REPORT

Kyoto, Japan
26-30 July 2010

Technical Panel on Phytosanitary Treatments

July 2010

Revised January 2012: Inserted Appendix 10

Food and Agriculture Organization of the United Nations

Table of Contents

1. Welcome and opening of the meeting

Mr Motoi Sakamura (Plant Protection Division, Japanese Ministry of Agriculture) welcomed the delegates to Kyoto and emphasized the importance of the IPPC work, in particular mentioning that it was important to deal with wood packaging material treatment submissions in a practical and urgent manner. Mr Sakamura also pointed out there is a large expectation on the part of many contracting parties for approval and adoption of internationally agreed (i.e. for ISPM 28:2007) fruit fly treatments.

2. Meeting Information

The Secretariat called attention to the meeting information.

2.1 Agenda

The TPPT steward reviewed the agenda with the Panel (see Appendix 1 to this report).

2.2 Documents List

The TPPT reviewed and updated the list of more than 100 documents provided for this meeting (see Appendix 2 to this report).

2.3 Participants List

The TPPT members, delegates and hosts introduced themselves and briefly described their roles and home organizations. The Secretariat called attention to the participants list and all Panel members verified the contact information on the participants list was correct (see Appendix 3 to this report).

2.4 Local Information

The representatives from the Plant Protection Division of the Japanese Ministry of Agriculture reviewed the document with the TPPT members and answered any questions the Panel had regarding the local area of Kyoto.

3. Meeting logistics and arrangements

Mr Sakamura informed the TPPT of the meeting schedule and necessary supplies and equipment available.

4. Adoption of Agenda

The TPPT reviewed and adopted the agenda (see Appendix 1 to this report).

5. Introductions

The Secretariat introduced the IPPC Secretariat staff and Mr Sakamura introduced the representatives of Japan (Hosts and Organizers) Mr Yuji Kitahara, Mr Hisashi Sakata and Mr Tatsuo Matsuda.

6. Roles

6.1 IPPC Secretariat

The IPPC Secretariat gave an overview of the IPPC and the roles and responsibilities of the IPPC Secretariat staff present at the meeting, Mr Larry Zettler (IPPC) and Ms Stephanie Dubon (IPPC). The IPPC also reminded the TPPT members of the global roles and responsibilities of panel members

6.2 Steward

The IPPC Secretariat gave an overview of the roles and responsibilities of the steward present at the meeting, Ms Jane Chard (UK). The steward also announced that this would be her last TPPT meeting as steward and that the SC would assign a new steward before the 2011 TPPT meeting.

6.3 Host

The IPPC Secretariat thanked the hosts and organizers from Japan.

6.4 Rapporteur

The IPPC Secretariat gave an overview of the roles and responsibilities of the rapporteur. The TPPT elected Mr Ray Cannon (UK) as rapporteur.

6.5 Chair

The IPPC Secretariat gave an overview of the roles and responsibilities of the chair.

7. Selection of Chair

The TPPT elected Mr Andrew Jessup (IAEA) as Chair.

8. Review of the last meeting of the TPPT

The TPPT reviewed the report of the January 2009 TPPT meeting and confirmed that the Panel addressed all follow-up actions (see Section 9 of this report for more detailed information).

9. Update on Commission on Phytosanitary Measures, TPPT Intersessional work, and other relevant bodies

The Steward updated the TPPT on what actions had taken place since the last TPPT meeting (approximately the previous 18 months), including email discussions, and summarized the work as follows:

- March 2009: Following the last meeting, the Secretariat sent letters to treatments submitters requesting additional information on their treatment submissions
- May - October 2009: Discussion of appropriate wording for the vapour heat treatment for melon fly took place by email
- June - August 2009: In response to the IPPC Call for new topics, the TPPT submitted seven topics for treatments, including a prioritization document. The SC recommended only one of the topics for a call (Soil and growing media in association with plants)
- August - October 2009: After CPM-4 (2009), the Secretariat developed indexes for adopted treatments. The TPPT agreed on three indexes for each of eight adopted treatments as annexes to ISPM 28: 2007. The indexes for each treatment would be searchable by pest, commodity and type of treatment
- October 2009: The TPPT modified the checklist form for evaluated treatments and revised the numbering policy
- October 2009: The Call for fruit fly heat treatments closed in October 2009. The Secretariat received nine submissions and the TPPT assigned a lead to each submission
- October 2009 - March 2010: The TPPT discussed the formal objections to irradiation treatments from the 4th Meeting of the Commission on Phytosanitary Measures [CPM-4 (2009)]. The TPPT consulted with submitters and produced a response endorsed by the TPPT. Five treatments went forward to CPM-5 (2010). CPM-5 (2010) adopted three treatments and returned two treatments to the Standards Committee (SC). The SC in turn sent these two treatments back to the TPPT to address the concerns expressed at CPM-5 (2010)
- November 2009: The TPPT finalized the steward's response to comments from the 2009 Member Consultation for fruit fly cold treatments. See agenda item 9.1 and documents 2010_TPPT_Jul_78 and 2010_TPPT_Jul_79 for more information
- December 2009: The Secretariat issued a call for fruit fly cold treatments which closed on 15 April 2010. The Secretariat received five treatment submissions and the TPPT assigned a lead to each submission

The Steward also updated the TPPT on CPM items relevant to the Panel and on decisions taken from the reports of the SC and CPM-5 (2010) since the 2009 TPPT meeting. The TPPT discussed the draft standard Appendix to ISPM 15:2009 in relation to topics on the agenda. The SC also requested the TPPT to develop a medium term topics and priorities (see Appendix 4 to this report) and to discuss what was needed in terms of international treatments and how long it would take to achieve adoption of these. The SC also set the order of priority for the TPPT to discuss treatments submissions, with wood packaging material treatments for inclusion in ISPM 15:2009 as the most urgent.

The SC raised the issue as to whether additional prescriptive guidance for treatment submissions was required. The TPPT discussed what was required (e.g. frequently asked questions) to facilitate proper and complete submissions. The TPPT suggested that guidance be provided to accompany new calls (e.g. soil and growing media) to detail what is required. The TPPT recognized that some countries produced incomplete or inadequate submissions, evidencing the fact that not all fully understood exactly what was required, even though it was documented in ISPM 28:2007. The TPPT also noted that the Technical Panel on Forest Quarantine (TPFQ) was concerned about which method to use for the calculation of CT products (see Section 13.3 of this report).

9.1 Agree on TPPT response to member comments on fruit fly cold treatments in order to resolve major issues

The steward introduced a series of collated points (major and minor) and comments on fruit fly cold treatments based on more than 200 responses received from the 2009 member consultation on eight fruit fly cold treatments. The TPPT discussed each item individually and either agreed with the suggested changes, rejected them, or provided an alternative. These included editorial issues as well as technical points (see Appendix 10 to this report).

The TPPT discussed the issue of endpoint mortality. Previously, a submission had been partly rejected on the basis that a pupal endpoint could (theoretically) result in a lack of detection of a failure, because a live larva post treatment might, as in the case of many fruit fly species, leave the fruit to pupate and hence be undetectable. The criteria previously formulated by the Panel required that no live larva (not 'no live pupa') be present in the treated commodity on the basis that all inspections at points of entry will involve cutting fruit and visually inspecting for live larvae.

The TPPT considered that 'no pupal emergence' was an acceptable mortality measurement and can be considered to equate to larval death, because any larvae surviving the treatment would be expected to develop into adults in the same manner as untreated larvae. The Panel therefore agreed that pupal assessment of mortality conforms to the TPPT assessment of mortality for temperature treatments (i.e., if the larvae survive treatment, aside from control-related mortalities, they would be expected to develop into adults, and by implication be detected upon inspection). The TPPT noted that two treatments based on 'no pupal emergence endpoint' which had been closed in 2009 (2007-TPPT-107, 2007-TPPT-108) might need to be reassessed. The TPPT agreed to request further information from the submitter on these treatments.

The TPPT discussed the issue of whether or not there were differences between fruit fly populations in terms of their cold hardiness. The Panel concluded that while there were considered to be phenotypic differences (plasticity) induced by the environment and a result of seasonal or geographical effects, it was not thought that this was a significant issue.

The TPPT discussed the statistical confidence around the ED value. The number of organisms treated in an experimental procedure (e.g. large scale testing) is required to calculate an ED value with confidence limits. This number may be determined directly by counting the actual numbers of organisms in the treated commodity or by estimating that number by using the numbers from the control group to calculate a proportional number in the treated commodity.

The TPPT agreed that in cases where estimates of the numbers of treated insects are used (e.g. Santaballa *et al.*, 2009), data on the statistical variation around the mean of the estimate should be provided.

In response to one comment concerning a lack of guidance on requirements for fruit fly cold treatments, the TPPT agreed to draft guidance for NPPOs on the main issues associated with the implementation of fruit fly cold treatments for discussion at the next meeting. The TPPT will also produce guidance documents on other types of treatments that have been evaluated by the Panel including heat via forced air, vapour heat, and hot water.

The Panel discussed other editorial issues and technical points and agreed to finalise the TPPT response to comments, summary report and revised treatment schedules by email for submission to the SC.

9.2 Provide wording for SC on two irradiation treatments not adopted at CPM-5 (2010) (*Cylas formicarius elegantulus* and *Euscepes postfasciatus*)

Although the CPM has adopted a total of 11 irradiation treatments, the CPM-5 (2010) returned two to the SC for further discussion, who in turn returned them to the TPPT (SC May 2010). The TPPT discussed at length how to accommodate these concerns about these treatments, i.e. that live, but irradiated and sterile, F1 adults could be present (to varying extents) in some irradiated commodities, and could therefore, in theory, be found in survey traps in some countries where such organisms were of quarantine concern. In these particular treatments, the end point was the occurrence of sterile adults, rather than the non-emergence of adults as in other adopted treatments. Although the Panel agreed that different countries must decided whether a particular treatment is suitable and appropriate for them, the Panel drafted a new paragraph and further expanded the explanatory document on irradiation treatments.

