPPT evaluation information during a subsequent call for treatments.

5.3 Irradiation for *Ostrinia nubilalis* (2012-009)

[47] This treatment is a minimum absorbed dose of 289Gy to prevent development past 1st instars of F1 adults when eggs through late pupae stages of *Ostrinia nubilalis* are treated in the host product. The treatment lead presented the submission and the panel discussed whether the treatment end-point would be acceptable, because surveillance is undertaken using a pheromone, and surviving, yet reproductively sterile, adults, theoretically, could be detected at the import location. If pupae are treated in the regulated article, they theoretically could emerge as adults, mate, and lay eggs, although the eggs would not hatch. Some of those eggs (the reference paper states 0.011% eggs hatched from about 9 500 laid by surviving adults) will hatch but none will mature beyond 1st instars. The reference paper also states that, following a dose of 300Gy, zero eggs hatched from 30 000 laid by surviving adults. During discussion, it was confirmed that *Ostrinia nubilalis* has an overwintering late stage (5th instar) larval diapause and does not pupate in regulated articles. None of the references indicate the pest pupates in regulated articles but, more significantly, life stages in this part of the life cycle would not be associated with host material in trade. Even altering storage conditions (e.g. cold storage) would not induce diapause, and, according to Hallman (2000), diapausing insects are not more tolerant to radiation than ones not in diapause. The panel confirmed that not all plant material that is host to this insect may tolerate irradiation at 289Gy (minimum absorbed dose). The panel discussed whether a dose of 300Gy would be more acceptable and also noted that the insect pupae, during the treatment development experiments, were treated in cardboard rings rather than in host plant material. The ED was not provided for this treatment but there were no survivors from 9 468 treated insects. From those data the panel calculated the efficacy as 99.9683% at the 95% level of confidence ($ED_{99.9683}$ or no survivors in 3 156 pupae).

[48] The panel agreed to recommend this treatment be added to the List of Topics for IPPC Standards and to prepare a discussion paper on end-point acceptability with various scenarios and their issues for review at its next meeting.

[49] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(10) *recommended* to the SC that the treatment *Irradiation for* Ostrinia nubilalis (2012-009) be added to the List of Topics for IPPC Standards

(11) *agreed* that a request for information be sent to the submitter of the treatment *Irradiation for* Ostrinia nubilalis (2012-009)

(12) *agreed* to prepare a paper on end-point acceptability (i.e. adult emergence) with various scenarios and their issues.

5.4 Irradiation for *Dysmincoccus neobrevipes* Beardsley, *Planococcus lilacinus* (Cockerell) and *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) (2012-011)

[50] This treatment is a minimum absorbed dose of 231Gy to prevent *Dysmincoccus neobrevipes* Beardsley, *Planococcus lilacinaus* (Cockerell) and *Planococcus minor* (Maskell) adult females from reproducing, in all fruits and vegetables that are hosts to the three species of mealybugs. The treatment lead noted that the information provided was not referenced throughout the submission form and could not be found in the supporting references. The submitter had been contacted and provided the supporting information that was not referenced, including mortality in the non-treated controls in the confirmatory trials (see box below):

Control Pumpkins	Number of females
No. 1	3,067
No. 2	3,183
No. 3	3,147
No. 4	3,153
No. 5	3,325

[51] The subsequent information indicated that 31 057 test organisms were treated (calculated from control data using the formula **n = μ - (STD × 1.645)**) with no survivors, providing an efficacy of 99.9903% at the 95% level of confidence ($ED_{99.9903}$ or no survivors in 10 352 female adults (most tolerant stage)).

[52] With the additional information provided, the panel agreed that the treatment be recommended to the SC for member consultation.

[53] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(13) *recommended* to the SC that the treatment *Irradiation for* Dysmincoccus neobrevipes *Beardsley,* Planococcus lilacinus *(Cockerell) and* Planococcus minor *(Maskell) (Hemiptera: Pseudococcidae)* (2012-011) be added to the List of Topics for IPPC Standards

(14) *recommended* the treatment *Irradiation for* Dysmincoccus neobrevipes *Beardsley,* Planococcus lilacinus *(Cockerell) and* Planococcus minor *(Maskell) (Hemiptera: Pseudococcidae)* (2012-011) to the SC for member consultation.

5.5 Generic irradiation for pupae of Lepidoptera (2012-012)

[54] This treatment is a minimum absorbed dose of 350Gy to prevent hatch of eggs laid by adults emerging from irradiated pupae of Lepidoptera. The treatment will also control all eggs and larvae of Lepidoptera. The treatment lead presented the submission, which was very similar to the submission in section 5.2 *Generic irradiation for eggs and larvae of Lepidoptera* (2012-008). For this submission, the efficacy was supported by studies on 31 species in eight families where prevention of egg hatch from irradiated late Lepidoptera pupae was achieved at 350Gy. One panel member noted that a supporting reference indicated a large heterogeneity in tolerance of ages of pupal stages. However,

another member pointed out that the submitter had used late pupal stages (the most tolerant) in the studies for treatment development. The panel discussed in detail that no efficacy level could be derived from the data provided and the panel needed to decide on what should be an appropriate level. The panel agreed that a major concern is that the treatment endpoint is described in a way that may not be acceptable by contracting parties (i.e. adult sterility, no F1 egg hatch, etc.). It was further noted that setting an end point of no adult emergence would be impractical in most cases because of the very large doses required to achieve such a level of efficacy.

[55] The TPPT agreed that the treatment should not be added to the List of Topics for IPPC Standards and recommended the submitter re-submit this proposal along with the requested in TPPT evaluation information during a subsequent call for treatments.

[56] Refer to Appendix 12 for the TPPT evaluation of the treatment.

6. Review of Treatments under the Topic *Fruit fly treatments* (2006-024)

[57] There were 16 treatments reviewed under this topic. Ten were cold treatments: four had been presented for adoption at CPM-7 (2012) but the Secretariat received formal objections 14 days prior to the CPM-7 (2012); four were returned to the panel in 2011 by the SC because of concerns regarding chilling injury to *Citrus limon* and for ED values to be revised; and the remaining two were awaiting additional information from the submitter. The other six treatments were heat treatments that had been awaiting receipt of additional information from the submitter.

6.1 High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) on fruit (2009-105)

[58] The treatment lead presented the submission and noted that this is a very complicated treatment. It was noted that it would be a very useful treatment because it will target more than one fruit fly species. In addition, updated information had recently been supplied, including a long list of references which the treatment lead had not yet fully reviewed. The panel agreed to defer this submission to the next TPPT meeting.

[59] The TPPT agreed that the *High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) on fruit* (2009-105) be deferred to the next TPPT meeting to allow sufficient time for a thorough review of the treatment submission.

6.2 Vapour heat treatment for *Mangifera indica* var. Manila Super (2009-108)

[60] The Secretariat informed the TPPT that a request for additional information had been sent to the submitter, but the submitter had not yet provided the requested information. The panel agreed that a final request for additional information be sent to the submitter, and if they did not respond, this treatment should be recommended for removal from the List of Topics for IPPC Standards.

The TPPT:

(15) *agreed* that a final request for information be sent to the submitter of the treatment *Vapour heat treatment for* Mangifera indica *var. Manila Super* (2009-108).

6.3 Vapour heat treatment for *Carica papaya* var. Solo (2009-109)

[61] The Secretariat informed the TPPT that a request for additional information had been sent to the submitter, but the submitter had not yet provided the requested information. The panel agreed that a final request for additional information be sent to the submitter and, if they did not respond, this treatment should be recommended for removal from the List of Topics for IPPC Standards.

The TPPT:

(16) *agreed* that a final request for information be sent to the submitter of the treatment *Vapour heat treatment for* Carica papaya *var. Solo* (2009-109).

6.4 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* and their hybrids (2010-102)

[62] A request for more information had been sent to the submitter and a response had been received, so the panel evaluated the treatment and response in absence of the treatment lead.

[63] The panel had requested more information on the following issues with the submission: mortality in the large scale tests, wild strains of *Ceratitis capitata*, where and when the fruits were collected from and what hybrids of *Citrus reticulata* were tested.

[64] The panel reviewed the information provided to ensure the data were sufficient. The submitter responded that naturally infested in-field fruits which showed symptoms of attack by *Ceratitis capitata* had been collected and taken to the lab to obtain wild strain pupae and that artificial breeding of flies had started with those pupae. In addition, periodically wild pupae were introduced to the laboratory population. The basic tests proved that there was no difference between young larvae (L1 + L2) and mature larvae (L3) with regards to the effectiveness of the treatment. In lieu of this fact, and in order not to make the trial unnecessarily long, the treatment was applied on fruits that had been kept for 10 days in the lab at 24 ± 1 ºC and 65% RH, which resulted in approximately 50% of L2 and L3 (exactly: 7% L1, 45% L2, 48% L3). This life stage mix is a very common situation for symptomatic fruits in the field before they fall from the tree. The efficacy of the treatment was established by cutting the treated fruits into pieces and subsequently counting the number of individuals of *C. capitata* that were still alive.

[65] The panel discussed the method of counting surviving larvae, the level of mortality in the non-treated control and the potential effect of the 10% salt solution (extraction technique) on larval mortality. The panel concluded that the method of extracting larvae was appropriate and the effect of the extraction on larval mortality was the same for controls and exposed larvae.

[66] The level of mortality in the non-treated control was not provided and this could be an issue if it was too high. Cumulative mortality from egg stages through larvae stages was high, which means that rearing conditions were inadequate for the insect, and, therefore, the research should be rejected. Using larvae survivors rather than waiting for prevention of puparial formation was not ideal because there could have been survivors misidentified as dead larvae because they were not observed to move. Normal- (live) coloured larvae should have been held for further development to determine if the apparent lack of movement indicated mortality. The panel agreed that all normal looking (but non-moving) larvae needed to be incubated to a later test for movement or further development. The panel agreed to send a request for more information to the submitter, asking for clarification of the bioassay method and also a full description of the method of determining mortality in the non-treated control

[67] Regarding the variety of hybrids of *Citrus reticulata* that were tested, the submitter had responded that it used the Clementine mandarin variety “Clemenules” (*Citrus clementina* Hort. Ex Tan, according to current nomenclature, and *Citrus reticulata* (Blanco), also known as variety “Nules” according to older nomenclature. This variety was chosen for being the one more favoured in the market and with greater levels of export, as well as the one that attains the highest prices. The panel accepted that the variety was *Citrus reticulata* (Blanco) under recent taxonomic changes.

[68] The panel agreed that additional information be requested to clarify the level of mortality in the non-treated control.

[69] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(17) *agreed* that a request for information be sent to the submitter of the treatment *Cold treatment for* Ceratitis capitata *on* Citrus reticulata *and their hybrids* (2010-102).

6.5 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2010-103)

[70] A request for more information had been sent to the submitter and a response had been received, so the panel reviewed the treatment and the requested information.

[71] The panel had requested more information on the following issues with the submission: wild strains of *Ceratitis capitata*, treatment duration and a revision of the ED values.

[72] The panel had asked the submitter for statistical proof that there were no differences in insect tolerance to cold storage between the three citrus types and, in response, a graph and two tables were supplied. The panel was concerned about where the data for analysis of variance came from. The panel analysed the table from submitter (end of Appendix B of the submitter's response) showing a range of LD (lethal dose) values and found that the analysis supplied was done on LD values, which is not correct.

[73] The submitter responded that naturally infested in-field fruits, which showed symptoms of attack by *Ceratitis capitata,* had been collected and taken to the laboratory to obtain wild strain pupae and that artificial breeding of flies had started with those pupae. In addition, wild pupae were introduced into the laboratory strain periodically.

[74] The submitter informed the panel that the treatment was longer than the target time for the first replicate (17 days) because the intended end of the treatment coincided with a holiday and the facilities were closed. However, since the two other repetitions confirmed that mortality was 100% after 16 days of treatment, the trial was regarded as valid. The panel considered that the 17-day replicate could not be used to support the 16 day treatment because there were, in effect, six replications in total and removing one replication would still provide sufficient numbers to support a 16-day treatment. The panel agreed that the response from the submitter was satisfactory.

[75] The panel recalculated the ED values after removing the first replicate (control and treatment fruit) from the results. The newly calculated ED was 99.9935% (1 survivor in 46 375) at the 95% level of confidence.

[76] The panel also discussed whether the schedule should be based on the lowest recorded temperature or the mean temperature and the panel agreed to use the mean temperature because this is customary.

[77] The panel discussed the temperature recordings and the stated variation of ±0.5 °C around 2 °C and whether the required temperature should be 1.5°C. Panel agreed that 2 ºC or below should be the schedule for this treatment. TPPT noted that the response from the submitter was satisfactory.

[78] The panel discussed the method of counting surviving larvae, the level of mortality in the non-treated control and the potential effect of the salt solution (extraction technique) on larval mortality.

[79] The level of mortality in the non-treated control was not provided, and this could be an issue if the level was too high. Cumulative mortality from egg stages through larvae stages was high, which means that rearing conditions were inadequate for the insect, and, therefore, the research should be rejected. Using larvae survivors rather than waiting for prevention of puparial formation was not ideal. There could have been survivors misidentified as dead larvae because they were not observed to move. Normal- (live) coloured larvae should have been held for further development to determine if the apparent lack of movement indicated mortality. The panel agreed that all normal looking (but non-moving) larvae needed to be incubated to later test for movement or further development. The panel agreed to send a request for more information to the submitter asking for clarification of the bioassay method and also a full description of the method of determining mortality in the non-treated control.

[80] The panel discussed the statistical analyses on the differences among the varieties of oranges studied. In its response, the submitter had asked the panel for further details on the calculations carried out by

the panel and the required data about the ED. The panel requested the Secretariat to update the checklist to include this information.

[81] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(18) *agreed* that a request for information be sent to the submitter of the treatment *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2010-103).

6.6 Vapour heat treatment for *Ceratitis capitata* on *Mangifera indica* (2010-106)

[82] The panel was unable to approve this treatment because the submitter had not provided the requested information needed to calculate the error around the estimation of the number of infested fruits in the treatment and the number of surviving pupae in the control.

[83] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(19) *agreed* that a request for information be sent to the submitter of the treatment *Vapour heat treatment for* Ceratitis capitata *on* Mangifera indica (2010-106).

6.7 Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107)

[84] The submitter had not provided the additional information needed to calculate the error around the estimation of the number of infested fruits in the treatment and the number of surviving pupae in the control.

[85] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(20) *agreed* that a request for information be sent to the submitter of the treatment *Vapour heat treatment for* Bactrocera tryoni *on* Mangifera indica (2010-107).