9.3 Consider topics and priorities and medium plan for the TPPT

The TPPT produced a topics and priorities and a medium term plan of work (5 years). For more information, see Section 19 of this report.

9.4 Specification Technical Panel 3 for the Technical Panel on Phytosanitary Treatments

The SC revised the Specification in April, 2010. The Panel reviewed the Specification.

10. Issues arising from relevant bodies

See Section 9 of this report.

11. Updates on progress with treatments approved at previous meetings

11.1 Vapour Heat Treatment for *Bactrocera cucurbitae* on *Cucumis melo* var. *reticulatus* (2006-110)

The Panel reviewed this treatment, which was drafted during the 2009 meeting, and made minor changes (see Appendix 5 to this report). The Panel considers the treatment ready to be submitted to the SC for approval for Member Consultation.

12. Review of administrative procedures

12.1 Procedures for the production of phytosanitary treatments

In 2009, the TPPT revised its procedure for production of phytosanitary treatments (2009 TPPT Meeting Report, Annex 7). The Steward reviewed these revisions and the document will be included in the IPPC Procedural Manual.

12.2 Submission form

The steward reviewed the revised treatment submission form that had been previously agreed by TPPT.

12.3 Prioritization criteria for proposed phytosanitary treatments and score definitions

The steward reviewed the revised score sheet (2009 TPPT Meeting Report, Annex 6) that is a part of the CPM-adopted Procedure and criteria for identifying topics for inclusion in the IPPC standard setting work programme. The revised score sheet (2009 TPPT Meeting Report, Annex 6) reflects the criteria adopted by the CPM.

12.4 Checklist update

The steward reviewed the revised checklist form agreed by the TPPT in 2009 (2009 TPPT Meeting Report, Annex 9).

12.5 Review of membership for ensuring overlap of incoming and outgoing members

The Panel reviewed its membership and could not foresee any reason for replacement of existing Panel members, or the need to bring in any additional experience, unless Panel members could no longer attend due to individual circumstances.

12.6 Discussion on how to deal with formal objections submitted prior to CPM meetings

The TPPT discussed how to best deal with formal objections submitted to the CPM by member countries. The TPPT reviewed the procedures and experience of dealing with previous comments (e.g. on the irradiation treatments). The TPPT agreed that it was essential to identify a volunteer from the Panel to take the lead in terms of dealing with any technical issues associated with country comments. This is often a time consuming role, so it is essential that sufficient time is available (including time to consult with other members of the Panel and other experts, as required).

12.7 TPPT tracking log

The Secretariat Representative outlined a revised tracking log for tracking treatment submissions. The TPPT agreed that it was useful to include all treatments which had been submitted including those that were closed, adopted and/or active. However, the issue of what level of access to the tracking log would be permissible requires further discussion or guidance (e.g. by the SC). The Panel suggested that documents should be dated according to when they were received, and could be sorted by both date and file name. International accepted abbreviations (e.g. for both fruit flies and treatments, e.g. VHT for MFF) could be used to shorten titles.

12.8 TPPT submissions for phytosanitary treatments numbering and naming convention proposal

The Secretariat produced a numbering and naming scheme that could be used to uniquely identify treatment submissions in a way that would avoid duplication, omission, and confusion as the treatment submissions progress through the vetting process. The Panel agreed that the present system can be confusing when considering treatments submitted during different calendar years and are at different stages in the approval process. The Panel further agreed that the naming and numbering scheme should be used in the tracking log as well as all documentation within the Secretariat.

13. Issues raised at the 2009 TPPT meeting

13.1 Develop guidelines for choosing a substitute pest for the next meeting

A member discussed a document he drafted on *Using surrogate species in the development of phytosanitary treatments*. A technical justification for selecting a surrogate pest has been devised and it was suggested that this could be used by countries as a method to select organisms to substitute for quarantine species. The paper presented a list of bionomic, taxonomic, and toxicological attributes accompanied by a scoring scheme. The Panel agreed that the choice of surrogate (or substitute) pest should depend on the type of treatment to be applied, and identifying the critical aspect of the biology (or behaviour) of the target species that is essential to defining its tolerance to the treatment.

Identifying the most tolerant species of any assemblage of pests identified by risk assessment is one way of ensuring that the treatment will be more that fully effective against the target species. The TPPT agreed that justification should be provided by a submitter (if surrogates are used to develop a treatment schedule) and that this document was a useful guideline. The list of attributes was not intended to be exhaustive, and the Panel recognized that there could be potential difficulties associated with the scoring system. However, the Panel considered the paper to be very useful and was redrafted in the form of a one page summary for distribution (see Section 13.4 of this report for more information).

13.2 FAO fumigation guide

One member provided feedback on the FAO Manual of fumigation for insect control (http://www.fao.org/docrep/x5042e/x5042E00.HTM). The Panel agreed that the FAO manual was now out of date and should neither be used nor recommended. It appears that no fully comprehensive fumigation manual exists, although different alternatives exist in the form of specific aspects (such as in-ship fumigation) produced by different countries. One member drew attention to a useful document, the *UNEP Sourcebook on Alternatives to methyl bromide*:

(http://www.unep.fr/ozonaction/information/mmcfiles/3072-e-mbsourcebook.pdf).

Some TPPT members had been contacted by the Secretariat who expressed an interest in coordinating the updating of the FAO fumigation guide. The Panel was, however, concerned that this was a large and rather open-ended task which could preclude completion without sufficient funding and guidance.

13.3 Calculating CT products

One member introduced a paper on how to calculate Concentration-Time (CT) products. Different treatment submissions to the TPPT (i.e. involving different fumigants) have used different methods for calculating CT products. The Panel set itself the objective of defining a recommended method for calculating the CT products. The paper recommends a formula for calculation of CT for ISPM 15:2009 (method 2-sample 3). Comments on this paper were also provided in another document by a second member. A third member questioned whether a 0.5 hr first reading should be taken (to improve accuracy), as done in United States Department of Agriculture (USDA) calculations. Although this was possible, a two-hour delay was generally taken as the standard interval to ensure mixing was complete, although this is not always the case. [*N. B.* using the rates over the first 2 hours can produce an underestimate of the total]. A fourth member presented a third paper outlining a possible solution for calculating CT products. This paper recommends taking more readings (closer together in time) when the rate of decline is steep, as errors associated with the estimate dose and the true curve will be greatest at this point. Another member commented that many factors influenced the CT product in practice; operationally, a schedule is developed and applied conservatively (i.e. without calculating the exact concentration decay curve). All that is required is that a certain concentration be reached by a certain time.

The Panel agrees that for standard practice a harmonized approach should be used. The first member commented that some of the doses recommended in ISPM 15:2009 are not practical under tarpaulin. The fifth member disagreed and suggested that for successful fumigation it is only necessary to monitor the initial concentration, at 0.5 and 2 hours (reflecting the absorption of the gas) to see if it is normal; after this the concentration will be a functional of the loss rate, and the CT product can be achieved by extending the process.

The Panel recommended that treatment submitters be asked to describe exactly how they calculated the CT product in their schedule, and the Panel should review (on a case-by-case basis) whether it was practical in commercial practice. There are various ways of calculating a CT product (some are more applicable to certain circumstances than others). Some are more accurate than others; some over-estimate and others underestimate the CT product. While it is important not to overestimate the dose to any marked extent, such variation can occur as a result of a number of different factors, and should

therefore be evaluated on a case–by-case basis. However, a conservative approach should be taken irrespective of the method of calculation.

13.4 Use of historical treatment data

One member presented a paper on how to use historical data to provide a level of efficacy for applied treatments. The TPPT agreed that it is necessary to know what is moving along a pathway before it is possible to know how successful or not an applied treatment was. Inspection will never be absolutely perfect (some undetected pests can always be assumed to have moved along the pathway, if untreated). If a correlation can be made between the infestation level in the production orchard, and the level of pest (untreated) in the commodity, it may be possible to calculate the efficacy of the treatments via historical data, but in practice (e.g. with fruit flies) as another member commented, the level of pest is almost zero (pre-treatment) in any case.

The TPPT concluded that it could recommend that historical data be utilized only where there is a statistical basis for determining some level of efficacy, e.g. when efficacy data exist in relation to sampling under operational conditions. In most, if not all, cases it will not be known with any degree of accuracy, how many target pests were present prior to treatment (the fourth item below); additionally, the accuracy of the inspection methods to detect the pest(s) at a certain level (or even the confidence with which one could detect an organism) needs to be known (the fifth item below). In particular, five specific difficulties were identified in the paper:

- The condition of the target regulated article may vary of time;
- The life stage of the target pest may change over time;
- Environmental conditions critical to treatment efficacy may vary over time;
- The number of live target organisms infesting the regulated article was unknown at the time;
- The number of surviving target organisms post-treatment was not determined (with any degree of accuracy).

The TPPT redrafted the surrogate species document into a one page summary (see Appendix 6 to this report).

14. Overview of treatment submissions

The Secretariat presented an overview of treatment submissions pending review by the TPPT. They were organized according to their priority of ISPM-15 treatments > Fruit fly cold treatments > Fruit fly heat treatments > Irradiation set forth by the SC in May, 2009.

15. Consideration of additional information

No additional information provided.

16. Cold treatments rejected by the SC

The steward deleted this item from the agenda, as it was previously covered in Section 12.7 of this report.

17. Treatments submitted in 2006 or 2007 call for treatments

The Panel planned to evaluate six ISPM 15:2009 treatments, but, based on the additional information from submitters, the Panel only reviewed three treatments in-depth. The Panel did not review one generic Irradiation treatment submitted in 2007 because the Panel did not receive any additional information from the submitter.

17.1 Wood packaging treatments for inclusion in ISPM 15

The Panel evaluated the ISPM 15:2009 treatments for equivalence to the current ISPM 15:2009 methyl bromide treatment (see Appendix 7 to this report).

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

The TPPT Lead introduced the submission *Sulfuryl fluoride fumigation of wood packaging material*. The lead updated the evaluation checklist to include a revised schedule based on work carried out in UK and Portugal in 2010 and reported in a separate document (Sousa *et al.*, 2010, 2010-TPPT-July-67); pine logs and planks of wood were exposed to SF in chambers; the results demonstrated that it is necessary to de-bark the wood prior to fumigation. The Panel reviewed and discussed the new data presented intended to validate the proposed fumigation schedules for SF. The experimental method (incubation) resulted in high populations of Pine Wood nematodes (PWN) in the wood (up to 1,067,130 per infected board pre-treatment) with high percentages of the 3rd stage juvenile dispersal stage (e.g. *c*. 80%). This 'worst case' experimental scenario was accepted by the TPFQ, who have also reviewed the same new evidence. There were no survivors from >200,000 nematodes, which is well above Probit 9 efficacy (3200 g/h/m^2). There were however, survivors in the 20°C experiments (i.e. over the range 1901– 4051 g/h/m^2) (First series, Table 21). The Panel noted that in this experimental method the actual numbers of nematodes cannot be used to calculate an efficacy (ED) value because any survivors of the treatment could in practice multiply in numbers over the period from 72 hrs to 21-42 days].

The Panel discussed why the 3200 CT dose was effective at 15°C but not at 20°C. No clear explanation was provided, but it might be related to temperature and nematode growth rates. The second series of experiments at 20°C (Table 24) was effective at the two lower dose rates, but there were survivors at the highest dose rate (2488 g/h/m^2). There were no tests carried out at 25°C but at 30°C there were no survivors over the range 1385-2141 CT dose (Table 28).

The data set could not be extrapolated to include intermediate doses at 20ºC and 25ºC because the Panel did not know what SF concentration is required to achieve probit-9 efficacy between the only two temperature points with demonstrated probit-9 efficacy (15ºC and 30ºC temperatures). If the data were extrapolated, the intermediate data points would necessarily fall above the line, as was demonstrated by nematode survival at 20ºC.

In conclusion, the Panel agreed that Probit 9 efficacy was proven for 15-20°C and 30+°C. The Panel discussed the proposed revised schedule and agreed that the two intermediate doses (at 20-25° and 25-29.9° C) should be deleted on the basis that A) there were survivors from the 20ºC interval treatments and B) the 25ºC interval was not tested in the new work (Sousa *et al.*, 2010). Additionally, it was decided that the temperature range in the schedules should be further limited to the actual target temperatures achieved in the experiments (e.g. see values in Table 5 for 15° C), and excluding those temperatures in Table 6 (e.g. 18° C and above; target temperature 20° C) where survivors occurred. The Panel acknowledges that this rather incomplete schedule may cause difficulties for tarpaulin fumigation under ambient conditions in some countries, but hopes that the data gaps could be filled before final approval occurs.

While the data supplied did not support the proposed schedules between 17.9^{O}C and 30^{O}C, the panel considered this partial schedule would be of value. The TPPT approved the revised schedule and it was reformatted by the TPPT to reflect the temperature limitations (i.e. 15-17.9ºC and 30ºC and above). The Panel considers the treatment ready to be submitted to the SC for approval for Member Consultation (see Appendix 8 to this report).

In addition, the TPPT agreed to send a letter to the submitter informing them of the decision to recommend the amended schedule to the SC along with a request for additional research needed to fill in the intermediate temperature ranges in the schedule.

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

The TPPT Lead reviewed the process of submission and evaluation of this treatment. The submitter has responded to requests for additional data and clarification providing two responses. The Panel reviewed the new data on the Ecotwin product (mixture of methyl isothiocyanate and sulfuryl fluoride gases) which was obtained from two research papers published in the Research Bulletin of the Plant Protection Service Japan. Although information on gas concentrations under operational conditions was provided, various pieces of information on the ratio of methyl isothiocyanate (MITC) to sulfuryl flouride (SF), moisture content, effects on different woods, and so on, were not available. In particular, the concentration of MITC was not measured during the experiments. Another member reported on preliminary experiments from China, that MITC is quickly absorbed by wood and the mixture was highly effective against nematodes.

The Panel discussed the contribution that MITC is providing to the product's efficacy and concluded that, although the concentration of the synergist may not be optimized, it simply reflects the concentration for which regulatory approval has been obtained. However, it is not known what the limits of moisture content, size and type of timber should be and this information is critical to producing a schedule. Most importantly however, no information is available on the effects of this mixture on *Anoplophora glabripennis* (Asian longhorned beetle, or ALB) or on an appropriate surrogate. However, if SF is the active ingredient, it is known from the SF submission (2007-101) that ALB is less susceptible than *Bursaphelenchus xylophilus* (pinewood nematode, or PWN). The Panel could not, however, ascertain how the mixture was interacting and needed to be assured that it would work under a range of practical conditions (wood moisture, type and so on). Further, the Panel would need to be assured that the mixture works just as well against ALB as against PWN. Although the SC has provided guidance to the Panel that it is necessary to provide efficacy data to Probit 9 on both PWN and ALB for ISPM 15 treatments, it is possible an extrapolation could be made. Information on any restrictions (i.e. unwanted effects on living plants, food etc.) associated with this product are also still unavailable.

The TPPT could not approve this treatment and agreed a letter be sent to the submitter requesting additional information on susceptibility to Asian longhorn beetle, the possible interaction of the active ingredients in the mixture and their fate on wood, any possible environmental or health and safety restrictions of the treatment.

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

The researchers used surrogates (a soil dwelling nematode and stored product beetles) to test the chemical fumigant in an artificial experimental procedure that approximated a structural fumigation regime more than that of an ISPM 15:2009 treatment protocol. The experiments demonstrated that the pests were susceptible to the treatment. Nonetheless, the Panel considered that the test species used were not suitable surrogates, there were insufficient numbers of bioassays used, and the experimental design might not be accepted by all importing countries. Therefore, the TPPT could not approve this treatment at this time.

The TPPT agreed a letter be sent to the submitter pointing out that it is necessary to use appropriate target pests as listed in Annex 1 to ISPM 15:2009 or acceptable surrogates. In addition, difficulties with the experimental set up will be pointed out.

17.1.4 Microwave irradiation of wood packaging material (2007-114)

The Panel discussed a new paper (by Hoover *et al.*, 2010) (2010_TPPT_Jul_84a) submitted in support of the submission 'Evaluation of microwave irradiation of wood packaging material' (2009_TPPT_54 and 2007-TPPT-114). The TPPT agreed that this was a very convincing investigation and that all of the issues identified previously by the Panel that needed additional supporting evidence (2009_TPPT_54) had been dealt with adequately. These included concerns over combustion; sensitivity of heating up time; etc. Treatment efficacy to Probit 9 has been demonstrated against PWN. It has been established that PWN is more tolerant of heat than ALB and therefore that Probit 9 efficacy

against the beetle was not required. The treatment had previously been tested against ALB (see papers by Fleming *et al.*) and shown to be effective (using numbers of c. 300 individual beetles).

The TPPT concluded that microwave irradiation treatment of wood (a minimum temperature of 60°C for 1 minute throughout the profile of the wood) has been shown to be an effective treatment against the pests listed in Annex I to ISPM 15:2009 and should be approved by the TPPT for wood not thicker than 20 cm.

The TPPT approved the treatment, formatted the schedule, and recommended it to the SC.

17.1.5 Phosphine (PH_3) fumigation of wood packaging material (2007-115)

The submission lead informed the TPPT that no additional information had been received in support of the submission since the previous meeting in 2009. It is understood that this treatment may be more suitable for wood products than for wood packaging material.

The TPPT agreed a letter be sent to the submitters informing that the TPPT agreed to remove this treatment submission from the work schedule.

17.1.6 Methyl Iodide fumigation for *Bursaphelenchus xylophilus* and Coleoptera: Cerambycidae of wood packaging material (2007-116)

The Panel reviewed this submission, but, unfortunately, previously requested information had not been provided since the last meeting and the Panel could not approve the treatment at this time.

The TPPP agreed to send a reminder of the required additional information to the submitter.

17.2 Fruit fly treatments

The steward moved this agenda item to Section 11 of this report.

17.3 Irradiation

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

The TPPT acknowledged some concerns during the 2009 meeting about the generic insect treatment based on two broad fronts. The first was the fact that the irradiation treatment delivers only F1 sterility for some insects and groups of insects. This would allow in some instances the presence of live adult insects post treatment that could trigger a quarantine action if detected in survey traps. The second concern was a general lack of confidence that the accumulated body of science on irradiation susceptibilities could be extrapolated to the entire insect group (except lepidopteran pupae and adults).

The TPPT also agreed to a draft work plan during the 2009 meeting on how to progress the generic insect treatment and, in cooperation with the submitter, irradiation experts and other scientists, to receive guidance on the most sensible and useful way to address these concerns of the panel. One suggestion to progress the treatment was to conduct gap analyses on smaller taxa within the Order to identify pests that are of phytosanitary concern and target those for further efficacy testing and possible development of separate generic doses.

The International Atomic Energy Agency (IAEA) continues to actively lead and support the development of irradiation treatment technology and application and recently released a series of grants for closing some gaps in the irradiation susceptibility data set. A TPPT member attended the first meeting of the Coordinated Research Project (CRP) on the Development of Generic Irradiation Doses for Quarantine Treatments, hosted by the IAEA in Vienna, Austria 5-9 October, 2009, and presented a brief report of the meeting to the Panel members.

The objective of the CRP project is to obtain additional susceptibility data on irradiation doses required to control certain plant pests, particularly those data-deficient groups such as mites, weevils,

leaf miners, whiteflies and mealy bugs. The project also aims to develop generic treatments for some of these taxonomic groups as well as to develop guidelines and protocols for the use of irradiation as a phytosanitary option. Part of the rationale for establishing this particular CRP is aimed at facilitating the adoption of additional irradiation treatments as Annexes to ISPM 28:2007, and for addressing some of the concerns outlined by the TPPT and the objections of certain IPPC Member States regarding a generic irradiation treatment for insects.

The TPPT agreed results from the CRP project could add credence to the concept and validity of a generic irradiation treatment for insects and may impact future revisions of the treatment submission as it stands.