6.8 Vapour heat treatment for *Bactrocera cucurbitae* on *Cucumis melo* var. *reticulatus* (2006-110)

[86] The treatment lead was unable to attend the meeting, so the Secretariat provided an update on the submission. The Secretariat explained that the SC returned the treatment to the panel due to the technical concerns with the treatment and the SC was still awaiting a formal response from the panel regarding this SC decision.

[87] The panel reviewed the SC's technical and non-technical comments.

[88] The panel discussed whether the form of artificial inoculation used to estimate life-stage may have impacted relative susceptibility. The panel considered that this issue needed to be resolved because available literature was mixed on which life stage was the most heat tolerant. One panel member agreed to contact researchers in the field to seek their opinion on this issue and any other data they may have available.

[89] Comments restricting the commodity to cultivar level were not supported by the panel because there is no evidence to suggest that cultivar differences will significantly impact melon fly susceptibility. Further research by Corcoran *et al.* (1993) on *Cucurbita pepo* found melon fly was equally susceptible under the same or similar treatment conditions (45 ºC for 30 minutes).

[90] One comment was related to the life stage and rearing technique used in the experimental protocol for this treatment submission. Further guidance on the validation of the use of artificial infestation for life-stage susceptibility testing needs to be provided by the submitter.

[91] In addition, the ED values will need to be re-calculated because the first replicate should not be included.

[92] Refer to Appendix 12 for the TPPT evaluation of the treatment.

The TPPT:

(21) *agreed* that a request for information be sent to the submitter of the treatment *Vapour heat treatment for* Bactrocera cucurbitae *on* Cucumis melo var. reticulatus (2006-110).

6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A)

[93] Panel was informed that the submitter had provided the additional information requested relating to calculations of the ED value (see Table 5 below).

Table 5: Large-scale trials showing the total number treated of 2nd instar MFF and 1st instar QFF. Comparison of the number of days required to kill >10 000 individuals in 3 replicate trials in 5 citrus cultivars at 2 °C and 3 °C

	Treatment: 2 °C			Treatment: 3 °C		
Fruit fly species and test fruit	**Days treated**	**No. of insects treated**	**No. of survivors**	**Days treated**	**No. of insects treated**	**No. of survivors**
Mediterranean fruit fly						
Valencia	18	141 441	0	20	142 584	0
Navel	18	165 894	0	20	152 868	0
Lisbon	16	132 216	0	18	122 400	0
Ellendale	18	133 788	0	20	137 742	0
Murcott	18	108 732	0	20	105 678	0

[94] Based on this and other information (see Appendix 7 to this report), the panel adjusted the ED calculations for the estimated treatment mortalities for the treatments using the new formula for mean control emergence numbers from aggregated fruit (**Average per treated regulated article = μ - (STD × √(1+1/r))** (see section 4 of Appendix 6 to this report):

- Schedule 1: 2 °C or below for 18 continuous days
  - For cultivar 'Navel' the efficacy is $ED_{99.9981}$ at the 95% confidence level
  - For cultivar 'Valencia' the efficacy is $ED_{99.9978}$ at the 95% confidence level
- Schedule 2: 3 °C or below for 20 continuous days
  - For cultivar 'Navel' the efficacy is $ED_{99.9980}$ at the 95% confidence level.
  - For cultivar 'Valencia' the efficacy is $ED_{99.9977}$ at the 95% confidence level.
- Schedule 3: 2 °C or below for 21 continuous days
  - For cultivars 'Washington Navel', 'Salustiana', 'Valencia' and 'Lue Gim Gong' the efficacy is $ED_{99.9917}$ at the 95% confidence level.

[95] The new formula provides more precise results than was the case using two standard deviations from the mean. The panel adjusted the schedules for these treatments and recommended them to the SC for adoption (sections 6.9 through 6.16 of this report).

The TPPT:

(22) *invited* recommended the *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2007-206A) to the SC for adoption by CPM.

6.10 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* x *C. sinensis* (2007-206B)

[96] The panel was informed that the submitter had provided the additional information requested relating to calculations of the ED value (see Appendix 7 to this report). Based on this information, and using the new formula for mean control emergence numbers from aggregated fruit, the panel adjusted the efficacy values for the estimated treatment mortalities for the treatments:

- Schedule 1: 2 °C or below for 18 continuous days
  - Efficacy and confidence level: $ED_{99.9970}$ at 95% confidence level
- Schedule 2: 3 °C or below for 20 continuous days
  - Efficacy and confidence level: $ED_{99.9970}$ at 95% confidence level.

[97] Refer to section 6.9 *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2007-206A) of this report for more information.

The TPPT:

(23) *recommended* the *Cold treatment for* Ceratitis capitata *on* Citrus reticulata *x* C. sinensis (2007-206B) to the SC for adoption by CPM.

6.11 Cold treatment for *Ceratitis capitata* on *Citrus limon* (2007-206C)

[98] The Secretariat noted that this treatment had been awaiting additional information from the submitter (refer to section 6.9 *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2007-206A) of this report for more information). Also, the SC had returned the treatment and the *Cold treatment for* Bactrocera tryoni *on* Citrus limon (2007-206G) (see section 6.12 of this report) to the panel because of concerns about chilling injury to *C. limon* during in-transit cold disinfestation. The panel had since drafted a discussion paper in response to the SC's concern and reviewed it during the meeting. The panel discussed some of the operational aspects of the paper, noting that the paper is not offering operational guidance but discusses aspects of the cold treatment that could cause injury to *C. limon*. The panel noted that the problem of chilling injury is not the treatment schedule but rather the operational conditions under which it is applied. The panel discussed and finalized the TPPT response to the SC (see Appendix 9 to this report).

[99] The Submitter had provided the requested information regarding the estimation of numbers of treated pests. These data were used by panel to recalculate the effective dose for this treatment using the new formula for mean control emergence numbers from aggregated fruit:

- Schedule 1: 2 °C or below for 16 continuous days
  - Efficacy and confidence level: ED99.9975 at the 95% confidence level
- Schedule 2: 3 °C or below for 18 continuous days
  - Efficacy and confidence level: $ED_{99.9973}$ at the 95% confidence level.

The TPPT:

(24) *invited* the SC to review the *TPPT response to the SC's concerns about chilling injury in lemons during in-transit cold disinfestation* (see Appendix 9 to this report)

(25) *recommended* the *Cold treatment for* Ceratitis capitata *on* Citrus limon (2007-206C) to the SC for adoption by CPM.

6.12 Cold treatment for *Bactrocera tryoni* on *Citrus limon* (2007-206G)

[100] This treatment had been returned to the TPPT by the SC because of concerns of possible chilling injury to *C. limon* during in-transit cold disinfestation. The panel had since drafted a discussion paper in response to the SC's concerns and reviewed it during the meeting. The panel discussed some of the operational aspects of the paper, noting that the paper is not offering operational guidance but discusses aspects of cold treatment that could cause injury to *C. limon*. The panel noted that the problem of chilling injury is not the treatment schedule but rather the operational conditions under which it is applied. The panel recalculated the ED values (see below) using the newly adopted formula for mean control emergence numbers from aggregated fruit and finalized the TPPT chilling injury response to the SC (see Appendix 9 to this report):

- Schedule : 3 °C or below for 14 continuous days
  - Efficacy and confidence level: $ED_{99.9872}$ at the 95% confidence level.

[101] Refer to section 6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A) and section 6.11 Cold treatment for *Ceratitis capitata* on *Citrus limon* (2007-206C) of this report for more information.

The TPPT:

(26) *recommended* the Cold treatment for *Bactrocera tryoni* on *Citrus limon* (2007-206G) to the SC for adoption by CPM.

6.13 Cold treatment for *Bactrocera tryoni* on *Citrus sinensis* (2007-206E)

[102] This treatment was presented for adoption at the CPM-7 (2012). However, the Secretariat received formal objections on the treatment, so it was returned to the SC. The panel drafted responses to the formal objections at its 2012 September TPPT Virtual Meeting[5].

[103] The panel adopted a new and revised formula for calculating the effective dose for mean control emergence numbers from aggregated fruit, and because of this new formula, it was decided to update this treatment. Therefore, the panel calculated a revised ED value, and the treatment schedule was updated accordingly:

- Schedule 1: 3 °C or below for 16 continuous days
  - For cultivar 'Navel' the efficacy is $ED_{99.9961}$ at the 95% confidence level
  - For cultivar 'Valencia' the efficacy is $ED_{99.9955}$ at the 95% confidence level.

[104] Refer to section 6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A) of this report for more information.

The TPPT:

(27) *revised* the treatment schedule for Cold treatment for *Bactrocera tryoni* on *Citrus sinensis* (2007-206E)

(28) *recommended* the Cold treatment for *Bactrocera tryoni* on *Citrus sinensis* (2007-206E) to the SC for adoption by CPM.

6.14 Cold treatment for *Bactrocera tryoni* on *Citrus reticulata* x *C. sinensis* (2007-206F)

[105] This treatment had been presented for adoption at the CPM-7 (2012). However, the Secretariat received formal objections on the treatment, so it was returned to the SC. The panel drafted responses to the formal objections at its 2012 September TPPT Virtual Meeting[6].

[106] The panel adopted a new and revised formula for calculating the effective dose for mean control emergence numbers from aggregated fruit, and because of this new formula, it was decided to update this treatment. Therefore, the panel calculated a revised ED value, and the treatment schedule was updated accordingly:

- Schedule: 3 °C or below for 16 continuous days
  - Efficacy and confidence level: $ED_{99.9986}$ at the 95% confidence level.

[107] Refer to section 6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A) of this report for more information.

The TPPT:

(29) *revised* the treatment schedule for Cold treatment for *Bactrocera tryoni* on *Citrus reticulata* x *C. sinensis* (2007-206F)

(30) *recommended* the Cold treatment for *Bactrocera tryoni* on *Citrus reticulata* x *C. sinensis* (2007-206F) to the SC for adoption by CPM.

6.15 Cold treatment for *Ceratitis capitata* on *Citrus paradisi* (2007-210)

[108] The SC had recommended this treatment for adoption at the CPM-7 (2012) meeting. However, the Secretariat received formal objections on the treatment, so it was returned to the SC. The panel drafted responses to the formal objections at its 2012 September TPPT Virtual Meeting[7].

[5] Report of the 2012 September TPPT Virtual Meeting: https://www.ippc.int/index.php?id=1110739

[6] See footnote 5.

[7] Report of the 2012 September TPPT Virtual Meeting: https://www.ippc.int/index.php?id=1110739

[109] Refer to section 6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A) of this report for more information.

The TPPT:

(31) *recommended* the Cold treatment for *Ceratitis capitata* on *Citrus paradisi* (2007-210) to the SC for adoption.

6.16 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* cultivars and hybrids (2007-212)

[110] The SC had recommended this treatment for adoption at the CPM-7 (2012) meeting. However, the Secretariat received formal objections on the treatment, so it was returned to the SC. The panel drafted responses to the formal objections at its 2012 September TPPT Virtual Meeting[8].

[111] Refer to section 6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A) of this report for more information.

The TPPT:

(32) *recommended* the Cold treatment for *Ceratitis capitata* on *Citrus sinensis* cultivars and hybrids (2007-212) to the SC for adoption by CPM.

6.17 CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on *Prunus persica* and *Prunus persica* var. *nectarina* (2012-010)

[112] The panel noted that this proposed treatment was not a current topic under the TPPT and, therefore, could not be considered.

6.18 CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on *Malus domestica* (2012-013)

[113] The panel noted that this proposed treatment was not a current topic under the TPPT and, therefore, could not be considered.

7. Review of Treatments under the Topic *Soil and growing media in association with plants* (2009-006)

[114] The panel has not received any submissions of data for treatments of soil and growing media in association with plants.

8. Summary of Recommendations to the SC

The TPPT:

(1) *asked* that the Secretariat provide an opportunity for the TPPT to review treatment guidelines or other material related to providing guidance on PTs prior to the final approval by the CDC.

(2) *asked* the Secretariat to consider, for the proposed *Criteria for phytosanitary treatments for formal objections*, that the examples given under the criteria for phytosanitary treatments should be removed because they were not as comprehensive as those listed in ISPM 28:2007.

(3) *asked* the SC to note that the TPPT agreed that the Cardiff Protocol would help to develop more appropriate treatment efficacy requirements for target pests.

(4) *invited* the SC to note that the *Working TPPT criteria for treatment evaluation*, for TPPT internal use only, has been updated

[8] Report of the 2012 September TPPT Virtual Meeting: https://www.ippc.int/index.php?id=1110739

(5) *invited* the SC to note the *TPPT procedure for evaluating phytosanitary treatments requiring additional information from submitters* that will be attached to official TPPT requests to submitters.

(6) *recommended* to the SC that guidelines and/or training material for all standards should not be released prior to the formal adoption of the standard

(7) *Recommended* that the SC removes the following treatments from the *List of Topics*:

- *HCN treatment of wood packaging material* (2007-103)
- *Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity* (2007-105)

(8) *Recommended* to the SC that the following treatments be added to the List of Topics:

- *Irradiation for* Ostrinia nubilalis (2012-009) be added to the *List of topics*
- *Irradiation for* Dysmincoccus neobrevipes *Beardsley*, Planococcus lilacinus *(Cockerell) and* Planococcus minor *(Maskell) (Hemiptera: Pseudococcidae)* (2012-011) be added to the *List of topics*

(9) *Recommended* the treatment *Irradiation for* Dysmincoccus neobrevipes *Beardsley*, Planococcus lilacinus *(Cockerell) and* Planococcus minor *(Maskell) (Hemiptera: Pseudococcidae)* (2012-011) to the SC for Member Consultation

(10) *Agreed* that a final notice letter be sent to the submitters of the treatments:

- *Vapour heat treatment for* Mangifera indica *var. Manila Super* (2009-108)
- *Vapour heat treatment for* Carica papaya *var. Solo* (2009-109)
- *Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for* Bursaphelenchus xylophilus, *Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material* (2007-102)

(11) *Agreed* that a request for information be sent to the submitter of the treatments:

- *Cold treatment for* Ceratitis capitata *on* Citrus reticulata *and their hybrids* (2010-102)
- *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2010-103)
- *Vapour heat treatment for* Ceratitis capitata *on* Mangifera indica (2010-106)
- *Vapour heat treatment for* Bactrocera tryoni *on* Mangifera indica (2010-107)
- *Vapour heat treatment for* Bactrocera cucurbitae *on* Cucumis melo var. reticulatus (2006-110)
- *Irradiation for* Ostrinia nubilalis (2012-009)

(12) *Recommended* the following treatments to the SC for adoption by CPM:

- *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2007-206A)
- *Cold treatment for* Ceratitis capitata *on* Citrus reticulata *x* C. sinensis (2007-206B)
- *Cold treatment for* Ceratitis capitata *on* Citrus limon (2007-206C)
- *Cold treatment for* Bactrocera tryoni *on* Citrus limon (2007-206G)
- *Cold treatment for* Bactrocera tryoni *on* Citrus sinensis (2007-206E)
- *Cold treatment for* Bactrocera tryoni *on* Citrus reticulata *x* C. sinensis (2007-206F)
- *Cold treatment for* Ceratitis capitata *on* Citrus paradisi (2007-210)

- Cold treatment for Ceratitis capitata on Citrus reticulata cultivars and hybrids (2007-212)

(13) *Agreed* to prepare a paper on end-point acceptability (i.e. adult emergence) with various scenarios and their issues to be presented for review by the TPPT

(14) *invited* the SC to review the *TPPT response to the SC's concerns about chilling injury in lemons during in-transit cold disinfestation* (see Appendix 9 to this report)

(15) *Recommended* the SC hold a call for treatments in 2013 for treatments under the topics irradiation, soil and growing media and fruit flies

(16) *Recommended* the SC hold a call for experts in 2013 because the membership of two panel members will be ending in 2014

9. Other Business

9.1 Virtual tools

International Phytosanitary Portal

[115] The Secretariat gave the panel an overview of the IPP public and restricted areas that are relevant to the panel's work, including the new forum discussion tools, meeting documents and location of information frequently referred to by the panel. The panel, in particular, the new members, thanked the Secretariat for the overview and found it very useful.