18. Treatments submitted in response to the 2009 and 2010 call for heat treatments and cold treatments for fruit flies

Fifteen new fruit fly treatments were received from the calls in 2009 and 2010

18.1 Fruit fly treatments using heat

Seven heat treatments were reviewed, 1 was eliminated, and 2 were tabled until the next meeting pending more review of the supporting data.

18.1.1 Heat treatment for *Bactrocera cucumis* on *Cucurbita pepo* (2010-106)

The submission lead for this treatment introduced the submission. Eggs of *Bactrocera cucumis* were determined to be the most tolerant stage to heat in this species. There were some concerns that while very large numbers (>178K) of eggs were tested in Corcoran et al. (1993), it was not possible to calculate the actual ED as the authors did not report on the control mortalities. However, the Panel agreed that the results were probably >Probit 9 as stated. A more recent paper (Hall et al. 2007) was not supplied with the submission, and the Panel considered that it was necessary to review this additional evidence. The authors reported a single survivor with arrested development resulted from the treatment but the TPPT felt that it should be considered as a survivor.

The TPPT agreed the submission could not be approved and a letter will be sent to the submitters requesting additional information on the laboratory method of genotypic infusion of wild type flies and the two referenced papers.

18.1.2 Vapour heat treatment for *Ceratitis capitata* on *Mangifera indica* (2010-106) (Previously 2009-TPPT-102)

The submission lead for this treatment presented this vapour heat treatment of 46.5ºC for 10 minutes at >95% relative humidity for Mediterranean fruit fly in mangos of the Kensington variety. The original work by Heather *et al.* (1997) showed that >Probit 9 security could be delivered by a treatment of 46.5°C for 10 minutes. Because there was a survivor from about 200,000 treated insects and because of concerns on the part of the importer (Japan) about increased phytosanitary risk, the treatment schedule was arbitrarily increased to 47°C for 15 minutes. Nonetheless, the Panel considered there was merit in using the 10 minute, 46.5° C treatment from the point of view of product quality because potential damage has been demonstrated at 47° C for 20 minutes (see Jacobi et al., 2001 (2009_TPPT_Jul_10)).

The Panel agreed that the treatment could not be approved at this time and that a letter would be sent to the submitter requesting specific information on how mortality was determined in the experiments including the numbers of fruits infested in both controls and treatments together with the numbers of surviving pupae from the controls.

18.1.3 Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica* (2010-107) (Previously 2009-TPPT-103)

The submission lead for this treatment presented this vapour heat treatment of 46.5C for 10 minutes at >95% relative humidity for Queensland fruit fly in four different mango varieties. The TPPT agreed that this treatment could be combined with the previous one (2010-106/2009-TPPT-102) to produce two schedules, one for each fruit fly species, for all mango varieties. This was done for several reasons: 1) the original research showed the treatment provided >Probit 9 efficacy and, 2) additional research data (Corcoran et al., 2000 (2009-TPPT-Jul-14)) (Table 1) comparing the lethal temperatures (LT99) for four other mango varieties (R2E2, Kent, Palmer, Keitt) with that of Kensington showed that the Kensington variety was the most tolerant of the five varieties tested.

The TPPT agreed that it could not approve the treatment at this time and that a letter would be sent to the submitter requesting specific information on how mortality was determined in the experiments including the numbers of fruits infested in both controls and treatments together with the numbers of surviving pupae from the controls.

18.1.4 Vapour heat treatment for *Bactrocera tryoni* on *Lycopersicon esculentum* (2009-104)

The Panel discussed the issue of whether this treatment could be used against other tomato varieties and agreed a letter should be sent to the submitter requesting information on 1) whether the results for one variety (Flora Dade) could be extrapolated to other varieties and 2) whether the researchers visually inspected the fruits for live larvae and pupae.

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

This treatment for selected fruit fly species (Diptera: Tephritidae) is used as a generic treatment against Tephritid fruit flies in fruit harvested for commercial consumption in New Zealand. The treatment was supported by a large number of research documents. However, there were too few studies that could be compared directly to determine relative susceptibilities to the treatment among members of the Tephritidae family. The supporting documents included susceptibility studies of 11 different tephritids but the TPPT found it very difficult to determine from the studies which of the tested species was the most tolerant to the treatment. In the limited direct comparative studies, there is some evidence that *Bactrocera melanotus* may be the most tolerant (Waddell *et al.* 1997) but there was insufficient information to conclude definitively.

The Panel discussed the concept of a generic heat treatment and considered that there were similarities among other measures (wood packaging material treatments, generic irradiation treatments, etc.) in terms of finding the most tolerant species and using this as a model against which to test other fruit flies. However, there was difficulty in extrapolating the research data across all taxa within Tephritidae.

The Panel also discussed the appropriateness of using hot water dips for determining the most tolerant life stage and fruit fly species rather than using actual vapour heat equipment. One member commented that heat is heat and the method by which it is delivered is irrelevant to determining innate pest susceptibilities to it. He further commented that hot water dips is a laboratory technique that is generally accepted by the scientific community and has been widely used around the world.

The TPPT was unsure of the validity of extrapolating and interpolating one treatment schedule from a range of variable treatment schedules that were developed with different variables. Consequently, the Panel felt that the treatment could not be approved at this time but the TPPT agreed to further consider the validity of a generic heat treatment and continue to discuss the issues surrounding the concept.

The TPPT agreed that a letter be sent to the submitter requesting additional information.

18.1.6 Heat treatment for Cook Island fruit fly and Pacific fruit fly in Waimanalo papaya in the Cook Islands (2009-TPPT-106)

The TPPT agreed that this submission could be included in the above generic treatment (see 18.1.5, 2009-105). Accordingly, the Panel did not approve the treatment as stand-alone and was closed.

18.1.7 Thermal conditioning in *Bactrocera tryoni* eggs (Diptera:Tephritidae) following hot water immersion (2009-107)

This was not a proper submission but rather a single research paper which showed that thermal conditioning of fruit fly eggs can occur at specific temperatures prior to heat treatment (Waddell et al 2000 (2009-TPPT-Jul-61)). The Panel agreed that this was significant scientific information and such an effect should be considered relative to other submissions. The TPPT agreed that the information would be included in a list of factors of importance to heat treatments in a heat treatment guidance document that will be produced by the TPPT. The TPPT closed this submission.

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

The TPPT agreed there was insufficient information presented to support this treatment. Supporting data, including the methods used in experimental protocols, and the source of all efficacy data were not provided for this treatment submission. Therefore, the TPPT agreed to write a letter to the submitter requesting all supporting data for the treatment.

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

The TPPT agreed there was insufficient information presented to support this treatment. The submission is based on unpublished reports that were not provided, so it was not possible to verify the treatment. The data are believed to be available as the treatment has been approved by a trading partner and commodities have been exported from the Philippines under this treatment regime. The TPPT agreed that a letter be sent to the submitter requesting the supporting documents.

18.1.10 Vapour heat treatment for fruit flies on *Mangifera indica* (2009-110)

The TPPT understood that this treatment has been approved by a trading partner and that trade under this treatment regime has occurred. However, the treatment submission lacked the original unpublished research reports on which it was based. Furthermore, the ED value has not been supplied, although it was possible to calculate it for one species. The TPPT agreed that a letter be sent to the submitter requesting the full data package accompany the submission.

18.2 Fruit fly treatments using cold

Three cold treatments were reviewed in depth and two were duplicates of treatments already approved or on the work plan.

18.2.1 Cold treatment for *Ceratitis capitata* on *Citrus paradisi* (2010-101)

This treatment submission was for a cold treatment of 0.5ºC at 90% RH for 12-13 days. The submitter did not provide the referenced reports so it was not possible for the Panel to verify validity of treatment parameters. The Panel had questions about the requirement for 90% RH during the treatment, the variable number of days in the schedule (12 to 13), and the level of efficacy and how that statistic was calculated.

The TPPT agreed the treatment could not be approved at this time and a letter will be sent to the submitter requesting clarification of the above points and the original referenced reports supporting the treatment.

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

This submission was based on work presented in a paper by E. Santaballa, R. Laborda, M. Cerdá (Bol. San. Veg. Plagas 35, 2009). The submission lead for this treatment relayed that the treatment (16 days at 2°C or below) showed quantifiable efficacy (ED 99.9906) with no survivors resulting from three trials totalling 31,988 insects treated on *Clementina* mandarin oranges. This treatment is two days

shorter in duration than the current draft schedule for this species (*Cold treatment for* Ceratitis capitata *on* Citrus reticulata *and* C. reticulata *x* C. sinensis, 2007-206B).

There was some discussion concerning whether artificial diets and the rates of introduction of wild type insects (i.e. the infusion of new genomes) could have played a role in explaining this variability in fruit fly populations geographically separated. One member considered that diets were more important and also pointed out that the data applied only to the Clementine variety of mandarin. The Panel agreed that clarification was needed of which variety of mandarin was used in the experiments. The schedule refers to *Clementina* but one member felt that *Clementina* is a brand name rather than a variety. The submitter included hybrids of *C. reticulata* in the treatment schedule but there was no mention of hybrids in the supporting research paper and the Panel was not confident that the treatment could be extrapolated across all *C. reticulata* hybrids.

The Panel analyzed the method by which the researchers (Santaballa *et al.* 2009 (2010_TPPT_Jul_66)) estimated mortality relative to the control in the large scale trials. The researchers identified that these trials used much smaller control fruits (about 30% the size of treated fruits) to estimate the number of insects in the treated fruits. Although the number is estimated, the inherent error associated with the estimate was not given in the paper. This precludes accurate calculation of the confidence limits associated with the ED value and when this error is factored into the calculation, the reported ED 99.9906 will be reduced.

The Panel also discussed the effective measure of mortality used in the experiment. Santaballa *et al.* (2009) used prevention of live pupae as the end point for mortality. For example, 12,812 pupae emerged from 882 control fruits while no pupae emerged from 2,202 treated fruits (containing an estimated 31,988 flies). The assumption is made that the lack of appearance of live pupae in effect equates to the larval instars being dead.

The TPPT concluded the treatment could not be approved at this time but agreed a letter be sent to the submitter requesting clarification of the variety of mandarin tested and the revision of the ED based on the error associated with estimating the number of treated fruit flies.

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

A Panel reviewer introduced this submission (2ºC or below for 16 days against *C. capitata* in *C. sinensis*). There were questions concerning treatment duration in one replicate that showed a duration >16 days). This finding necessitated recommending that the treatment be amended to 17 days.

The submitter reported the treatment efficacy level in the large scale trials to be ED>99.9968. The large scale trials showed a total of 73,368 fruit flies treated with no survivors, a figure that equates to ED99.9959 at the 95%CL. Although stated that there were no 'practical' differences between the different varieties ($P<0.05$), no analysis of the differences had been presented to substantiate this statement.

The TPPT concluded that the treatment could not be approved at this time and agreed a letter be sent to the submitter requesting specific information regarding the replicate that showed duration longer than the stated treatment time and a revision of the ED based on the error associated with estimating rather than counting directly the number of treated fruit flies in the large scale trials.

18.2.4 Cold treatment for *Ceratitis capitata* on *Citrus sinensis* and *C. reticulata* (2010-104)

This treatment submission, at 2ºC or below for 18 days, is a combination of the two previous submissions 2010-102 (see Section 18.2.2 of this report) and 2010-103 (see Section 18.2.3 of this report), with all three submitted by the same country. The TPPT did not understand why the combination treatment was submitted along with the individual treatments.

The TPPT did not review this treatment submission in detail because it is a duplicate of work already on the TPPT work plan (2007-212 and 2007-206A). The Panel questioned why the submitters had

chosen an 18-day schedule (possibly as a combined schedule for all fruits) as opposed to a 16-day treatment (see Sections 18.2.2 and 18.2.3 of this report).

The TPPT agreed a letter be sent to the submitter informing them of the Panel decision.

18.2.5 Cold disinfestation of Australian mandarins against Queensland fruit fly (2010-105)

The TPPT did not review this submission in detail because a current draft schedule exists for this treatment (*Cold treatment for* Bactrocera tryoni *on* Citrus reticulata *and* C. reticulata *x* C. sinensis, 2007-206F).

The TPPT agreed a letter be sent to the submitter informing them of the Panel decision.

19. TPPT Topics and Priorities for 2010-2011

The TPPT reviewed its topics and priorities for the next year, anticipating that the SC might not meet next year in view of budgetary restraints.

19.1 Review TPPT topics and priorities and continued need for the work

The Panel drafted its 2010 topics and priorities based on new tasks identified in the current meeting and any on-going items (see Appendix 4 to this report). Work includes the following:

- draft summary reports of the TPPT evaluations of each treatment for inclusion in the letter to be sent by the Secretariat to the submitters.
- produce various guidance documents about treatments (such as heat treatments and treatments for soil and growing media) for use by treatment submitters.
- consult and collaborate with other Panels (TPFF and TPFQ) on a number of issues including the use of historical data for determining treatment efficacy, choice of appropriate surrogates for phytosanitary treatment development, and calculation of CT products.
- draft TPPT responses to country comments on fruit fly cold treatments (e.g. based on what was discussed and decided during the meeting).
- review new treatments submitted in response to a call
- follow through on reviews of treatments awaiting receipt of new experimental evidence for support

19.2 Develop a medium term plan of work

The TPPT considered that there would be a continued need for its existence based on the dynamic nature of phytosanitary treatment development and produced a medium term plan of four to five years of work (see Appendix 9 to this report).

20. Other topics from the TPPT specification

20.1 Provide advice to the SC on subjects, topics and priorities for technical standard development relating to phytosanitary treatments and identify areas where further research on treatments is needed.

Call for treatments for soil and growing media

The Panel considered a call for treatments for soil and growing media. There was some discussion as to whether this is premature in view of the fact that many countries do not allow entry of soil and growing media. Further, considering possible budget limitations, the Panel may not meet again for two years. Nonetheless, it was agreed that guidance is needed in this area and the Panel concluded that it should produce a discussion document on the requirements and criteria for evaluation of such treatments.

The SC is invited to:

1. *Advise* the TPPT on how the revision of the membership will be handled because the end of the five-year term for members is in 2013.

2. *Note* the tracking log and its potential value to NPPOs.

3. *Note* the work done on surrogate/substitute species

4. *Note* that the documents on calculation of the CT value will be sent to the TPFQ. The TPPT will work with the TPFQ on fumigation and resolving the open ended guideline for the methyl bromide fumigation schedule in ISPM 15:2009 Annex 1 that allows for extending the 24h exposure period well beyond the treatment schedule.

5. *Note* the discussion on use of historical information to validate efficacy of treatments (Annex) and the request that the report will be made available to TPFF and TPFQ. Note also that the TPPT will request that the TPFF produce a practical example of a data set of historical use information for consideration at the next meeting of the TPPT.

6. *Review* the revised draft irradiation treatments for *Cylas formicarius elegantulus* and *Euscepes postfasciatus* and recommend the treatments to the CPM for adoption.

7. *Approve* for member consultation two wood packaging material treatments for inclusion in ISPM 15:2009 [*Sulfuryl fluoride fumigation of wood packaging material* and *Heat treatment of wood packaging material* (via microwave)] and the Vapour heat treatment of *Cucumis melo* var. reticulata for *Bactrocera cucurbitae*.

8. *Note* that the SC will be asked to approve TPPT responses to member comments on fruit fly cold treatments and the revised draft treatments for CPM by email.

9. *Note* the progress made with the evaluation of heat treatments.

10. *Note* that the TPPT intends to produce a discussion document on guidance for submitters for treatments for soil and growing medium associated with plants and a call for such treatments is proposed after the 2011 TPPT meeting.

11. *Note* that the TPPT will develop guidance material for NPPOs on the application of treatments for fruit fly cold, heat via forced air, vapour heat, and hot water for consideration at the next TPPT meeting.

12. *Note* the work programme and the medium term plan (Annexes 4 and 5 in this report).

13. *Note* that the TPPT will produce a document on the criteria that have been used to evaluate treatments.

14. *Note* that there will be a call for treatments for fruit flies (*Modified atmospheres as a treatment for fruit flies*).

15. *Note* that the Secretariat will send letters to treatment submitters requesting additional information with a due date of 1 February 2011

16. *Note* that treatment submissions where there haw been no response from letters sent the submitter in 2009 will be deleted if there is no response to a final registered letter which will be sent by the Secretariat during 2010.

17. *Note* the TPPT closed five submissions that did not receive responses from the submitters from letters sent in Spring 2010, although two of these may need to be reconsidered in light of decisions on fruit fly cold treatments if information is provided by the submitter.

18. *Note* the TPPT closed three submissions that were either not a treatment (a laboratory procedure) or were duplicate submissions.

19. *Thank* the Government of Japan for hosting and partially funding the 2010 meeting.

21. Date and location of next meeting

Mr Sakamura announced that Japan MAFF would host the 2011 meeting of the TPPT but the specific city and the exact dates would be set at a later time.

APPENDIX 1: Agenda

Report of the meeting of the Technical Panel on Phytosanitary Treatments
26-30 July 2010
Kyoto, Japan
Agenda

Note: The order of priority recommended by the SC is ISPM-15 > fruit fly CTs > fruit fly HTs > IR

Agenda Item		Document Number	Presenter
1	Welcome and opening of the meeting		L Zettler
2	Meeting Information		Host Country
	2.1 Agenda	2010_TPPT_Jul_01	
	2.2 Documents List	2010_TPPT_Jul_02	
	2.3 Participants List	2010_TPPT_Jul_03	
	2.4 Local Information	2010_TPPT_Jul_04	
3	Meeting logistics and arrangements		Host Country
4	Review and adoption of agenda	2010_TPPT_Jul_01	L Zettler
5	Introductions		L Zettler
6	Roles		L Zettler
	6.1 IPPC Secretariat		
	6.2 Steward		
	6.3 Host		
	6.4 Rapporteur		
	6.5 Chair		
7	Selection of Chair		L Zettler
8	Review of the last meeting of the TPPT	2010_TPPT_Jul_85	J Chard
9	Update on CPM and other relevant bodies	2010_TPPT_Jul_80 2010_TPPT_Jul_91	J Chard
	9.1 Agree on TPPT response to member comments on fruit fly cold treatments in order to resolve major issues (*SC Nov 09*)	2010_TPPT_Jul_77 2010_TPPT_Jul_78	J Chard
	9.2 Provide wording for SC on 2 irradiation treatments not adopted at CPM (for *Cylas formicarius* and *Euscepes postfasciatus*) (*SC April 10*)		J Chard
	9.3 Consider work programme and medium term plan (*SC April 10*) (*cover fully at agenda 19?*)		J Chard
	9.4 Specification TP No. 3 for the TPPT	2010_TPPT_Jul_81	J Chard

Agenda Item		Document Number	Presenter
10	Issues arising from relevant bodies		J Chard
11	Update on progress with treatments approved at previous meetings of TPPT		L Zettler
	11.1 Vapor Heat Treatment of *Cucumis melo* var. *reticulatus* (Fresh Netted Melon Fruit) for *Bactrocera cucurbitae* (melon fly) (2006-TPPT-110)	2009_TPPT_33_*(2006-TPPT-Dec-110)-Submission Form* 2009_TPPT_38_*(2006-TPPT-Dec-110)-Checklist Revised* 2010_TPPT_Jul_98 2010_TPPT_Jul_99	J Chard
12	Review of Administrative Procedures		
	12.1 Procedures for the production of phytosanitary treatments		J Chard
	12.2 Submission form		L Zettler
	12.3 Prioritization criteria for proposed phytosanitary treatments and score definitions		J Chard
	12.4 Checklist update		M Ormsby
	12.5 Review of membership for ensuring overlap incoming and outgoing members		J Chard
	12.6 Discussion on how to deal with formal objections submitted to CPM		J Chard
	12.7 TPPT Tracking Log	2010_TPPT_Jul_89	S Dubon
	12.8 TPPT Submissions for Phytosanitary Treatments Numbering and Naming Convention Proposal	2010_TPPT_Jul_90	S Dubon
13	Issues raised at 2009 TPPT meeting		
	13.1 Develop guidelines for choosing a substitute pest for next meeting	2010_TPPT_Jul_79	A Jessup
	13.2 FAO fumigation guide (to determine how useful it is and make a recommendation to the next TPPT meeting)	2010_TPPT_Jul_75	R Cannon
	13.3 Develop paper on how to calculate CT for next meeting	2010_TPPT_Jul_67 2010_TPPT_Jul_67a 2010_TPPT_Jul_92	MG Park MG Park A Jessup
	13.4 Develop paper on how to use historical data to provide level of efficacy for next meeting	2010_TPPT_Jul_73	M Ormsby
14	Overview of treatment submissions	2010_TPPT_Jul-76	L Zettler
15	Consideration of additional information		J Chard