Online Comment System

[116] The Secretariat reminded the panel that it has begun using the IPPC Online Comment System[9] (OCS) for submitting and responding to comments on draft ISPMs for member consultation. The Secretariat also informed the panel that some training on the OCS would be provided at the next TPPT meeting because it is anticipated that the panel will use the OCS when responding to member comments.

GoToTraining

[117] The Secretariat informed the panel that GoToTraining is becoming a standard tool within the Secretariat to facilitate the inter-session work of the panel. These virtual meeting tools do not require installation of software. However, they do require the use of a headset and the previous installation of JAVA. The Secretariat also informed the panel that the installation and use of such electronic tools may require prior approval of their organization's information technology services.

[118] More information on these tools can be found on the IPP[10].

Feedback on virtual meetings (SC Request)

[119] At its May 2012 meeting, the SC requested that the panel provide feedback on the virtual meetings. The panel had a long discussion and provided the Secretariat with a list of positive features, challenges, and other items that the SC should consider when evaluating the progress of virtual meetings, which can be found in Appendix 10 to this report.

9.2 Feedback on the TPPT Evaluation Procedure, including the checklist, submission forms, other relevant templates, etc.

[120] The panel reviewed the current rules and procedures for TPPT and technical panels in general. The panel had no comments or proposed changes.

[9] IPPC Online Comment System (OCS): http://ocs.ippc.int/

[10] Virtual Meeting Tools: https://www.ippc.int/index.php?id=1110980

9.3 Review of List of Topics for IPPC Standards, treatment leads and vacancies, prioritization and future calls for treatments

[121] The Secretariat makes a call for topics every two years and informed the panel that IPPC members and TPs can submit detailed proposals for new topics or for the revision of existing ISPMs. Submissions should be accompanied with a draft specification, a literature review and justification that the proposed topic meets the CPM-approved criteria for topics (available in the IPPC Procedure Manual for Standard Setting[11]). The next call for topics is tentatively scheduled for 2013. The panel agreed to begin considering whether any new topics should be added or any existing ISPMs need to be revised. The panel will discuss this issue further at its next meeting.

[122] The panel reviewed in detail each item on the List of Topics for IPPC Standards under the responsibility of the TPPT and reassigned treatment leads, reviewed the priority and strategic objectives assigned to each treatment and updated the status of each.

[123] The current version of the List of Topics for IPPC Standards can be found on the IPP[12].

9.4 Working TPPT criteria for treatment evaluation

[124] The TPPT reviewed and updated its document entitled *Working TPPT criteria for treatment evaluation* (see Appendix 13 to this report).

9.5 Engaging Experts

[125] At the 2012 October Strategic Planning Group (SPG) meeting, the Secretariat had informed the SPG of some of the difficulties the Secretariat was encountering in engaging experts and contracting parties, such as low responses to calls for treatments, calls for experts, as well as the lack of availability of nominated experts, stewards, etc. to complete their activities for which they have been selected and for which they signed a statement of commitment. Regarding the latter, a line had been added to the statement of commitment so that supervisors also commit to allocating the time and resources to fulfil the agreed commitment. The SPG discussed the paper and proposed that a questionnaire be sent to NPPOs, RPPOs and relevant experts to help identify their constraints.

[126] The SC had agreed this issue be placed on the agenda of the forthcoming TP meetings. In accordance with the SC request, the panel discussed some challenges to engaging experts in the standard setting process and forwarded these items to the Secretariat (see Appendix 13 to this report).

9.6 Expert consultation on cold treatment

[127] At its April 2012 meeting, the SC considered how to proceed with the four cold treatments that had received formal objections at CPM-7 (2012). One suggestion was to hold a discussion forum for experts of cold treatments in order to build confidence in cold treatments and to establish mutual understanding of any related issues. The SC agreed that a meeting be organized under the auspices of the Secretariat using relevant experts from the TPPT and Technical Panel on Pest Free Areas and System Approaches for Fruit Flies (TPFF). The TPPT and TPFF could help identify the best cold treatment experts in the world to attend the meeting. The Secretariat had noted that some financial resources were available and a consultant could be hired to organize the meeting.

[128] The Secretariat had developed a draft programme for the symposium and had asked the panel to review it and provide feedback. The panel requested more time to review the programme, so the Secretariat agreed to post it on the forum in the TPPT restricted area of the IPP. The panel agreed that, after the forum discussion, this issue should be discussed further at the next TPPT virtual meeting.

[11] IPPC Procedure Manual for Standard Setting: https://www.ippc.int/index.php?id=1111176&no_cache=1&L=0

[12] List of topics for IPPC Standards: https://www.ippc.int/index.php?id=207776

10. Follow-up Actions for the next TPPT Virtual Meeting

10.1 TPPT work programme and medium term plan

[129] The TPPT reviewed, adjusted and updated its work programme and medium term plan (see Appendix 11 of this report).

The TPPT:

(1) *recommended* that a call for treatments be made in 2013 for treatments under the topics irradiation, soil and growing media and fruit flies

(2) *recommended* that a call for experts for the TPPT be made in 2013 because the membership of two panel members will be ending in 2014.

11. Close of the Meeting

[130] The Secretariat thanked the participants for their excellent work during the meeting and thanked the host and organizer for their hospitality and logistical arrangements. The next TPPT meeting will take place in Fukuoka, Japan from 8-12 July 2013.

[131] The Secretariat also thanked the members whose membership is ending in 2013 for all their hard work and dedication to the panel:

- Ms Alice Baxter (South Africa
- Mr Ray Cannon (United Kingdom)
- Mr Mohammad Katbeh-Bader (Jordan)
- Mr Scott Wood (USA)

Appendix 1: Agenda

AGENDA ITEM	DOCUMENT NO.	PRESENTER[13]
1. Opening of the meeting		
1.1 Welcome by the IPPC Secretariat		DUBON/ ZETTLER
1.2 Election of the Chair		DUBON
1.3 Election of the Rapporteur		CHAIR
1.4 Adoption of the Agenda	2012_TPPT_Dec_01	CHAIR
2. Administrative Matters		
2.1 Documents List	2012_TPPT_Dec_02	DUBON
2.2 Participants List	2012_TPPT_Dec_03	DUBON
2.3 Local Information	2012_TPPT_Dec_04	DUBON
3. Updates from relevant Bodies		
3.1 Items arising from 2012 October Strategic Planning Group (SPG)	2012_TPPT_Dec_07	DUBON
3.2 Items arising from 2012 October Bureau	2012_TPPT_Dec_07	DUBON
3.3 Items arising from 2012 November SC	2012_TPPT_Dec_07	DUBON
3.4 Items arising and updates from other Technical Panels	2012_TPPT_Dec_07 2012_TPPT_Dec_12	DUBON

3.5 Update from the IPPC Secretariat
• Standard Setting
  ○ Call for Treatments (see also Agenda item X)
  ○ Calls for Experts
• Communications
• Information Exchange
• Capacity Development
• Implementation Review and Support System (IRSS)
	2012_TPPT_Dec_07	ZETTLER

4. Review of treatments under the topic Wood packaging material treatments (2006-015)		
4.1 HCN treatment of wood packaging material (2007-103)	2007-103 2007-103_Update	JESSUP
4.2 Sulfuryl fluoride fumigation of wood packaging material (2007-101)	2007-101 2007-101_Update	ORMSBY

[13] Presenters with an asterisk (*) next to their name will be leaving the panel in the near future and need to be replaced. Presenters in (RED) are proposed leads. Please consider whether you would be interested in taking on this responsibility and communicate with Stephanie and Larry before the 2012 December meeting.

AGENDA ITEM	DOCUMENT NO.	PRESENTER[13]
4.3 Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for *Bursaphelenchus xylophilus*, Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material (2007-102)	2007-102 2012_TPPT_Dec_13	WOOD*
4.4 Heat treatment of wood packaging material using dielectric heating (2007-114)	• 2007-114 • 2007-114_Update • 2012_TPPT_Dec_06_Guidelines	ORMSBY
5. Review of treatments under the topic Irradiation treatments (2006-014)	2012_TPPT_Dec_10	CANNON
5.1 Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity (2007-105)	2007-105 *Status pending*	CANNON*
5.2 Generic irradiation for eggs and larvae of Lepidoptera (2012-008)	• 2012-008_Checklist • 2012-008_SubmissionForm • 2012-008_SubmissionEmail • 2012-008_Reference_Hallmanetal2012 • 2012-008_Reference_AbbasEtAl2011 • 2012-008_Reference_Hallman2000 • 2012-008_Reference_IAEA2004	New Submission* (ORMSBY)
5.3 Irradiation for *Ostrinia nubilalis* (2012-009)	• 2012-009_SubmissionForm • 2012-009_SubmissionEmail *No checklist received*	New Submission* (JESSUP)
5.4 Irradiation *for Dysmincoccus neobrevipes* Beardsley, *Planococcus lilacinus* (Cockerell) and *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) (2012-011)	• 2012-011_Checklist_Rev1 • 2012-011_SubmissionForm • 2012-011_SubmissionEmail • 2012-011_Communication	New Submission* (WILLINK)
5.5 Generic Irradiation for pupae of Lepidoptera (2012-012)	• 2012-012_Checklist • 2012-012_DiscussionPaper • 2012-012_SubmissionForm • 2012-012_SubmissionEmail • 2012-012_Reference_Hallmanetal2012 • 2012-012_Reference_Brower1976	New Submission* (KATBEH-BADER)*
6. Review of treatments under the topic Fruit fly treatments (2006-024)	2012_TPPT_Dec_11 2012_TPPT_Dec_14	ORMSBY JESSUP/WOOD

AGENDA ITEM	DOCUMENT NO.	PRESENTER[13]
6.1 High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) on fruit (2009-105)	• 2009-105 • 2009-105_SubmissionForm *No update received*	JESSUP ORMSBY
6.2 Vapour heat treatment for *Mangifera indica* var. Manila Super (2009-108)	2009-108 *No update received*	Vacant* (WILLINK)
6.3 Vapour heat treatment for *Carica papaya* var. Solo (2009-109)	2009-109 *No update received*	BAXTER*
6.4 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* and their hybrids (2010-102)	2010-102 *No update received*	CANNON*
6.5 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2010-103)	2010-103 *No update received*	CANNON*
6.6 Vapour heat treatment for *Ceratitis capitata* on *Mangifera indica* (2010-106)	2010-106 2012_TPPT_Dec_13	WOOD*
6.7 Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107)	• 2010-107 • 2010-107_Update	PARK
6.8 Vapour heat treatment for *Bactrocera cucurbitae* on *Cucumis melo* var. reticulatus (2006-110)	2006-110 *No update received*	WANG
6.9 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2007-206A)	2007-206A *No update received*	BAXTER*
6.10 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* x *C. sinensis* (2007-206B)	2007-206B 2012_TPPT_Dec_13	Vacant* (WOOD)*
6.11 Cold treatment for *Ceratitis capitata* on *Citrus limon* (2007-206C)	2007-206C *No update received*	Vacant* (WANG)
6.12 Cold treatment for *Bactrocera tryoni* on *Citrus limon* (2007-206G)	2007-206G *No update received*	WANG
6.13 Cold treatment for *Bactrocera tryoni* on *Citrus sinensis* (2007-206E)	2007-206E *No update received*	BAXTER*
6.14 Cold treatment for *Bactrocera tryoni* on *Citrus reticulata* x *C. sinensis* (2007-206F)	2007-206F *No update received*	Vacant* (WILLINK)
6.15 Cold treatment for *Ceratitis capitata* on *Citrus paradisi* (2007-210)	2007-210 2012_TPPT_Dec_13	Vacant* (WOOD)*
6.16 Cold treatment for *Ceratitis capitata* on *Citrus reticulata* cultivars and hybrids (2007-212)	• 2007-212 • 2007-212_Update	Vacant* (ORMSBY)

AGENDA ITEM	DOCUMENT NO.	PRESENTER[13]
6.17 CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on stone fruits (2012-010)	• 2012-010_Checklist • 2012-010_SubmissionForm • 2012-010_SubmissionEmail • 2012-010_Reference_ Neven&Mitcham1996 • 2012-010_Reference_Neven2002 • 2012-010_Reference_Neven2008 • 2012-010_Reference_Nevenetal2006 • 2012-010_Reference_Obenlandetal2005 • 2012-010_Reference_ USDATreatmentManual2012	New Submission* (CANNON)*
6.18 CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on Malus domestica (2012-013)	• 2012-013_Checklist • 2012-013_SubmissionForm • 2012-013_SubmissionEmail • 2012-013_Reference_ Neven&Mitcham1996 • 2012-013_Reference_Neven2002 • 2012-013_Reference_Neven2008 • 2012-013_Reference_ Neven&Rehfield-Ray2006 • 2012-013_Reference_ USDATreatmentManual2012	New Submission* (BAXTER)*
7. Review of treatments under the topic Soil and growing media in association with plants (2009-006)		CHAIR
8. Recommendations to the SC		CHAIR
9. Other business		
9.1 Virtual Tools • IPP (www.ippc.int) • OCS (www.ocs.ippc.int) • GoToTraining • Feedback on virtual meetings (SC Request)		DUBON
9.2 Feedback on the TPPT Evaluation Procedure, including the checklist, submission forms, other relevant templates, etc.	2012_TPPT_Dec_05	ZETTLER
9.3 Review of List of Topics, treatment leads and vacancies, prioritization, etc.	2012_TPPT_Dec_08	DUBON
9.4 Working TPPT criteria for treatment evaluation	2012_TPPT_Dec_Guideline_H	ORMSBY
9.5 Engaging Experts	2012_TPPT_Dec_07	DUBON
9.6 Cold Treatment Symposium`		SHAMILOV