Agenda Item		Document Number	Presenter
16	DELETED from agenda *(fruit fly cold treatments rejected by SC, covered in 12.7)*		
17	Treatments submitted in 2006 or 2007 call for treatments		J Chard
	17.1 ISPM No. 15	2010_TPPT_Jul_100	
	17.1.1 Sulfuryl fluoride – eradication of pests infesting wood packaging material (2007-TPPT-101)	2009_TPPT_07_*(2007-TPPT-101) Submission Form Revised* 2010_TPPT_Jul_82_*Checklist* 2010_TPPT_Jul_87_FinalReport 2010_TPPT_Jul_93 2010_TPPT_Jul_100	M Ormsby
	17.1.2 Ecotwin fumigation of solid wood packaging material for *Bursaphelenchus xylophilus* (pine wood nematode), longhorn beetles and scolytid beetles (2007-TPPT-102)	2009_TPPT_10_*(2007-TPPT-102) Submission Form* 2010_TPPT_Jul_94	S Wood
	17.1.3 Wood preservative for using in hermetically sealed structures (2007-TPPT-103)	2009_TPPT_41_*(2007-TPPT-103) Submission Form* 2010_TPPT_Jul_83_*Checklist*	A Jessup
	17.1.4 Evaluation of microwave irradiation of wood packaging material (2007-TPPT-114)	2009_TPPT_54_*(2007-TPPT-114)_TPPT Summary Report annexed to IPPC response letter sent to submitter in 2008* 2010_TPPT_Jul_84_Checklist 2010_TPPT_Jul_84a_Checklist Report 2010_TPPT_Jul_100	M Ormsby
	17.1.5 Phosphine treatment for invertebrates in wood and wooden products (2007-TPPT-115)	2009_TPPT_39_*(2007-TPPT-115)-Checklist REVISED Phosphine* 2009_TPPT_18_*(2007-TPPT-115)-Submission Form*	W Yuejin
	17.1.6 Methyl iodide treatment for wood packaging (2007-TPPT-116)	2009_TPPT_23_*(2007-TPPT-Dec-116)-Submission Form* 2009_TPPT_24_*(2007-TPPT-Dec-116)-Summary Report in 2008* 2009_TPPT_70_*(2007-TPPT-Dec-116)-Checklist Revised* 2010_TPPT_Jul_95	M Ormsby
	17.2 Fruit Fly (moved to agenda item 11)		
	17.3 Irradiation		

Agenda Item		Document Number	Presenter
	17.3.1 Generic treatment for insects (Arthropoda:Insecta) except lepidopteran pupae and adults (Insecta:Lepidoptera) in any host commodity (2007-TPPT-105)	2009_TPPT_36_*(2007-TPPT-Dec-105)-Submission Form*	R Cannon
18	Treatments submitted in response to 2009 Call		J Chard
	18.1 Heat treatments		
	18.1.1 Heat treatment of zucchini *for Bactocera cucumis* (Australia) (2009-TPPT-101)	2010_TPPT_Jul_05 2010_TPPT_Jul_06 2010_TPPT_Jul_07	S Wood
	18.1.2 Hot air treatment of mangoes var Kensington for Mediterranean and Queensland fruit flies (Australia) (2009-TPPT-102)	2010_TPPT_Jul_08 2010_TPPT_Jul_09 2010_TPPT_Jul_10 2010_TPPT_Jul_11	S Wood
	18.1.3 Vapour heat treatment of mango varieties for Queensland fruit fly (Australia) (2009-TPPT-103)	2010_TPPT_Jul_12 2010_TPPT_Jul_13 2010_TPPT_Jul_14 2010_TPPT_Jul_15	M-G Park
	18.1.4 Vapour heat treatment of tomatoes for *Bactrocera tryoni* (Australia) (2009-TPPT-104)	2010_TPPT_Jul_16 2010_TPPT_Jul_17 2010_TPPT_Jul_18 2010_TPPT_Jul_19 2010_TPPT_Jul_20	M-G Park
	18.1.5 High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) in fruit (New Zealand) (2009-TPPT-105)	2010_TPPT_Jul_21 2010_TPPT_Jul_22 2010_TPPT_Jul_23 2010_TPPT_Jul_24 2010_TPPT_Jul_25 2010_TPPT_Jul_26 2010_TPPT_Jul_27 2010_TPPT_Jul_28 2010_TPPT_Jul_29 2010_TPPT_Jul_30 2010_TPPT_Jul_31 2010_TPPT_Jul_32 2010_TPPT_Jul_33 2010_TPPT_Jul_34 2010_TPPT_Jul_35 2010_TPPT_Jul_36	A Jessup

Agenda Item	Document Number	Presenter
	2010_TPPT_Jul_37	
	2010_TPPT_Jul_38	
	2010_TPPT_Jul_39	
	2010_TPPT_Jul_40	
	2010_TPPT_Jul_41	
	2010_TPPT_Jul_42	
	2010_TPPT_Jul_43	
	2010_TPPT_Jul_44	
	2010_TPPT_Jul_45	
	2010_TPPT_Jul_46	
	2010_TPPT_Jul_47	
	2010_TPPT_Jul_48	
	2010_TPPT_Jul_49	
	2010_TPPT_Jul_50	
	2010_TPPT_Jul_51	
	2010_TPPT_Jul_52	
	2010_TPPT_Jul_53	
	2010_TPPT_Jul_54	
	2010_TPPT_Jul_55	
	2010_TPPT_Jul_56	
	2010_TPPT_Jul_64-*Checklist*	
	2010_TPPT_Jul_74	
18.1.6 Heat treatment for Cook Island fruit fly and Pacific fruit fly in Waimanalo papaya in the Cook Islands (PPPO) (2009-TPPT-106)	2010_TPPT_Jul_57	A Jessup
	2010_TPPT_Jul_58	
	2010_TPPT_Jul_59	
	2010_TPPT_Jul_65-*Checklist*	
18.1.7 Thermal conditioning in *Bactrocera tryoni* eggs (Diptera:Tephritidae) following Hot water immersion (PPPO) (2009-TPPT-107)	2010_TPPT_Jul_60	A Jessup
	2010_TPPT_Jul_61	
	2010_TPPT_Jul_66-*Checklist*	
18.1.8 Vapor Heat Treatment for Fresh Mango (*Mangifera indica*) var. Manila Super (Syn. Carabao mango) (2009-TPPT-108)	2010_TPPT_Jul_62	M Mizobuchi
	2010_TPPT_Jul_68	
18.1.9 Vapor Heat Treatment for Fresh Papaya var. Solo (*Carica papaya*) (Philippines) (2009-TPPT-109)	2010_TPPT_Jul_63	A Baxter
	2010_TPPT_Jul_97	
18.1.10 Vapour heat treatment against fruit flies (Oriental fruit fly *Bactrocera dorsalis*, Melon fruit fly *B. cucurbitae*, Peach fruit fly *B. zonata*, Guava fruit fly *B. correcta* and *B. tau*) on mango (India) (2006-TPPT-132)	2010_TPPT_Jul_88-Checklist	R Cannon
	2006_TPPT_132-Submission Form	
18.2 Fruit fly cold treatments	2010_TPPT_Jul_101-*Submission Form*	M-G Park

Agenda Item		Document Number	Presenter
	18.2.1 Cold treatment of *Citrus paradisi* for Mediterranean fruit fly (Turkey) (2010-TPPT-101)	2010_TPPT_Jul_69	
	18.2.2 Cold treatment of *Citrus reticulata* and their hybrids for medfly (*Ceritatis capitata* Wied) (Spain) (2010-TPPT-102)	2010_TPPT_Jul_102-*Submission form* 2010_TPPT_Jul_102-*Supporting doc-1* 2010_TPPT_Jul_70	M Mizobuchi
	18.2.3 Cold treatment of *Citrus sinensis* for Medfly (*Ceritatis capitata* Wied) (Spain) (2010-TPPT-103)	2010_TPPT_Jul_103-*Submission form* 2010_TPPT_Jul_103-*Supporting doc-1* 2010_TPPT_Jul_103-*Supporting doc-2* 2010_TPPT_Jul_71 - Checklist	M Mizobuchi
	18.2.4 Cold treatment of *Citrus sinensis* and *Citrus reticulata* for Medfly (*Ceritatis capitata* Wied) (Spain) (2010-TPPT-104)	2010_TPPT_Jul_104-*Submission form* 2010_TPPT_Jul_*104-Supporting doc-1* 2010_TPPT_Jul_72	M Mizobuchi
	18.2.5 Cold disinfestation of Australian mandarins against Queensland fruit fly (Australia) (2010-TPPT-105)	2010_TPPT_Jul_105-*Submission form* 2010_TPPT_Jul_105-*Supporting doc-1* 2010_TPPT_Jul_96	S Wood
19	Work programme for 2010-11		J Chard
	19.1 Review work programme and continued need for the work	*Task from the SC*	J Chard
	19.2 Develop a medium term plan	*Task from the SC*	J Chard
20	Other tasks from specification for TPPT	2010_TPPT_Jul_80	J Chard
	20.1 Provide advice to the SC on subjects, topics and priorities for technical standard development relating to phytosanitary treatments and identify areas where further research on treatments is needed. (*All members*)	2010_TPPT_Jul_86	M Ormsby
21	Date and location of next meeting		L Zettler
22	Close of meeting		J Chard

APPENDIX 2: Documents List

Report of the meeting of the Technical Panel on Phytosanitary Treatments
26-30 July 2010
Kyoto, Japan
Documents List

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2006_TPPT_132	18.1.10	Submission Form - Vapour heat treatment against fruit flies (Oriental fruit fly *Bactrocera dorsalis*, Melon fruit fly *B. cucurbitae*, Peach fruit fly *B. zonata*, Guava fruit fly *B. correcta* and *B. tau*) on mango (India) (2006-TPPT-132)	15 July 2010
2009_TPPT_07	17.1.1	*(2007-TPPT-101)-Submission Form Revised:* Sulfuryl fluoride - eradication of pests infesting wood packaging material	09 July 2010
2009_TPPT_10	17.1.2	*(2007-TPPT-102)-Submission Form:* Ecotwin fumigation of solid wood packaging material for *Bursapelenchus xylophilus* (pine wood nematode), longhorn beetles and scolytid beetles	12 July 2010
2009_TPPT_18	17.1.5	*(2007-TPPT-115)- Submission Form* Phosphine treatment for invertebrates in wood and wooden products	12 July 2010
2009_TPPT_23	17.1.6	*(2007-TPPT-Dec-116)-Submission Form* Methyl iodide treatment for wood packaging	13 July 2010
2009_TPPT_24	17.1.6	*(2007-TPPT-Dec-116)-Summary Report in 2008* Methyl iodide treatment for wood packaging	13 July 2010
2009_TPPT_33	11	*(2006-TPPT-Dec-110)-Submission Form:* Vapor Heat Treatment of *Cucumis melo* var. *reticulatus* (Fresh Netted Melon Fruit) for *Bactrocera cucurbitae* (melon fly)	13 July 2010
2009_TPPT_36	17.3.1	*(2007-TPPT-Dec-105)-Submission Form:* Generic treatment for insects (Arthropoda:Insecta) except lepidopteran pupae and adults (Insecta:Lepidoptera) in any host commodity	12 July 2010
2009_TPPT_38	11	*(2006-TPPT-Dec-110)-CheckList Revised:* Vapor Heat Treatment of *Cucumis melo* var. *reticulatus* (Fresh Netted Melon Fruit) for *Bactrocera cucurbitae* (melon fly)	13 July 2010
2009_TPPT_39	17.1.5	*(2007-TPPT-115)-Checklist REVISED* Phosphine treatment for invertebrates in wood and wooden products	12 July 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2009_TPPT_41	17.1.3	*(2007-TPPT-103)-Submission Form:* Wood preservative for using in hermetically sealed structures	12 July 2010
2009_TPPT_54	17.1.4	*(2007-TPPT-114)_TPPT Summary Report annexed to IPPC response letter sent to submitter in 2008:* Evaluation of microwave irradiation of wood packaging material	12 July 2010
2009_TPPT_70	17.1.6	*(2007-TPPT-Dec-116)-Checklist Revised* Methyl iodide treatment for wood packaging	13 July 2010
2010_TPPT_Jul_01	2.1, 4	Provisional agenda	19 May 2010
2010_TPPT_Jul_02	2.2	Documents list	19 May 2010
2010_TPPT_Jul_03	2.3	Participants list	17 May 2010
2010_TPPT_Jul_04	2.4	Local information	17 May 2010
2010_TPPT_Jul_05	18.1.1	Heat treatment of zucchini for *Bactocera cucumis* (Australia)	17 May 2010
2010_TPPT_Jul_06	18.1.1	Checklist - Heat treatment of zucchini for *Bactocera cucumis* (Australia)	17 May 2010
2010_TPPT_Jul_07	18.1.1	Corcoran et al 1993	17 May 2010
2010_TPPT_Jul_08	18.1.2	Hot air treatment of mangoes var Kensington for Mediterranean and Queensland fruit flies (Australia)	17 May 2010
2010_TPPT_Jul_09	18.1.2	Checklist - Hot air treatment of mangoes var Kensington for Mediterranean and Queensland fruit flies (Australia)	17 May 2010
2010_TPPT_Jul_10	18.1.2	Jacomi et al 2001	17 May 2010
2010_TPPT_Jul_11	18.1.2	Heard et al 1992	17 May 2010
2010_TPPT_Jul_12	18.1.3	Vapour heat treatment of mango varieties for Queensland fruit fly (Australia)	17 May 2010
2010_TPPT_Jul_13	18.1.3	Checklist - Vapour heat treatment of mango varieties for Queensland fruit fly (Australia)	17 May 2010
2010_TPPT_Jul_14	18.1.3	Corcoran et al 2000	17 May 2010
2010_TPPT_Jul_15	18.1.3	Corcoran et al 1999	17 May 2010
2010_TPPT_Jul_16	18.1.4	Vapour heat treatment of tomatoes for *Bactrocera tryoni* (Australia)	17 May 2010
2010_TPPT_Jul_17	18.1.4	Checklist - Vapour heat treatment of tomatoes for *Bactrocera tryoni* (Australia)	17 May 2010
2010_TPPT_Jul_18	18.1.4	Heather et al 2002	17 May 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2010_TPPT_Jul_19	18.1.4	Corcoran et al 1998	17 May 2010
2010_TPPT_Jul_20	18.1.4	Heather et al 1997	17 May 2010
2010_TPPT_Jul_21	18.1.5	High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) in fruit (New Zealand)	17 May 2010
2010_TPPT_Jul_22	18.1.5	Alderson et al 1999	17 May 2010
2010_TPPT_Jul_23	18.1.5	Armstrong 1990	17 May 2010
2010_TPPT_Jul_24	18.1.5	Armstrong et al 1989	17 May 2010
2010_TPPT_Jul_25	18.1.5	Armstrong et al 1995	17 May 2010
2010_TPPT_Jul_26	18.1.5	Clare 1997	17 May 2010
2010_TPPT_Jul_27	18.1.5	Economopoulos et al 2007	17 May 2010
2010_TPPT_Jul_28	18.1.5	Foliaki and Armstrong 1997	17 May 2010
2010_TPPT_Jul_29	18.1.5	Gaffney and Armstrong 1990	17 May 2010
2010_TPPT_Jul_30	18.1.5	Gazit et al 2004	17 May 2010
2010_TPPT_Jul_31	18.1.5	Hallman 2000	17 May 2010
2010_TPPT_Jul_32	18.1.5	Jacobi et al 2001	17 May 2010
2010_TPPT_Jul_33	18.1.5	Mangan and Ingle 1992	17 May 2010
2010_TPPT_Jul_34	18.1.5	Mangan and Ingle 1994	17 May 2010
2010_TPPT_Jul_35	18.1.5	Mangan et al 1998	17 May 2010
2010_TPPT_Jul_36	18.1.5	Neven 2000	17 May 2010
2010_TPPT_Jul_37	18.1.5	Gould 1994	17 May 2010
2010_TPPT_Jul_38	18.1.5	Hallman and Armstrong 1994	17 May 2010
2010_TPPT_Jul_39	18.1.5	Mangan and Hallman 1998	17 May 2010
2010_TPPT_Jul_40	18.1.5	Nishijima et al 1992	17 May 2010
2010_TPPT_Jul_41	18.1.5	Waddell et al 1993	17 May 2010
2010_TPPT_Jul_42	18.1.5	Obenland et al 1999	17 May 2010
2010_TPPT_Jul_43	18.1.5	Sales et al 1997	17 May 2010
2010_TPPT_Jul_44	18.1.5	Sharp and Gould 1994	17 May 2010
2010_TPPT_Jul_45	18.1.5	Sharp and Hallman 1992	17 May 2010
2010_TPPT_Jul_46	18.1.5	Sharp 1992	17 May 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2010_TPPT_Jul_47	18.1.5	Sharp 1993	17 May 2010
2010_TPPT_Jul_48	18.1.5	Sharp 1994	17 May 2010
2010_TPPT_Jul_49	18.1.5	Shellie and Mangan 1995	17 May 2010
2010_TPPT_Jul_50	18.1.5	Shellie and Mangan 2000	17 May 2010
2010_TPPT_Jul_51	18.1.5	Shellie and McGuire 1996	17 May 2010
2010_TPPT_Jul_52	18.1.5	Shellie et al 1993	17 May 2010
2010_TPPT_Jul_53	18.1.5	Thomas and Shellie 2000	17 May 2010
2010_TPPT_Jul_54	18.1.5	Tora Vueti et al 1997	17 May 2010
2010_TPPT_Jul_55	18.1.5	Waddell et al 1997	17 May 2010
2010_TPPT_Jul_56	18.1.5	Waddell et al 1997	17 May 2010
2010_TPPT_Jul_57	18.1.6	Heat treatment for Cook Island fruit fly and Pacific fruit fly in Waimanalo papaya in the Cook Islands (PPPO)	17 May 2010
2010_TPPT_Jul_58	18.1.6	Waddell et al 1997	17 May 2010
2010_TPPT_Jul_59	18.1.6	Clare 1997	17 May 2010
2010_TPPT_Jul_60	18.1.7	Thermal conditioning in *Bactrocera tryoni* eggs (Diptera:Tephritidae) following Hot water immersion (PPPO)	17 May 2010
2010_TPPT_Jul_61	18.1.7	Waddell et al 2000	17 May 2010
2010_TPPT_Jul_62	18.1.8	Vapor Heat Treatment for Fresh Mango (Mangifera indica) var. Manila Super (Syn. Carabao mango)	17 May 2010
2010_TPPT_Jul_63	18.1.9	Vapor Heat Treatment for fresh papaya var. solo (Carica papaya)	16 July 2010
2010_TPPT_Jul_64	18.1.5	Checklist: High temperature forced air treatment for selected fruit fly species (Diptera: Tephritidae) in fruit (New Zealand)	24 May 2010
2010_TPPT_Jul_65	18.1.6	Checklist: Heat treatment for Cook Island fruit fly and Pacific fruit fly in Waimanalo papaya in the Cook Islands (PPPO)	24 May 2010
2010_TPPT_Jul_66	18.1.7	Checklist: Thermal conditioning in *Bactrocera tryoni* eggs (Diptera:Tephritidae) following Hot water immersion (PPPO)	24 May 2010
2010_TPPT_Jul_67	13.3	Calculation of Ct Products – Park	24 May 2010
2010_TPPT_Jul_67a	13.3	Calculation of Ct Products – Park revised	26 July 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2010_TPPT_Jul_68	18.1.8	Checklist for evaluating Vapour heat treatment of mango varieties for Queensland fruit fly	08 July 2010
2010_TPPT_Jul_69	18.2.1	Checklist for evaluating Cold treatment of *Citrus paradisi* for Mediterranean fruit fly	08 July 2010
2010_TPPT_Jul_70	18.2.2	Checklist for evaluating Cold treatment of *Citrus reticulata* and their hybrids for medfly (*Ceritatis capitata* Wied)	08 July 2010
2010_TPPT_Jul_71	18.2.3	Checklist for evaluating Cold treatment of *Citrus sinensis* for Medfly (*Ceritatis capitata* Wied)	08 July 2010
2010_TPPT_Jul_72	18.2.4	Checklist for evaluating Cold treatment of *Citrus sinensis* and *Citrus reticulata* for Medfly (*Ceritatis capitata* Wied)	08 July 2010
2010_TPPT_Jul_73	13.4	Develop paper on how to use historical data to provide level of efficacy for next meeting	08 July 2010
2010_TPPT_Jul_74	18.1.5	Yahia and Ariza 2003	17 May 2010
2010_TPPT_Jul_75	13.2	Information regarding FAO fumigation guide	17 May 2010
2010_TPPT_Jul_76	14	Treatments identified as potential submissions at TPPT meeting in 2007	17 May 2010
2010_TPPT_Jul_77	9.1	General comments and other major points for TPPT discussion on fruit fly cold treatments	19 May 2010
2010_TPPT_Jul_78	9.1	Discussion document on possible layout of schedules for fruit fly cold treatments	19 May 2010
2010_TPPT_Jul_79	13.1	Develop guidelines for choosing a substitute pest for next meeting	08 July 2010
2010_TPPT_Jul_80	9	Items of relevance and decisions from the reports of the Standards Committee and the fifth meeting of the Commission on Phytosanitary Measures since the 2009 TPPT meeting	08 July 2010
2010_TPPT_Jul_81	9.4	Specification No. TP 3 for the TPPT	09 July 2010
2010_TPPT_Jul_82	17.1.1	Checklist: Sulfuryl Flouride eradication of pests infesting wood packaging material	14 July 2010
2010_TPPT_Jul_83	17.1.3	Checklist: Wood Preservative for using in hermetically sealed structures	27 July 2010
2010_TPPT_Jul_84	17.1.4	Checklist: Evaluation of microwave irradiation of wood packaging material	14 July 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2010_TPPT_Jul_84a	17.1.4	Report supporting Checklist: Evaluation of microwave irradiation of wood packaging material	26 July 2010
2010_TPPT_Jul_85	8	2009 TPPT Meeting Report	14 July 2010
2010_TPPT_Jul_86	20	Ramsfield et al 2010: Heat Treatment of Fungi in Wood	30 July 2010
2010_TPPT_Jul_87	17.1.1	Final Report: Sulfuryl Flouride eradication of pests infesting wood packaging material	26 July 2010
2010_TPPT_Jul_88	18.1.10	Checklist: Vapour heat treatment against fruit flies (Oriental fruit fly *Bactrocera dorsalis*, Melon fruit fly *B. cucurbitae*, Peach fruit fly *B. zonata*, Guava fruit fly *B. correcta* and *B. tau*) on mango (India) (2006-TPPT-132)	15 July 2010
2010_TPPT_Jul_89	12.7	TPPT Tracking Log	15 July 2010
2010_TPPT_Jul_90	12.8	TPPT Submissions for Phytosanitary Treatments Numbering and Naming Convention Proposal	15 July 2010
2010_TPPT_Jul_91	9	Annex to Items of relevance and decisions from the reports of the Standards Committee and the fifth meeting of the Commission on Phytosanitary Measures since the 2009 TPPT meeting	26 July 2010
2010_TPPT_Jul_92	13.3	CT Calculation – A Jessup	26 July 2010
2010_TPPT_Jul_93	17.1	Draft Appendix to ISPM 15: 2009 – Submission of new treatments for inclusion in ISPM 15 (draft for 2010 IPPC Member Consultation)	26 July 2010
2010_TPPT_Jul_94	17.1.2	Ecotwin – Comments from Letters to submitter	26 July 2010
2010_TPPT_Jul_95	17.1.6	Methyl Iodide - Comments from Letters to submitter	26 July 2010
2010_TPPT_Jul_96	18.2.5	Checklist: Cold disinfestations (2010-TPPT-Jul-105)	28 Jul 2010
2010_TPPT_Jul_97	18.1.9	Checklist: Vapor Heat Treatment for fresh papaya var. solo (*Carica papaya*)	29 July 2010
2010_TPPT_Jul_98	11.1	Checklist: Vapor Heat Treatment of *Cucumis melo* var. *reticulatus* for *Bactrocera cucurbitae*	29 July 2010
2010_TPPT_Jul_99	11.1	Summary: Vapor Heat Treatment of *Cucumis melo* var. *reticulatus* for *Bactrocera cucurbitae*	29 July 2010