AGENDA ITEM	DOCUMENT NO.	PRESENTER[13]
10. Follow-up Actions for next TPPT Meeting		
10.1 TPPT Work Programme and Medium Term Plan	2012_TPPT_Dec_09	DUBON
11. Close of the meeting		CHAIR

Appendix 2: Documents list

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
Draft treatments			
2007-101	4.2	Sulfuryl fluoride fumigation of wood packaging material (2007-101) (ORMSBY)	2012-10-10
2007-102	4.3	Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for *Bursaphelenchus xylophilus*, Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material (2007-102) (WOOD)	2012-10-10
2007-105	5.1	Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity (2007-105) (CANNON)	2012-10-10
2007-114	4.4	Heat treatment of wood packaging material using dielectric heating (2007-114) (ORMSBY)	2012-10-03
2007-212	6.16	Cold treatment for *Ceratitis capitata* on *Citrus reticulata* cultivars and hybrids (2007-212) (ORMSBY)	2012-10-03
2010-107	6.7	Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107) (PARK)	2012-10-03
All other meeting documents (including checklists)			
2012_TPPT_Dec_01	1.4	Agenda (DUBON)	2012-11-22
2012_TPPT_Dec_02	2.1	Documents List (DUBON)	2012-11-22
2012_TPPT_Dec_03	2.2	Participants List (DUBON)	2012-11-22
2012_TPPT_Dec_04	2.3	Local Information (DUBON)	2012-09-17
2012_TPPT_Dec_05	9.2	TPPT Procedures (DUBON)	2012-10-03
2012_TPPT_Dec_06	4.4	Guidelines for the application and verification of dielectric heating as a phytosanitary measure (ORMSBY)	2012-11-02
2012_TPPT_Dec_07	3.0 and 9.5	Items arising other relevant bodies (DUBON)	2012-11-22
2012_TPPT_Dec_08	9.3	List of Topics for IPPC standards – items relevant to the TPPT (DUBON)	2012-11-22
2012_TPPT_Dec_09	10.1	TPPT Work Programme and medium term plan (DUBON)	2012-11-22
2012_TPPT_Dec_10	5.0	Issues concerning irradiation treatments of relevance to the TPPT (CANNON)	2012-11-22
2012_TPPT_Dec_11	6.0	Adjusted efficacy calculations for cold treatments (ORMSBY)	2012-11-22
2012_TPPT_Dec_12	3.4	IFQRG Cardiff Protocol: Developing Efficacy Schedules for WPM-Infesting Forestry Pests (ORMSBY)	2012-11-22

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
2012_TPPT_Dec_13	4.3, 6.6, 6.10, 6.15	Treatment Updates (WOOD)	2012-11-22
2012_TPPT_Dec_14	6.0	Chilling injury in lemons during in-transit cold disinfestations (JESSUP/WOOD)	2012-11-22
2012_TPPT_Dec_Guideline_H	9.4	Guideline: TPPT criteria for treatment evaluations (ORMSBY)	2012-11-01
2007-101_Update	4.2, 4.3	Update: Sulfuryl fluoride fumigation of wood packaging material (2007-101) (ORMSBY)	2012-11-22
2007-103_Update	4.1	Update: HCN treatment of wood packaging material (2007-103) (JESSUP)	2012-11-22
2007-212_Update	6.16	Update: Cold treatment for *Ceratitis capitata* on *Citrus reticulata* cultivars and hybrids (2007-212) (ORMSBY)	2012-11-22
2009-105_SubmissionForm	6.1	Revised Submission Form from NZ: High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) on fruit (2009-105) (ORMSBY)	2012-11-22
2010-107_Update	6.7	Update: Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107) (PARK)	2012-11-01
2012-008_Checklist	5.2	Checklist: Generic irradiation for eggs and larvae of Lepidoptera (2012-008) (ORMSBY)	2012-11-22
2012-008_Reference_ Hallmanetal2012	5.2	2012-008 Reference Hallman et al 2012	2012-09-21
2012-008_Reference_AbbasEtAl2011	5.2	2012-008 Reference Abbas Et Al 2011	2012-11-22
2012-008_Reference_Hallman2000	5.2	2012-008 Reference Hallman 2000	2012-11-22
2012-008_Reference_IAEA2004	5.2	2012-008 Reference IAEA 2004	2012-11-22
2012-008_SubmissionEmail	5.2	2012-008 Submission Email	2012-09-21
2012-008_SubmissionForm	5.2	2012-008 Submission Form	2012-09-21
2012-009_SubmissionEmail	5.3	2012-009 Submission Email	2012-09-21
2012-009_SubmissionForm	5.3	2012-009 Submission Form	2012-09-21
2012-010_Checklist	6.17	Checklist: CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on stone fruits (2012-010) (CANNON)	2012-11-22
2012-010_Reference_ Neven&Mitcham1996	6.17	2012-010 Reference Neven and Mitcham 1996	2012-09-21
2012-010_Reference_ Neven2002	6.17	2012-010 Reference Neven 2002	2012-09-21
2012-010_Reference_ Neven2008	6.17	2012-010 Reference Neven 2008	2012-09-21

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
2012-010_Reference_ Nevenetal2006	6.17	2012-010 Reference Neven et al 2006	2012-09-21
2012-010_Reference_ Obenlandetal2005	6.17	2012-010 Reference Obenland et al 2005	2012-09-21
2012-010_Reference_ USDATreatmentManual2012	6.17	2012-010 Reference USDA Treatment Manual 2012	2012-09-21
2012-010_SubmissionEmail	6.17	2012-010 Submission Email	2012-09-21
2012-010_SubmissionForm	6.17	2012-010 Submission Form	2012-09-21
2012-011_Checklist_Rev1	5.4	Revised Checklist: Irradiation *for Dysminococcus neobrevipes* Beardsley, *Planococcus lilacinus* (Cockerell) and *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) (2012-011) (WILLINK)	2012-11-22
2012-011_Communication	5.4	2012-011 Communication	2012-09-21
2012-011_SubmissionEmail	5.4	2012-011 Submission Email	2012-09-21
2012-011_SubmissionForm	5.4	2012-011 Submission Form	2012-09-21
2012-012_Checklist	5.5	Checklist: Generic Irradiation for pupae of Lepidoptera (2012-012) (KATBEH-BADER)	2012-11-22
2012-012_DiscussionPaper	5.5	Discussion Paper: Generic Irradiation for pupae of Lepidoptera (2012-012) (ORMSBY)	2012-11-22
2012-012_Reference_ Brower1976	5.5	2012-012 Reference Brower 1976	2012-11-22
2012-012_Reference_ Hallmanetal2012	5.5	2012-012 Reference Hallman et al 2012	2012-10-02
2012-012_SubmissionEmail	5.5	2012-012 Submission Email	2012-10-02
2012-012_SubmissionForm	5.5	2012-012 Submission Form	2012-10-02
2012-013_Checklist	6.18	Checklist: CATTS (Controlled Atmosphere/Temperature Treatment System) for *Cydia pomonella* and *Grapholita molesta* on Malus domestica (2012-013) (BAXTER)	2012-11-22
2012-013_Reference_ Neven&Mitcham1996	6.18	2012-013 Reference Neven and Mitcham 1996	2012-10-02
2012-013_Reference_ Neven&Rehfield-Ray2006	6.18	2012-013 Reference Neven and Rehfield-Ray 2006	2012-10-02
2012-013_Reference_ Neven2002	6.18	2012-013 Reference Neven 2002	2012-10-02
2012-013_Reference_ Neven2008	6.18	2012-013 Reference Neven 2008	2012-10-02
2012-013_Reference_ USDATreatmentManual2012	6.18	2012-013 Reference USDA Treatment Manual 2012	2012-10-02
2012-013_SubmissionEmail	6.18	2012-013 Submission Email	2012-10-02

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
2012-013_SubmissionForm	6.18	2012-013 Submission Form	2012-10-02
2012_TPPT_Dec_11_Rev1	5.4	Adjusted efficacy (ORMSBY)	2012-12-03
2012_TPPT_Dec_15	6	Most heat tolerant stage of Tephritidae (HALLMAN)	2012-12-03
2012_TPPT_Dec_16	Multiple	Steward's comments	2012-12-03

Appendix 3: Participants list

Participant role	Name, mailing, address, telephone	Email address	Term expires
Assistant Steward	Mr Jan Bart **ROSSEL** Director International Plant Health Program Office of the Australian Chief Plant Protection Officer Australian Government Department of Agriculture, Fisheries and Forestry **AUSTRALIA** Tel: +61 2 6272 5056 / 0408625413	bart.rossel@daff.gov.au	NA
Member	Mr Patrick **GOMES** Fruit Fly Science and Technology Coordinator USDA-APHIS-PPQ 920 Main Campus Dr – Suite 200 Raleigh, North Carolina **USA** Tel: +1 919 855 7313	Patrick.J.Gomes@aphis.usda.gov	2017 – 1st Term
Member	Mr Guy **HALLMAN**[14] Research Entomologist Stored Product Insect Research Unit Center for Grain & Animal Health Research 1515 College Ave. Manhattan, KS 66502 **USA** Tel: +1 785 776 2705	Guy.Hallman@ars.usda.gov	2017 – 1st Term
Member	Mr Andrew **JESSUP**[16] Senior Research Horticulturist NSW Department of Primary Industries Locked Bag 26, GOSFORD NSW 2250 **AUSTRALIA** Tel: +02 4348 1965	andrew.jessup@dpi.nsw.gov.au	2014 – 1st Term
Member	Mr Mohammad **KATBEH BADER** Director of Phytosanitary Department Ministry of Agriculture P.O. Box 11732, Area code 662 Amman **JORDAN** Tel: +962 6 5686151 Mob: +962 6 79 5895691	katbehbader@moa.gov.jo	2013 – 1st Term

[14] Able to virtually attend part of the meeting

Participant role	Name, mailing, address, telephone	Email address	Term expires
Member	Mr Michael **ORMSBY** Senior Adviser, Plant Risk Analysis Ministry for Primary Industries P.O Box 2526, Wellington, **NEW ZEALAND** Tel: +64 4 8940486	Michael.Ormsby@mpi.govt.nz	2015 – 2nd Term
Member	Mr Eduardo **WILLINK** Estación Experimental Agroindustrial Obispo Colombres, P.O.Box 9, Las Talitas (4101) Tucumán **ARGENTINA** Tel: +54 381-4276561 ext. 154	ewillink@eeaoc.org.ar; ewillink@arnet.com.ar	2015 – 2nd Term
Member	Mr Scott **WOOD** Center for Plant Health Science Technology Plant Protection and Quarantine Animal and Plant Health Inspection Service U.S. Department of Agriculture 1730 Varsity Drive, Suite 400 Raleigh, NC 27606-5202 **USA** Tel: +1 919 855 7451	Scott.Wood@aphis.usda.gov	2013 – 1st Term
Invited Expert	Mr Andrew **PARKER** Insect Pest Control Laboratory FAO/IAEA Agriculture and Biotechnology Laboratories Agency's Laboratories Seibersdorf IAEA A-2444 Seibersdorf **AUSTRIA** Tel: +43 1 2600 28408	a.parker@iaea.org	NA
IPPC Secretariat Lead	Ms Stephanie **DUBON** International Plant Protection Convention Food and Agriculture Organization of the United Nations 4700 River Road Riverdale, MD 20737 **USA** Tel: +1 301 851 2180	Stephanie.Dubon@fao.org	NA

Participant role	Name, mailing, address, telephone	Email address	Term expires
IPPC Secretariat Expert	Mr Larry **ZETTLER** International Plant Protection Convention Food and Agriculture Organization of the United Nations 920 Rahn Station Rd Rincon, GA 31326 **USA** Tel: +1 912 754 9907 Mob: +1 912 547 9677	Larry.Zettler@fao.org	NA
IPPC Secretariat Support	Mr Artur **SHAMILOV** International Plant Protection Convention Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla 00153 Rome **ITALY** Tel: + 39 06 570 56 073	Artur.Shamilov@fao.org ;	NA

Appendix 4: Types of TPPT documents

The Technical Panel on Phytosanitary Treatments (TPPT) developed this proposal in response to the 2012 November Standards Committee (SC) request that the TPPT consider whether standards are needed for various types of treatments (e.g. ISPM 18:2003, *Guidelines for the use of irradiation as a phytosanitary measure*).

The TPPT has provided a description of the various types of documents generated in the work of the panel and has made a number of recommendations to the SC on what further documents or standards may need to be developed.

The TPPT agreed that:

- All documents related to treatment submissions (checklists, submission forms, guidance, etc.) are standard setting documents, developed and stored for reference purposes when evaluating phytosanitary treatments under ISPM 28:2007
- Documents describing TPPT working or evaluation procedures are *TPPT working documents* and are for internal use by the TPPT only

The TPPT considers that standards are required for various types of treatments and recommends that the SC *consider* the following (A or B) and C:

EITHER:

A.

Adding new topics (one for each type of treatment) to the List of Topics for IPPC standards. The resulting separate draft ISPMs would provide guidelines on the application of specific groups of phytosanitary treatments. Detailed requirements for each treatment type in each group would be held in an annex to each standard and developed as required. This would involve the following topics (including, but not limited to) in the same form as ISPM 18:2003:

- Temperature treatments:
  - Heat treatments – with annexes for the different heating systems e.g. HWT, VHT, HTFA etc.
  - Cold treatments
- Fumigation treatments – with annexes for the different fumigants and delivery systems e.g. SF, MeBr etc.
- Chemical treatments – with annexes for the different chemicals and delivery systems.
- Modified atmospheres – with annexes for the different types of modified atmosphere treatments.

Each standard would have a general introductory section repeating much of the information already provided in ISPM 18:2003 (e.g. labelling, post-treatment product security etc.). The treatment schedules would remain annexed to ISPM 28:2007.

This approach would provide clear locations for common types of treatments. However, many treatments combine more than one treatment type and it may be difficult to allocate a treatment to one treatment group (e.g. heat treatments under modified atmospheres, chemical treatments under pressure and heat, etc.).

ISPM 18:2003 would need to be revised to ensure consistency with the new standards and ISPM 28:2007

OR:

B.

Adding the following new topics to the List of Topics for IPPC standards:

- Temperature treatments:

  - Heat treatments – with annexes for the different heating systems e.g. HWT, VHT, HTFA etc.
  - Cold treatments
- Fumigation treatments – with annexes for the different fumigants and delivery systems e.g. SF, MeBr etc.
- Chemical treatments – with annexes for the different chemicals and delivery systems.
- Modified atmospheres – with annexes for the different types of modified atmosphere treatments.

Each of these topics would result in an ISPM annexed to ISPM 28:2007 and structured with;

- an introductory section providing the generally applicable information (e.g. post-treatment product security, etc.) and;
- sub-annexes containing the treatment schedule (as already annexed) and guidance information for the application of each treatment type and a list of approved schedules. As new treatment types become available they would be added as new sub-annexes.

While this approach would ensure all treatments are held in one place, the standard may become quite large, complicated, and more difficult for a reader to navigate. The issue with treatments that combine more than one treatment type is lessened.

ISPM 18:2003 would need to be revoked and the information revised and included in the new ISPM 28:2007.

AND:

C.

The SC would request that the Capacity Development Committee (CDC) develops a database of available treatments (IPPC-approved and NPPO/RPPO-approved, etc.) searchable by commodity, pest and treatment type as a reference source for importing countries and treatment developers to facilitate the implementation of phytosanitary treatments.

The database would enable contracting parties and/or treatment developers to easily search for treatments by pest type, commodity type or treatment type when developing import requirements or identifying gaps in available treatments.

Appendix 5: The Cardiff Protocol as proposed by IFQRG and TPFQ

The *Cardiff Protocol* has been developed to overcome a concern raised in comments submitted on the treatment criteria during IPPC member country consultation. The concern was raised in a number of submissions as follows:

> ….. the testing standards proposed in this Appendix to ISPM 15 are so rigorous that they will effectively prevent the development of new treatments. The major difficulty lies in assembling the required number of experimental units of wood infested with forest pests to achieve Probit 9. Probit 9 is a standard developed for dose response of fruit flies, and it requires 99.9968% mortality in a sample of at least 100,000 individuals with a probability (p-value) of <0.05. For many of the pests on the proposed list, it would be virtually impossible to assemble populations of this size for testing. The larvae of these pests are 100 times larger than fruit flies and only occur sparsely in infested logs, so a whole forest would have to be infested and cut to test for efficacy at Probit 9. It has been suggested that this is too stringent for commodities that are rarely infested or are poor hosts (see Follet. P.A. and G.T. McQuate, 2001). The currently approved treatments were never tested with this level of rigor, and they might very well not pass muster if they were tested today. If we discourage new treatment development we will maintain the status quo, relying on current, less effective treatments. For example, Myers *et al* showed only 90% of emerald ash borer pre-pupae are killed by 56/30. Ramsfield, T.D. and Dick, M.A, 2010, recently reported that only two of 11 wood-inhabiting fungi tested were reliably killed by 56/30 (with 99.99% confidence). While ISPM 24 calls for equivalency of phytosanitary measures, we would hope to see better efficacy in ISPM 15 treatments than this. But to establish criteria as restrictive as those proposed in this draft Appendix will make this unlikely.

And

> …. the requirement for an efficacy level of 99.99683% at 95% confidence level may not be necessary for efficacy testing for all treatments. Infestation levels of most wood pests likely to be found in wood packaging are generally very low and the numbers of organisms required for Probit-9 testing would be very difficult to achieve. Although the provision for extrapolation using lower test numbers is suggested, this approach will always result in higher treatment dose requirements than may be necessary to achieve inactivation of the organisms. The resultant over-treatment is also neither economically nor environmentally desirable. The use of Probit-9 approaches for efficacy testing has been widely criticized (Landolt 1984, Follett & McQuate 2001, Sgrillo 2005, Follett & Hennessey 2007). The efficacy level for a given pest should be determined through assessment of biological characteristics that impact the likelihood that an organism will be introduced and establish including: fecundity, longevity, voltinism, parthenogenesis (if relevant), prevalence in wood, dispersal ability, vector relationship (if relevant), host range, founder population dynamics, sporulation characteristics of fungi (asexual and sexual reproduction), resting stages and sub-lethal effects. Assessment of these characteristics should provide insight into the acceptable number of organisms that can survive a treatment and still reflect acceptable efficacy. The International Forestry Quarantine Research Group (IFQRG) is reviewing the use of a biology-based approach to categorize wood pests and develop pest-group specific recommendations for treatment testing efficacy levels based on the unique biological characteristics of each group. Such an approach should be considered equivalent to any prescriptive probit-9 testing if sufficiently justified. Other methods to determine appropriate efficacy levels have been proposed based on survival probabilities of a single mating pair of insects (Follett and McQuade 2001, Follett et al. 2007). It is critical that new treatments adhere to high phytosanitary standards and can demonstrate appropriate levels of efficacy to achieve the stated ISPM-15 goal of reducing pests.

The *Cardiff Protocol* provides a method for determining confirmatory levels of efficacy for target pest species based on their actual risk in international trade. The *Cardiff Protocol* can be summarised as follows:

For invertebrate pests (pests that infest in relatively low densities)

In its simplest form the equation for invertebrate pests would be:

$$\mathbf{ED^{no\ survivors} = I \times V \div MPL}$$

where the effective dose ($ED^{no\ survivors}$) or required efficacy with no survivors is equal to the level of infestation (I) multiplied by the volume of trade (V) and divided by the maximum pest limit (MPL).

To determine the test size ($TS^{no\ survivors}$) with no survivors so that a research programme can be designed to verify a treatment's efficacy against the required ED at the 95% level of confidence, you only need to multiply the ED by 3 (Couey & Chew 1986) for no survivors: or

$$\mathbf{TS^{no\ survivors} = ED \times 3}$$

The number of level of infestation (I) is calculated from the ratio (percentage) of units that are likely to be infested (r) multiplied by the average number of individuals likely to infest a single unit (n), or

$$\mathbf{I = r \times n}$$

The maximum pest limit (MPL) can be calculated from the information in figure 1 by dividing the founder population size (FP) by the probability of a pest surviving ($P^{survival}$) to a mature (breeding) adult, or

$$\mathbf{MPL = FP \div P^{survival}}$$

All of the aforementioned equations combine into the following equation:

$$\mathbf{TS^{no\ survivors} = 3 \times I^{rxn} \times V \div (FP \div P^{survival})}$$

Where:

I = level of infestation (**r** = ratio of infested units, **n** = average number of infesting individuals per unit)

V = volume of trade or level of aggregation

FP = founder population size

$\mathbf{P^{survival}}$ = probability of pest survival (or 1 – the probability of pest mortality)

For pests with very-high infestation rates e.g. micro-organisms

In its simplest form the equation for pests with very-high infestation rates would be:

$$\mathbf{ED^{no\ survivors} = r \times V \div MICL}$$

where the effective dose ($ED^{no\ survivors}$) or required efficacy with no survivors is equal to the infestation ratio (r) multiplied by the volume of trade (V) and divided by the maximum infested commodity limit (MICL).

Appendix 6: Working TPPT criteria for treatment evaluation

Contents

1. Introduction

This document provides a description of the agreed procedure for the evaluation of phytosanitary treatments for inclusion in an International Standard for Phytosanitary Measures (ISPM). The procedures and processes documented here have been agreed and applied by the Technical Panel for Phytosanitary Treatments (TPPT) for the evaluation of phytosanitary treatments against the requirements of ISPM 28:2007 *Phytosanitary treatments for regulated pests*.

2. Procedure for the production of phytosanitary treatments

2.1 Call for submissions for phytosanitary treatments on topics approved by the CPM

a) The IPPC Secretariat issues a call for submissions for phytosanitary treatments as approved by the Standards Committee (SC). Phytosanitary treatments are submitted by NPPOs or RPPOs for evaluation as an international standard in response to a call for submissions by the Secretariat.

b) The "Submission Form for Phytosanitary treatments" should be used by NPPOs or RPPOs to submit information on phytosanitary treatments.

c) The submission forms are collated by the Secretariat and sent to the Technical Panel on Phytosanitary Treatments (TPPT) for review.

2.2 Evaluation of treatment submissions

d) The TPPT prioritize submissions for development of phytosanitary treatments, taking into account guidance from the SC and the "Procedure and criteria for identifying topics for inclusion in the IPPC standard setting work programme" (adopted by the CPM-3 in 2008) and using the score definitions (see IPPC procedural manual). The TPPT will also take into account recommendations by other CPM bodies.

e) Submissions will be evaluated for their suitability as an international treatment by the TPPT in line with guidance provided in ISPM No. 28 (*Phytosanitary treatments for regulated pests*) and Section A. The submitted treatments will be determined to be:

i. an acceptable treatment;

ii. a treatment requiring more information or research in order to evaluate its efficacy; or

iii. an unacceptable treatment for international use.

f) Acceptable treatments will be recommended to the SC. For treatments requiring more information, or unacceptable treatments, the NPPO or RPPO, with a copy to the contact person for the submission will be notified by the Secretariat and additional information will be requested or the reasons for the rejection will be given. In addition, the submitter of treatments that are being recommended to the SC will be advised accordingly.

Section A: Process for the evaluation of treatment submissions by experts

- One expert for each treatment submission is selected as its "lead" by the TPPT to evaluate the submission;
- The lead will review the data to ensure it supports the stated efficacy based on ISPM No. 28 (*Phytosanitary treatments for regulated pests*) and additional instructions from the TPPT if needed;
- The lead completes a "checklist" and an "evaluation sheet" developed by the TPPT;

- In some cases, for example where more than one submission is received for a particular treatment/commodity/pest combination, the lead may need to resolve differences between data sets and to prevent duplication of near identical treatments;
- The lead may be able to accumulate further data to support a treatment submission. Where incomplete submissions are received, leads will liaise with the submitter to help progress the submission;
- The treatment is then submitted to the TPPT for assessment.

3. Overview of a Good Research Protocol

A number of authors have published comprehensive guides on what good research methodologies should cover when developing phytosanitary treatments. Hallman and Mangan (1998), Hallman (2000), Heather (2004), and Heather and Hallman (2008) provide comprehensive overviews of sound research protocols, while Sgrillo (2002) provides some background and guidance on quantitative parameters for phytosanitary measures.

From these papers and ISPM 28 it can be surmised that a sound research protocol should ensure:

- That there is an unambiguous description of the target pest and commodity, and the nature of the association of the two in trade and how this relates to the mode of action of the treatment;
- That the condition of the target pest, host and environment at the time of testing is equivalent to the likely condition or range of conditions found in trade;
- That the effectiveness of the treatment is tested against the most tolerant life stage or condition of the target pest likely to be found at the time of treatment application in trade;
- For generic treatments, effectiveness of the treatment is tested against the most tolerant species within the target group;
- That the treatment outcome is appropriate to the phytosanitary needs of trade; and
- That the publication or reporting of the research outcomes is suitably transparent for assessment by regulatory organisations.

4. General considerations when calculating the effective dose (ED)

The panel has recommended a number of principles that they should apply when calculating the ED for each treatment at the 95% confidence level, based on the total number of target pests treated. Further information on the calculation of the ED is provided in a publication by Couey and Chew (1986). These agreed principles include:

- The level of mortality in the controls must be accounted for when calculating treatment efficacy from counts of dead treated pests. The recorded mortality of treated target pests should be adjusted for natural mortality recorded in controls e.g. if there is a 10% level of mortality in the control sample, 10% of the deaths in the treated sample should be attributed to causes other than the treatment.
- Greater than expected natural mortality levels (in controls) should be treated with care as they may indicate a target pest population under stress. A population under stress may be more susceptible to the treatment than a natural population.
- Sample sizes are too small to provide meaningful or practical results. A small number of treatment repetitions can, on analysis, result in statistical errors giving meaningless conclusions (if the SD at 95% is greater than the mean, the lower (worst case) result may be a negative dose e.g. 10 ± 12 gives a range from -2 to 22). Sample sizes and repetitions should be sufficient to account both for natural variation and achieve significant regressions when extrapolating treatment efficacy.
- When the population of treated pests is estimated from control pest populations, the estimation must be based on a statistical analysis of the controls. Researchers need to apply the same statistical rigour to control data as they do to treatment data. Where the infestation rate for each

regulated article in the control is known, the estimated treated regulated article infestation rate would be:

$$\text{Average per treated regulated article} = \mu - (STD \times 1.645)$$

Where the control infestation rate is based on the mean of grouped commodities, as the number of controls increases so does the level of confidence in the estimation of the population mean. A suitable formula for estimating the average number of exposed pests per treated regulated article would therefore be:

$$\text{Average per treated regulated article} = \mu - (STD \times \sqrt{(1+1/r)})$$

Where **r** is equal to the number of control replicates used to estimate the mean (**μ**) and standard deviation (**STD**) of the control means.

5. Choosing Surrogate Species for the Development of Phytosanitary Treatments

Note: In the context of the TPPT, discussion on choosing a surrogate species is confined to the use of insect pest species to substitute for target species when the target species is difficult or impossible to obtain or use in research on developing a phytosanitary treatment.

Target species: The species that is of quarantine concern to an importing country.

Surrogate species: The species that is tested instead of the target species.

A suitable surrogate species may be as tolerant or preferably more tolerant than the target species and must respond as closely as possible to the target treatment in the same way as the target species. By definition, the surrogate species is not the same as the target species but should have a similar response to the treatment and may differ in the way it reacts to a phytosanitary treatment. When a surrogate species is used in developing a phytosanitary treatment the TPPT would like to see justification that the surrogate species is a suitable substitute for the target species.

The following attributes may be used in providing such a justification. Similarity between the target species and the surrogate species in:

- Order, Family, Genus, Species (different strain, sub-species, variant, etc) ["taxonomic distance"]
- Host (i.e. target product), Host range
- Life history, Phenology, Size
- Feeding regime
- Reaction to treatment, Tolerance to treatment (preferably less tolerant at same temperature, duration of exposure, dose concentration, etc) ["toxicologically representative"]
- Habitat type (e.g. tropical, temperate)
- Level of damage to target product, Part/s of target product damaged
- Published supporting scientific literature, Existing international / bilateral approvals

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6. General considerations for temperature treatments

The panel considered issues associated with treatments based on temperature, taking into account the work of Hallman and Mangan (1997). In 2009 the panel recommended a number of principles that should be applied when evaluating temperature treatments for adoption as international standards (outlined below).

6.1 Mortality assessments

When assessing mortality, any larvae that are found alive should be considered survivors whether or not they subsequently fail to pupate or survive to adults. This takes account of the fact that in practice on phytosanitary inspection any live insect found will be considered a survivor.

6.2 Genotype of insect

It is possible that laboratory-bred colonies of insects may become more susceptible to temperature-based treatments over time. The panel is not aware of any research having been undertaken to demonstrate whether this is an issue in reality. The panel considers that as long as the colonies used in the research have been established or reinvigorated before the research, issues such as these should not be considered significant subject to research showing otherwise.

6.3 Pre-treatment acclimation

Insects may be less susceptible to temperature treatments depending on the conditions they are exposed to immediately prior to treatment. The panel considers that where this may be an issue, pre-treatment requirements should be included in any recommended treatment schedule.

6.4 Commodity variability

To provide confidence that temperature treatments are applicable internationally, host material used in research should be sampled from as wide a geographic area as possible and unexpected results should be considered with care.

6.5 Scale of treatment application

The panel should consider any possible reduction in effectiveness of temperature treatments that may occur when treatments are scaled up and applied in commercial conditions.

6.6 Rate of temperature change

Where the rate of temperature change of the commodity may be considered significant to the effectiveness of a temperature treatment, this should be specified in the treatment schedule.

7. General considerations for wood packaging material heat treatments

The panel considered the following issues when evaluating wood packaging material heat treatments for adoption as international standards (outlined below).

7.1 Mortality assessments

When assessing mortality, the target life stage should be that most likely to be present in the wood at the time of treatment. Any target life stage found alive should be considered a survivor whether or not

it subsequently fails to survive to adulthood or produce offspring. This takes account of the fact that in practice on phytosanitary inspection any live life stage found will be considered a survivor.

7.2 Environmental factors

Consideration should be taken of potential environmental effect on the efficacy of the treatment under conditions expected to be encountered at the time of treatment (such as wood moisture content or density). Unexpected results should be considered with care.

7.3 Pre-treatment acclimation

Target pests may be less susceptible to temperature treatments depending on the conditions they are exposed to immediately prior to treatment. The panel considers that where this may be an issue, pre-treatment requirements should be included in any recommended treatment schedule.

7.4 Scale of treatment application

The panel should consider any possible reduction in effectiveness of temperature treatments that may occur when treatments are scaled up and applied in commercial conditions.

7.5 Rate of temperature change

Where the rate of temperature change of the commodity may be considered significant to the effectiveness of a temperature treatment, this should be specified in the treatment schedule.

7.6 Heating process

Consideration should be taken of the heating process (e.g. heating from inside out or outside in) and the conditions that need to be met before the treatment can commence.

8. General considerations for wood fumigation treatments

The panel considered the following issues when evaluating wood fumigation treatments for adoption as international standards (outlined below).

8.1 Mortality assessments

When assessing mortality, the target life stage should be that most likely to be present in the wood at the time of treatment. Any target life stage found alive should be considered a survivor whether or not it subsequently fails to survive to adulthood or produce offspring. This takes account of the fact that in practice on phytosanitary inspection any live life stage found will be considered a survivor.

8.2 Environmental factors

Consideration should be taken of potential environmental effects on the efficacy of the treatment under conditions expected to be encountered at the time of treatment. Wood factors such as moisture content, density, porosity and presence of bark should be considered along with temperature. Unexpected results should be considered with care.

8.3 Scale of treatment application

The panel should consider any possible reduction in effectiveness of fumigation treatments that may occur when treatments are scaled up and applied in commercial conditions.

9. General considerations for cold treatments

The panel considered the issues associated with treatments based on temperature, taking into account the work of Hallman and Mangan (1997). The panel recommended a number of principles that they should apply when evaluating temperature treatments for adoption as international standards (outlined below).

9.1 Mortality assessments

When assessing mortality, any larvae that are found alive should be considered survivors whether or not they subsequently fail to pupate or survive to adults. This takes account of the fact that in practice on phytosanitary inspection any live insect found will be considered a survivor.

9.2 Genotype of insect

It is possible that laboratory-bred colonies may become more susceptible to temperature-based treatments over time. The panel is not aware of any research having been undertaken to demonstrate whether this is an issue in reality. The panel considers that as long as the colonies used in the research have been established or reinvigorated before the research, issues such as these should not be considered significant subject to research showing otherwise.

9.3 Pre-treatment acclimation

Insects may be less susceptible to temperature treatments depending on the conditions they are exposed to immediately prior to treatment. The panel considers that where this may be an issue pre-treatment requirements should be included in any recommended treatment schedule.

9.4 Commodity variability

To provide confidence that temperature treatments are applicable internationally, host material used in research should be sampled from as wide a geographic area as possible and unexpected results should be considered with care.

9.5 Scale of treatment application

The panel should consider any possible reduction in effectiveness of temperature treatments that may occur when they are scaled up and applied in commercial conditions.

9.6 Rate of temperature change

Where the rate of temperature change of the commodity may be considered significant to the effectiveness of a temperature treatment, this should be specified in the treatment schedule.

9.7 Issues associated with drafting of the treatment descriptions for cold treatments

When drafting the treatment descriptions from the different submissions, the TPPT noted that one submission related to two fruit flies on a number of different hosts. Other submissions were for the same fruit fly species and host commodity. The TPPT therefore made the following decisions regarding the treatment descriptions:

- Each treatment should be for an individual fruit fly species.
- For fruit fly hosts, the TPPT were aware that several countries had found different *Citrus* species responded to cold treatment differently. Treatments should therefore be produced for separate *Citrus* species.
- Regarding cultivars of *Citrus* species, the TPPT was aware that certain research had shown different cultivars of *Citrus sinensis* (orange) responded differently to cold treatments and they decided to quote the treatment efficacies for the different cultivars of *C. sinensis* separately in the treatment description. For the other *Citrus* species, the TPPT was not aware of different responses by cultivars and therefore there was no differentiation according to cultivar for these species.
- Treatments involving the same fruit fly species and host (for example *Ceratitis capitata* on *Citrus sinensis*) were included as different schedules in the same treatment description.
- Regarding temperatures sensitivities (e.g. 2^{o}C +/- 0.5^{o}C), these were not added to the treatment schedules. In some submissions the temperature limits were quoted, but the TPPT noted that experimental probes were often more sensitive than commercial probes. The TPPT therefore decided to include a sentence in the treatment descriptions indicating that ‘the stated

temperatures should not be exceeded'. Commercial operators would need to take into account the normal working range of their equipment in order to meet this requirement.

10. General considerations for irradiation treatments

The panel considered the issues associated with treatments based on irradiation, taking into account the work of Hallman and Mangan (1997). The panel recommended a number of principles that they should apply when evaluating irradiation treatments for adoption as international standards (outlined below).

10.1 Extension of treatments to all fruits and vegetables

The efficacy of irradiation treatments can be extrapolated to all fruits and vegetables. Confidence was based on experience in the application of irradiation treatments and evidence from studies on *Anastrepha ludens, A. suspensa* and *Bactrocera tryoni* (Bustos *et al*., 2004; Gould & von Windeguth, 1991; Hallman & Martinez, 2001; Jessup *et al*., 1992; von Windeguth 1986; von Windeguth & Ismail, 1987).

The panel recognised, however, that treatment efficacy has not been tested for all potential fruit and vegetable hosts of the submitted target pests. If evidence becomes available to show that the extrapolation of treatments to cover all hosts of the target pests is incorrect, then the treatments should be reviewed.

10.2 Extension of treatments to all populations within a species

The panel considered whether the scope of submitted irradiation treatments could be extended to cover all strains and biotypes of the target pests concerned.

The panel was confident that the extrapolation of efficacy to all strains and biotypes of the target pests could be made for the irradiation treatments that had been submitted. This confidence was based on the absence of published evidence for significant differences between subspecies and biotypes in their radiation tolerance, including a study comparing strains of one target pest by Hallman (2003). The panel also recognised that recommended minimum doses are higher than otherwise required and should account for any minor differences in intra-species tolerances that may exist.

The panel recognised, however, that treatment efficacy has not been tested for all potential strains and biotypes of the submitted target pests. If evidence becomes available to show extrapolation of treatments to cover all strains and biotypes is incorrect, then the treatments should be reviewed.

10.3 Extension of species to the whole genus

The panel considered whether the scope of submitted irradiation treatments could be extended to cover all species in a genus of the target pests concerned.

The panel noted that Bakri *et al*. (2005) had indicated that, with few exceptions, there was no need to develop radiation biology data for all species within the same genus. The panel considered that a case for extrapolating irradiation doses to all species within a genus would need to be explored more fully in any submission.

10.4 Extending beyond genus to family

The panel considered whether the scope of submitted irradiation treatments could be extended to cover all genera in a family of the target pests concerned.

The TPPT noted that within Tephritidae a wide range of genera has been tested and this had supported extending irradiation treatments to the Family level in this case (report of 2006 meeting).

It was noted that for other insect families it would be impossible to get sufficient data to confirm that all genera within a family conform to the same treatment dose. This would be an enormous

undertaking, which is unlikely to happen. The panel considered that a case for extrapolating irradiation doses to all genera within a family would need to be explored more fully in any submission.

10.5 Determination of the most tolerant life stage of the target pest(s)

The panel noted that the insect life stage that is most tolerant to irradiation is the most advanced stage when identical objectives are measured (e.g. prevention of adult emergence). The treatments only need to be effective for those life stages likely to be encountered in the traded commodity.

10.6 Effect of environmental conditions

The panel considered whether the scope of submitted irradiation treatments could be extended to cover treatments undertaken in all environmental conditions likely to be encountered under commercial conditions.

The panel was confident that the extrapolation of efficacy to all likely temperatures could be made for the irradiation treatments that had been submitted. Confidence was based on experience in the operation of irradiation treatments and evidence from studies on *Rhagoletis pomonella* (Hallman, 2004).

The panel noted that lowered oxygen conditions (hypoxia) may affect the efficacy of irradiation treatments. Unless the treatment has been determined to be effective under hypoxic conditions, the panel considers that to achieve the stated treatment efficacy the irradiation treatment should not be applied to fruit and vegetables stored in modified atmospheres.

10.7 Non-target effects of irradiation

The panel considered that the only potentially significant non-target effects of the irradiation treatments that were reviewed at the meeting were those affecting commodity quality. The research presented indicated that there would be minimal adverse effects at the prescribed dosages to the commodities tested. In some circumstances the research indicated that the irradiation treatments may enhance product quality through extending shelf life. However, the panel has recommended extending the treatments to all fruits and vegetables, including those that have not been tested or have been shown to be negatively impacted by relatively low irradiation doses. The panel therefore recommends that, prior to approving an irradiation treatment; NPPOs may wish to take account of any potential non-target effects of the treatment.

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Appendix 7: Control data for treatment 2007-206A, 2007-206B and 2007-206C

Table 4.5 Efficacy of the large scale treatment of infested citrus fruit containing 2nd instar larvae of Medfly exposed for 18 days (16 for lemons) at 2.0 ±0.5°C. The treatment efficacy is based on no survivors being recorded in three replicate trials of the most tolerant stage.

Citrus Cultivar	Test Number	Number of infested fruit in the trial	Estimated number of 2nd insects treated	Number of surviving individuals
(1) Valencia orange				
	1	1200	45,918	0
	2	1200	47,724	0
	3	1200	47,799	0
TOTAL		**3600**	**141,441**	**0**
(2) Navel orange				
	1	1200	54,012	0
	2	1200	54,327	0
	3	1200	57,555	0
TOTAL		**3600**	**165,894**	**0**
(3) Lisbon lemon				
	1	1200	41,118	0
	2	1200	47,769	0
	3	1200	43,329	0
TOTAL		**3600**	**132,216**	**0**
(4) Ellendale tangor				
	1	1200	43,815	0
	2	1200	46,395	0
	3	1200	43,578	0
TOTAL		**3600**	**133,788**	**0**
(5) Murcott tangor				
	1	1200	34,404	0
	2	1200	35,463	0
	3	1200	38,865	0
TOTAL		**3600**	**108,732**	**0**

Table 4.6 Efficacy of the large scale treatment of infested citrus fruit containing 2nd instar larvae of Medfly exposed for 20 days (18 for lemons) at 3.0 ±0.5°C. The treatment efficacy is based on no survivors being recorded in three replicate trials of the most tolerant stage.

Citrus Cultivar	Test Number	Number of infested fruit in the trial	Estimated number of 2nd insects treated	Number of surviving individuals
(1) Valencia orange				
	1	1200	50,283	0
	2	1200	44,943	0
	3	1200	47,358	0
TOTAL		**3600**	**142,584**	**0**
(2) Navel orange				
	1	1200	50,046	0
	2	1200	52,395	0
	3	1200	50,427	0
TOTAL		**3600**	**152,868**	**0**
(3) Lisbon lemon				
	1	1200	40,365	0
	2	1200	44,241	0
	3	1200	37,794	0
TOTAL		**3600**	**122,400**	**0**
(4) Ellendale tangor				
	1	1200	45,648	0
	2	1200	44,736	0
	3	1200	47,358	0
TOTAL		**3600**	**137,742**	**0**
(5) Murcott tangor				
	1	1200	37,320	0
	2	1200	35,076	0
	3	1200	33,282	0
TOTAL		**3600**	**105,678**	**0**

Appendix 8: TPPT procedure for evaluating phytosanitary treatments requiring additional information from submitters

1. Evaluation of Submissions

Submissions will be evaluated for their suitability as an international phytosanitary treatment (PT) by the TPPT following the guidance provided in ISPM 28:2007 *Phytosanitary treatments for regulated pests*. Whenever a treatment is thoroughly evaluated by the panel, the treatment lead drafts the treatment evaluation, which is included in the meeting report.

2. Sending letters to submitters

If more information is needed by the panel, the Secretariat sends a request for information to the submitter with the panel's evaluation and treatment lead contact information attached.

The official TPPT information request should be sent at least six months prior to next TPPT meeting, with the information due to the Secretariat at least 60 days before the TPPT meeting. The letter should include the following:

- most recent TPPT evaluation of the treatment which includes in detail the information requested by the panel
- request to the submitter to provide a reason why the treatment should remain on the *List of topics for IPPC standards*
- if the submitter cannot provide the information at least 60 days before the next TPPT meeting, the submitter should clearly identify the date the information will be available

If the submitter did not forward the requested information for evaluation by the panel before the due date, then the treatment will not be reviewed by the TPPT at their next meeting.

3. Sending final notice letters to submitters

If the submitter did not reply to the request for additional information before the due date, then the Secretariat will send a final notice letter. The final notice letter should include the following:

- the previous letter and treatment evaluation as an attachment
- a statement that if no information is received by the due date, the panel will request that the SC remove the treatment from the *List of topics*
- to provide a reason why the treatment should remain on the *List of topics*
- if the submitter cannot provide the information at least 60 days before the next TPPT meeting, the submitter should clearly identify the date the information will be available

4. TPPT re-evaluation

Based on the response from submitter and regardless of whether the requested information was received, the TPPT will re-evaluate the treatment and determine whether to recommend the treatment remain on the *List of topics*.

5. Treatments removed from the *List of topics*

For a treatment removed from the *List of topics*, the NPPO or RPPO may re-submit the treatment during next call for treatments. The TPPT will evaluate the treatment as a new submission and will request it be added to the *List of topics* as appropriate.

Appendix 9: TPPT response to the SC's concerns about chilling injury in lemons during in-transit cold disinfestation

Background

In many cases, international trading of fresh lemons can be achieved only if the fruit has been subjected to an approved cold storage quarantine treatment designed to kill possible infestations with fruit flies, false codling moth and some other pest insect species. Approved treatment schedules vary quite considerably between pest species, production region and destination. Storage temperatures used in these treatment schedules range from -0.55°C to 3°C. Most treatment schedules stipulate the number of temperature probes that are embedded in the batch of fruit enclosed in the refrigerated shipping container and how many of these probes need to register the target disinfestation temperature that needs to be reached before actual treatment commencement. Also, some jurisdictions require amelioration schedules should temperature spikes occur during in-transit treatment.

Lemons, generally, are marginal in their tolerance of extended periods in cold storage and, if so disposed, can display symptoms of chilling injury. Typically these symptoms are in the form of internal cavitation (a drying out of segments of internal flesh) and red blotch, skin pitting and skin discolouration. Chilling injury symptoms do not always occur during cold treatment or immediately after removal from cold storage. Often symptoms can occur during wholesale storage or whilst on retail display. Chilling injury does not occur in all years nor on all lemon cultivars or in all production regions. It is likely that chilling injury incidence is associated with weather conditions during harvest and fruit nutrition status during production. Growers can reduce the potential for chilling injury by ensuring the surfaces of the lemons are dry before placement in cold storage or, in susceptible years, carrying out the practice of "curing" the fruit. Typical curing procedures include 1 week storage, after harvest, at 10°C to 21°C. This practice is thought to reduce chilling injury by allowing the sealing of harvest-induced wounds and by allowing the skin to dry out and harden to make it less susceptible to adverse conditions during packaging and subsequent storage.

Other techniques to reduce chilling injury in cold-stored lemons and other citrus that are susceptible to chilling injury (such as grapefruit and oranges) that have been tested include hot water dips, fruit waxing, fungicide (thiabendazole – TBZ) dipping, controlled atmospheres, CO_2 treatment and shrink wrapping.

Present situation

On the whole, chilling injury is not a major problem for cold disinfested lemons in international trade. However, chilling injury symptoms have occurred at various times and caused significant losses to fruit quality as well as to grower and exporter incomes due to loss of market value and acceptability. Instances of increased chilling injury have occurred when:

1. In-transit temperatures have fallen to below the target temperature for prolonged periods. This may occur with poor temperature control (or tampering) of refrigerated shipping containers during the voyage or when loads change ships during transit. In the latter instance the temperature may rise and then fall during changeover and subsequent equilibration resulting in a temperature spike which may require an extension of the total cold storage period by a number of hours or even days. Also, as often occurs when transhipment occurs in hot climates, temperature control is over-compensated by setting the new containers to well below the disinfestation target temperature in order for a rapid cool down. This subjects some fruit, particularly those that are on the surface regions of the stacks of fruit in the stow, to very low temperatures which makes them more prone to chilling injury.

This set of circumstances has occurred during in-transit treatment of Argentinean lemons exported to Japan (E. Willink, personal communication, 2012). These fruit, if kept within 1°C below the targeted 2°C or 3°C for the 19 or 21 days that lasts the treatment, little injury should occur. However, generally, in order to make sure the treatment is completed, the temperature is maintained at greater than 2°C below the target disinfestation temperature during the whole trip (40 to 50 days), and this situation has been known to result in chilling injury.

2. Some fruit in the load are subjected to rapid airflow over their skin due to proximity to ventilation fans. When refrigerated shipping containers or, for that matter, on-shore cold rooms, are operating constant air movement is required inside the chamber to ensure that all parts of the chamber are at the same (preferably the target disinfestation) temperature. This is provided by chamber fans which are often high on the wall opposite the chamber door. These fans cause air movement and subsequent mixing throughout the chamber. Problems in the form of skin discoloration may occur when these fans blow a constant stream of dry, cold air from the compressors directly over fruit (in cartons, or possibly in bins) (L. Zettler, personal communication, 2012). Only fruit on the surface of their packaging tend to be affected.

This problem would be alleviated by careful placement of stacks of fruit in the container, redirecting the direction of the fans or by protecting fruit in the air stream with blanketing.

3. Cold disinfestation facilities are not uniform in their temperature mapping resulting in cold spots that damage fruit placed there. Some refrigerated shipping containers, particularly old ones, are unable to keep temperatures within a small range around the target disinfestation temperature. Such containers may allow not activate cooling fans until the temperature rises to, say, 2°C above the set temperature. Once the cooling is triggered it may not turn cooling off until the container's temperature sensors read 2°C below the set temperature. Again, fruit near the surface of stacks that are subject to these exaggerated fluctuations, may be damaged. Newer refrigerated shipping containers are able to keep temperatures within much tighter tolerances and problems with chilling injury based on this are not significant these days.

4. The target temperatures of some required disinfestation treatments are very low and are close to the low temperature threshold of lemons. For example lemons from South Africa and Spain to the USA, depending in the quarantine pest of concern, may require treatment at -0.55°C. If the temperature goes much below that during shipment for extended periods chilling injury may occur.

5. Varietal differences in lemons may be a factor in tolerance to cold treatments. The importance of pre-shipment quality testing using the specific varieties of lemons and packaging to be shipped should be noted, and this testing be conducted under the conditions that would be encountered during the treatment. Failure to do this may increase the likelihood of handling commodities incorrectly, resulting in injury.

Conclusions

Most refrigerated shipping containers that can store at a constant -0.55°C are most likely fairly new and problems with overshooting the lower temperature in the tolerance range are unlikely. Damage most often occurs under conditions described in point 2 above (L. Zettler, personal communication, 2012).

To minimize cold damage, the observations recorded above should be considered when applying cold disinfestation treatments to lemons in international trade.

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Appendix 10: TPPT feedback on virtual meetings

Background

At the end of every virtual meeting (VM), TPPT members have been providing feedback on how the VMs and inter-session work is progressing. At its April 2012 meeting, the SC formally requested the TPPT to provide feedback on VMs.

Below are some positive aspects, challenges and other items the panel has experienced during VMs. The Secretariat has compiled the items from past TPPT VM reports and the list developed at the 2012 December TPPT meeting.

Positive aspects of virtual meetings

- VMs work well on agenda items that are smaller in scale, such as administrative, information, feedback, progress reports, TPPT work programme updates, etc.
- The virtual tool used (GoToTraining) works well, like being in a virtual meeting room. The tool is intuitive and easy to use
- A step-up from email
- Cheaper than travel, time and money expenses of face-to-face meetings
- Chatlog is nice feature, good for audio connection losses
- One-on-one training by the Secretariat was excellent and the refreshers before each virtual meeting are valuable
- Screen-sharing of a slideshow with the current agenda item being discussed is good for following the discussion
- Meeting reminders one week, day and hour before the meeting is very helpful. Also, the meeting registration is very simple

Challenges

- Some members aren't able to attend due to connection problems and not all members who were able to connect could easily and significantly contribute to the discussion (*feedback from the first TPPT VM*)
- Monthly VMs may be excessive because of travel and regular workloads of the panel members
- Panel members from developing countries noted that the VMs are difficult because of connection issues
- Some panel members, who are not native English speakers, noted it was more difficult for them to understand the discussion and present their points of view
- VMs could be difficult and inefficient for the more technical discussions such as the review of a draft treatment, because not all members may be connected the entire length of the meeting the dynamics of a face-to-face meeting may allow a more thorough review, discussion and development of treatments and other documents (*it is for this reason that the panel has yet to do a full review of a draft treatment during a VM*)
- Because of connection issues, VMs don't enhance equal representation and full participation. The panel would like to have 80% participation, but this has gone down in recent months
- May not be good for new initiatives
- Due to members being across the globe and with odd meeting times (late at night for some, early morning for others), everyone sacrifices
- Having a long agenda can be an issue. The panel recommends a shorter agenda and to focus on one to five agenda items instead of 20
- There have been issues of starting VMs on time. The Secretariat noted that the meeting room is usually opened at least one hour before the meeting begins to allow sufficient time for participants to join and prepare

Other items to consider

- Some panel members noted that virtual meetings were much easier to attend from home rather than at work because of software issues, requesting a meeting room, setting up the computer, interruptions from colleagues, internet problems, lost connections during the meeting, etc.
- The panel agreed to meet every two months with meeting dates scheduled well in advance, and to cancel the VM if there are no urgent items to discuss
- The panel requested the Secretariat to have all VM documents posted at least one week before the meeting.
- The panel agreed to schedule VMs one month before important meetings, such as the next face-to-face TPPT meeting, SC meetings, etc.
- The panel also requested the Secretariat to plan meetings when TPPT responses may be urgently needed well in advance so all members are able to fully participate (i.e. formal objection period 14 days prior to CPM)

Appendix 11: TPPT work programme and medium term workplan

Note: status of work on treatments is documented in the List of topics

2012 TPPT Work programme

2013 DUE DATE	RESPONSIBLE	ACTION
1 Jan	**Multiple members**	Finalize TPPT documents for meeting report or to forward to SC: Review final TPPT response to chilling injury to lemons (Jessup) Status of TPPT Documents under development (Ormsby/Rossell) Feedback from virtual meetings (Dubon) TPPT comments on Formal Objections (Dubon) Revised List of Topics (Dubon) Cold Treatment Symposium agenda (Shamilov)
1 Jan	**DUBON**	Revise internal TPPT documents and action items from 2012 Dec TPPT meeting: TPPT Procedure for evaluating phytosanitary treatments requiring additional information from submitters (Dubon) Working TPPT criteria for treatment evaluation (Ormsby/Dubon) Re-format Checklist for treatments and other templates (Dubon) Re-organize TPPT restricted area of IPP (Dubon) Create FTP server for draft PTs and relevant docs, templates, working docs, etc. (Dubon) Template for guidance documents (Dubon)
1 Jan	**Multiple members**	Prepare evaluations for treatments fully reviewed at 2012 December TPPT meeting. Evaluations to be placed in meeting report (all) and attached to letters to submitters (if applicable) 2006-110 (WANG) 2007-103 (JESSUP) 2007-105 (PARKER) 2010-102 (JESSUP) 2010-103 (JESSUP) 2010-106 (HALLMAN) 2010-107 (PARK) 2012-008 (ORMSBY) 2012-009 (JESSUP) 2012-011 (PARKER) 2012-012 (WILLINK)
1 Jan	**Steward, Rapporteur, Secretariat**	Finalize draft meeting report, send to all members, comment via TPPT forum on IPP

2013 DUE DATE	RESPONSIBLE	ACTION
7 Jan	**DUBON**	Send letters to submitters asking for more information, with deadline for info due by 1 May 2013 (DUBON) 2006-110 (WANG, MORE INFO) 2007-102 (GOMES, FINAL NOTICE) 2009-108 (WILLINK, FINAL NOTICE) 2009-109 (HALLMAN, FINAL NOTICE) 2010-102 (JESSUP, MORE INFO) 2010-103 (JESSUP, MORE INFO) 2010-106 (HALLMAN, MORE INFO) 2010-107 (PARK, MORE INFO) 2012-008 (ORMSBY, REJECTED) 2012-009 (JESSUP, MORE INFO) 2012-010 (HALLMAN, REJECTED) 2012-012 (WILLINK, REJECTED) 2012-013 (HALLMAN, REJECTED)
7 Jan	**All members**	Final review of 2012 Dec TPPT meeting report (using IPP forum)
15 Jan	**HALLMAN**	Contact Armstrong and Heather regarding most tolerant life stages of Tephritidae
15 Jan	**SHAMILOV**	2012 Dec TPPT meeting report posted on IPP
1 Feb	**DUBON**	All docs prepared and submitted for SC e-decision • TPPT response to chilling injury to lemon • Eight cold treatments to SC for adoption by CPM • Three treatments to SC for MC (2012-011, 2012-010, 2012-013)
1 Feb	**All members**	Finalize list of proposals for 2013 Call for topics (discussion via IPP forum)
1 Feb	**JESSUP/DUBON**	TPPT position paper on adult emergence in irradiation treatments posted on IPP forum for TPPT discussion
28 Feb	**All members**	TPPT virtual meeting (tentative)
1 Apr	**DUBON**	Follow-up email for letters to submitters (reminder of 1 May due date)
1 Apr	**All members**	Review TPPT update document for 2013 May SC meeting
8-12 Apr		CPM-8 (2013) meeting (Rome)
25 Apr	**All members**	TPPT virtual meeting (tentative)
1 May		Data from submitters due for discussion at 2013 July TPPT meeting
6-10 May		2013 May SC meeting (Rome)
1 Jun	**DUBON**	Send letters to submitters notifying them that their treatment was removed from the list of topics by the SC 2007-103 (JESSUP) 2007-105 (PARKER)
1 Jun	**All members**	Discussion papers, checklists, updates, etc. to be discussed at 2013 July TPPT meeting are due
13 Jun	**All members**	TPPT virtual meeting (tentative)
8-12 Jul	**All members**	2013 July TPPT meeting (Fukuoka, Japan)

TPPT Medium Term Workplan

2013	Meeting Call for topics: propose pests other than fruit flies, wood treatments, plants for planting, containers Call for treatments: irradiation, soil and growing media, fruit flies Call for experts? 5-year membership terms end Some new members
2014	Meeting Call for treatments (if added to List of topics) pests other than fruit flies, wood treatments, plants for planting, containers Call for experts? Jessup/Park membership terms end Some new members?
2015	Meeting Discuss wood treatments, plants for planting, containers Call for topics? Call for treatments? Call for experts?

Appendix 12: TPPT evaluations of treatments fully reviewed during this meeting

Ordered by topic number

TPPT evaluation of Vapour heat treatment for *Bactrocera cucurbitae* on *Cucumis melo* var. *reticulatus* (2006-110)

Treatment lead: Mr Wang Yuejin

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on *Vapour heat treatment for* Bactrocera cucurbitae *on* Cucumis melo *var.* reticulatus (2006-110).

The panel had recommended the treatment to the International Plant Protection Convention's (IPPC) Standards Committee (SC) for adoption by the Commission on Phytosanitary Measures (CPM). However, the SC returned the treatment to the panel due to the technical concerns with the treatment.

To be able to recommend the treatment to the SC for adoption by the CPM, the panel needs more information on the following:

- Whether the form of artificial inoculation used to estimate life-stage may have impacted relative susceptibility. This issue needs to be resolved because available literature is mixed on which life stage was the most heat tolerant.
- Comments restricting the commodity to cultivar level were not supported by the panel because there is no evidence to suggest that cultivar differences will significantly impact on melon fly susceptibility. Further research by Corcoran *et al.* (1993) on *Cucurbita pepo* found melon fly was equally susceptible under the same or similar treatment conditions (45ºC for 30 minutes).
- There were concerns about the life stage and rearing technique used in the experimental protocol for this treatment submission. Further guidance on the validation of the use of artificial infestation for life-stage susceptibility testing needs to be provided by the submitter.
- In addition, the ED values will need to be re-calculated because the first replicate should not be included.

For further information regarding this evaluation, please contact wangyuejin@263.net.cn.

TPPT evaluation of HCN treatment of wood packaging material (2007-103)

Treatment lead: Mr Andrew Jessup

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on *HCN treatment of wood packaging material* (2007-103).

New information from the submitter was received in response to the panel's request and reviewed by the treatment lead and the panel. As a result the panel was unable to recommend this treatment for approval because sufficient information has not been provided to support the treatment.

After reviewing the information, the treatment lead and the panel expressed concerns with some important aspects of the submission including the use of suitable surrogate insects and the numbers of insects treated to demonstrate treatment efficacy.

The panel considered that this treatment will not be completed in the foreseeable future and is recommending to the International Plant Protection Convention's (IPPC) Standards Committee (SC) that this treatment should be removed from the *List of topics for IPPC standards*.

Once the treatment is removed from the *List of topics*, the IPPC Secretariat will send a letter to the submitter explaining that the treatment was removed, will inform the submitter on what information is

needed to meet the requirements, and, once this information is gathered, suggest it be resubmitted during a future call for treatments.

For further information regarding this evaluation, please contact andrew.jessup@dpi.nsw.gov.au.

TPPT evaluation of Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity (2007-105)

Treatment lead: Mr Andrew Parker

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the proposal for *Generic irradiation treatment for all insects (Arthropoda: Insecta) except lepidopteran pupae and adults (Insecta: Lepidoptera) in any host commodity* (2007-105). The panel was unable to recommend these treatments for approval because the requested additional information was not provided. The submitting country indicated that it was not able to supply the additional data to support the proposal and would not be able to do so in the near future.

The panel considered that this treatment will not be completed in the foreseeable future and is recommending to the International Plant Protection Convention's (IPPC) Standards Committee (SC) that this treatment should be removed from the *List of topics for IPPC standards*.

Once the treatment is removed from the *List of topics*, the IPPC Secretariat will send a letter to the submitter explaining that the treatment was removed, will inform the submitter on what information is needed to meet the requirements, and, once this information is gathered, suggest it be resubmitted during a future call for treatments.

For further information regarding this evaluation, please contact A.Parker@iaea.org.

TPPT evaluation of Cold treatment for *Ceratitis capitata* on *Citrus reticulata* and their hybrids (2010-102)

Treatment lead: Mr Andrew Jessup

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on the *Cold treatment for* Ceratitis capitata *on* Citrus reticulata *and their hybrids* (2010-102). The panel was unable to recommend these treatments for approval because the level of control mortality was not provided.

The panel recommended that additional information be submitted to support control data, such as further information of mortality in large scale trials, mortality control in treated fruits flies, which live stage was used to determine the mortality of treated species, etc., because the reference paper is not clear.

For further information regarding this evaluation, please contact andrew.jessup@dpi.nsw.gov.au.

TPPT evaluation of Cold treatment for *Ceratitis capitata* on *Citrus sinensis* (2010-103)

Treatment lead: Mr Andrew Jessup

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on the *Cold treatment for* Ceratitis capitata *on* Citrus sinensis (2010-103). The panel was unable to recommend these treatments for approval at this time.

In regards to the panel's request for clarification of the statement that there were no statistical differences between fruit species, the panel is concerned about conducting an analysis of variance on the numbers presented in the second table of Annex B of the re-submission to produce the graph of lsd values and the analysis of variance table in Annex B. It appears that the analysis comparing fruit species was conducted on pooled insect stage responses (to create replication) with the four LD values as treatments. A comparison of the survival of cold-treated *C. capitata* between fruit species needs to be supplied.

The panel requests more information from the submitter on the justification, defence and a full description of the control mortality method.

For further information regarding this evaluation, please contact andrew.jessup@dpi.nsw.gov.au.

TPPT evaluation of Vapour heat treatment for *Ceratitis capitata* on *Mangifera indica* (2010-106)

Treatment lead: Mr Guy Hallman

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on the *Vapour heat treatment for* Ceratitis capitata *on* Mangifera indica (2010-106). The panel was unable to recommend these treatments for approval because the requested information on each replicate was not provided. This information should include additional detailed information on each individual replicate, including the results, the numbers of infested fruit both in the control and treatment, and the number of surviving pupae in each of the control fruit.

The TPPT also needs additional information regarding the required parameters for these treatments. Therefore, we request that you specify the following items in the resubmission: heat up time, heat up recording interval, minimum air temperature at start of heat up, minimum air temperature at end of heat up, dwell time, minimum dwell time pulp temperature, relative humidity, and cooling method.

For further information regarding this evaluation, please contact Guy.Hallman@ars.usda.gov.

TPPT evaluation of Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107)

Treatment lead: Mr Min-goo Park

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on the *Vapour heat treatment for* Bactrocera tryoni *on* Mangifera indica (2010-107). The panel was unable to recommend these treatments for approval because the requested information on each replicate was not provided. This information should include additional detailed information on each individual replicate, including the results, the numbers of infested fruit both in the control and treatment, and the number of surviving pupae in each of the control fruit.

The TPPT also needs additional information regarding the required parameters for these treatments. Therefore, we request that you specify the following items in the resubmission: heat up time, heat up recording interval, minimum air temperature at start of heat up, minimum air temperature at end of heat up, dwell time, minimum dwell time pulp temperature, relative humidity, and cooling method.

For further information regarding this evaluation, please contact pmg@korea.kr.

TPPT evaluation of Generic irradiation for eggs and larvae of Lepidoptera (2012-008)

Treatment lead: Mr Mike Ormsby

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the *Generic irradiation for eggs and larvae of Lepidoptera* (2012-008) submission. The Panel was unable to recommend this treatment for approval because no efficacy level could be derived from the supporting literature, and the end point of the treatment is described in a way that may not be acceptable to IPPC members.

The TPPT needs additional information to approve this submission that should specify a treatment efficacy level supported by appropriate evidence, describe the end-point in a manner suitable for the management of risks in international trade, and structure the submission in a way that indicates the treatment end-point will be achieved at a suitable level of efficacy for the most tolerant species to irradiation. The submitter should consider reducing the range of target pest species to a single family or genus.

We request that you re-submit this proposal along with the requested information during a subsequent call for treatments.

For further information regarding this evaluation, please contact Michael.Ormsby@mpi.govt.nz.

TPPT evaluation of Irradiation for *Ostrinia nubilalis* (2012-009)

Treatment lead: Mr Andrew Jessup

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the additional information submitted on *Irradiation Treatment for* Ostrinia nubilalis (2012-009). The panel was unable to recommend these treatments for approval at this time because more supporting information is required.

More information is required to support the statement (cited as Hallman *et al.* 2010, but not provided in the original submission) that the most mature insect life stages are more radio-tolerant that lesser mature life stages. The panel requests submission of the cited article.

The panel also discussed the fact that late pupae, on which the submission is based, are not found in the regulated articles targeted in the submission. If this is the case, then a lower irradiation quarantine dose might be applicable for those life stages that do attack the regulated articles indicated in the submission. The panel requests that these issues be discussed and, if necessary, more data supplied in a re-submission.

Also, this species may enter a diapause stage in late winter, and therefore may attach itself to regulated articles. Hallman (2000) suggests that insects in diapause may be more radio-tolerant than those not in diapause. This issue needs to be addressed.

The panel would also appreciate discussion on the probability of F1 insects (i.e. offspring from insects treated following the submitted irradiation treatment schedule and which will be sterile) surviving in an importing region and being found in traps or by other means. This is important for quarantine purposes as it is unlikely that techniques exist to test whether or not these insects are sterile due to the treatment imposed on their parents.

For further information regarding this evaluation, please contact andrew.jessup@dpi.nsw.gov.au.

TPPT evaluation of Irradiation for *Dysmincoccus neobrevipes* Beardsley, *Planococcus lilacinus* (Cockerell) and *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) (2012-011)

Treatment lead: Mr Andrew Parker

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the proposed treatment *Irradiation for* Dysminococcus neobrevipes *Beardsley,* Planococcus lilacinus *(Cockerell) and* Planococcus minor *(Maskell) (Hemiptera: Pseudococcidae) (*2012-011). The panel concluded that the proposal is technically sound and adequately supported by the supplied data. The proposal is based on a dose of 231 Gy to prevent reproduction of female of *Dysminococcus neobrevipes* Beardsley with an $ED_{99.99023}$ at a confidence level of 95%. The supplied data also substantiated the assertion that the other two species are not more difficult to control so that this dose may be accepted for all three species.

For further information regarding this evaluation, please contact A.Parker@iaea.org.

TPPT evaluation of Generic Irradiation for pupae of Lepidoptera (2012-012)

Treatment lead: Mr Eduardo Willink

The IPPC Technical Panel on Phytosanitary Treatments (TPPT) reviewed the treatment *Generic irradiation for pupae of Lepidoptera* (2012-012). This submission was supported by studies on 31 species in eight families where prevention of egg hatch from irradiated late Lepidoptera pupae was achieved at 350Gy. The panel was unable to recommend this treatment for approval because no efficacy level could be derived from the supporting literature and the end point of the treatment is described in a way that may not be acceptable to IPPC members.

The TPPT would need additional information to approve this submission that should specify a treatment efficacy level supported by appropriate evidence, describe the end-point in a manner suitable for the management of risks in international trade, and structure the submission in a way that indicates the treatment end-point will be achieved at a suitable level of efficacy for the most tolerant species to irradiation. The submitter should consider reducing the range of target pest species to a single family or genus.

We request that you re-submit this proposal along with the requested information during a subsequent call for treatments.

For further information regarding this evaluation, please contact ewillink@eeaoc.org.ar

Appendix 13: Questionnaire for IPPC standard setting: Identification of key stakeholders and their needs

Background

The IPPC Secretariat has developed a questionnaire addressed to SC members and observers, whose purpose is to identify the key stakeholders of the standard setting process, as well as their needs. The results will be the basis for the development of a structured Communications Work Plan which will include standard setting goals, processes and priorities.

The standard setting Work Plan will be coherent with the IPPC Communications Strategy, and will be integrated with the IPPC Communications Work Plan, whose drafts have been presented at the 2012 meeting of the Strategic Planning Group (SPG).

The IPPC vision, mission and strategic objectives follow for reference.

The IPPC vision
Protecting global plant resources from pests.

The IPPC mission
To secure cooperation among nations in protecting global plant resources from the spread and introduction of pests of plants, in order to preserve food security, biodiversity and to facilitate trade.

The IPPC strategic objectives
A. To protect sustainable agriculture and enhance global food security through the prevention of pest spread;
B. to protect the environment, forests and biodiversity from plant pests;
C. to facilitate economic and trade development through the promotion of harmonized scientifically based phytosanitary measures; and
D. to develop phytosanitary capacity for members to accomplish A, B and C.

Questionnaire

1) Please identify key IPPC internal and external stakeholders *[Definition of stakeholders: Actors (persons or organizations) who have a vested interest in the policy that is being promoted by another actor. Internal stakeholders are an integral part or members of the organization, while external stakeholders are not. When talking about external stakeholders, you may want to keep into account the following sub-categories: "Customers" / "Suppliers" / Partners / Community / Society].*

Stakeholder that are:

- Exporting, Importing commodities

2) What are internal stakeholders seeking from IPPC? What are their main needs?

- Protection from unreasonable rejection of commodities
- Technical Guidance
- Science-based standards

3) Do you think that external stakeholders should participate in the standard setting process?

- Yes, member consultation, etc.
- However, should have NPPO reps who are linked with industry

- Depending on topic, industry may be invited to EDGs (Sea containers, grain).

What are the mutual benefits resulting from their involvement?

- Assists with implementation
- Operational data
- Is it economic and practical?

4) What are the stages of the standard setting process in which (internal and external) stakeholders should participate?

- Should have information gathering session, early involvement, scoping session (Similar to Workshop on grain Dec 2011) inviting internal and external stakeholders
- Member consultation (both internal and external)
- SC members work with external throughout SSP to engage, receive feedback

5) Please mention five standards (current or draft) which the IPPC should use to promote its activities, listed in order of priority.

- Commodity specific
    - ISPM 15 (including impacts on reducing use of MeBr)
    - Sea Con
    - Grain
- ISPM 28 (Treatments)
- ISPM 11 (PRA, identifying the risk)
- ISPM 6 (Surveillance)

6) Further comments

- Receiving more nominations of experts
    - Lack of resources from countries to send experts, need more resources from IPPC to send experts, additional budget, need more planning time to organize, request travel (issues for developing and developed)
    - Rely too much on in-kind contributions (OIE model)
- Receiving more, better quality Treatment submissions
    - Review treatment manuals from NPPOs and see if any can be made into IPPC PTs.
    - Older treatments, not so much scientific data

Please state the country or organization that you are representing:

TPPT December 2012