Document Number	Agenda Item	Document Title	Date Posted/ Distributed
2010_TPPT_Jul_100	17.1	Summary report for ISPM 15 – Sulfuryl fluoride and Microwave	30 July 2010
2010_TPPT_Jul_101-Submission Form	18.2.1	Cold treatment of *Citrus paradisi* for Mediterranean fruit fly (Turkey)	17 May 2010
2010_TPPT_Jul_102-Submission form	18.2.2	Cold treatment of *Citrus reticulata* and their hybrids for medfly (*Ceritatis capitata* Wied) (Spain)	17 May 2010
2010_TPPT_Jul_102-Supporting doc-1	18.2.2	Santaballa et al 2009	17 May 2010
2010_TPPT_Jul_103-Submission form	18.2.3	Cold treatment of *Citrus sinensis* for Medfly (*Ceritatis capitata* Wied) (Spain)	17 May 2010
2010_TPPT_Jul_103-Supporting doc-1	18.2.3	Santaballa et al 1995	17 May 2010
2010_TPPT_Jul_103-Supporting doc-2	18.2.3	Laborda et al 1997	17 May 2010
2010_TPPT_Jul_104-Submission form	18.2.4	Cold treatment of *Citrus sinensis* and *Citrus reticulata* for Medfly (*Ceritatis capitata* Wied) (Spain)	17 May 2010
2010_TPPT_Jul_104-Supporting doc-1	18.2.4	De Lima et al 2007	17 May 2010
2010_TPPT_Jul_105-Submission form	18.2.5	Cold disinfestation of Australian mandarins against Queensland fruit fly (Australia)	17 May 2010
2010_TPPT_Jul_105-Supporting doc-1	18.2.5	De Lima et al 2007	17 May 2010

APPENDIX 3: Participants List

Report of the meeting of the Technical Panel on Phytosanitary Treatments

26-30 July 2010

Kyoto, Japan

Participants List

Participant role	Name, mailing, address, telephone	Email address	Term expires
Steward	Ms. Jane Chard Scottish Agricultural Science Agency 1 Roddinglaw Road Edinburgh EH12 9FJ United Kingdom Tel: (+44) 131 2448863	jane.chard@sasa.gsi.gov.uk;	N/A
Member	Ms. Alice Baxter Assistant Director, Directorate Plant Health Department of Agriculture Private Bag X258 Pretoria 0001 South Africa Tel: +27-12-3196114 Fax: +27-12-3196580	AliceB@nda.agric.za;	2013
Member	Mr. Ray Cannon Central Science Laboratory Sand Hutton York YO41 1LZ United Kingdom Tel: +44 (0)1904 462218	r.cannon@csl.gov.uk;	2013
Member	Mr. Andrew Jessup Insect Pest Control Sub-programme FAO/IAEA Agriculture and Biotechnology Laboratory IAEA Laboratories, A-2444 Seibersdorf, Austria Tel: +43-1-2600-28413 Fax: +43-1-2600-28222	a.jessup@iaea.org;	2014
Member	Mr. Mohammad Katbeh Bader Head of Phytosanitary Department Ministry of Agriculture P.O. Box 11732, Area code 662 Amman Jordan Tel: +962 6 5686151(Office) +962 6 79 5895691 (Mobile) Fax: +962 6 5686310	katbehbader@moa.gov.jo;	2013

Participant role	Name, mailing, address, telephone	Email address	Term expires
Member	Mr. Mitsusada Mizobuchi Chief Officer of Narita Sub-station Yokohama Plant Protection Station Ministry of Agriculture, forestry and Fisheries 1-1, Furukome-aza-Furukome, Narita-shi, Chiba Japan Tel: +81 476 34 2350 Fax: +81 476 34 2354	mizobuchim@pps.maff.go.jp;	2013
Member	Mr. Michael Ormsby Senior Adviser, Plant Risk Analysis Biosecurity New Zealand Ministry of Agriculture & Forestry P.O Box 2526, Wellington, New Zealand Tel: +64 4 8940486 Fax: +62 4 8940733	Michael.Ormsby@maf.govt.nz;	2013
Member	Mr. Min-Goo Park Division of Pest survey and Control National Plant Quarantine Service Ministry of Agriculture and Forestry Anyang-6 dong, Anyang city, Gyeonggi Prov. P.O. 430-016 Republic of Korea Ph: +82 31 441 6982 Fax: +82 31 468 5814	mgpark@npqs.go.kr;	2014
Member	Mr. Eduardo Willink Estación Experimental Agroindustrial Obispo Colombres, P.O.Box 9, Las Talitas (4101) Tucumán Argentina Tel: + 54 381-4276561 int. 154	ewillink@eeaoc.org.ar; ewillink@arnet.com.ar;	2013
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; Fax: +1 919 855 7480	Scott.Wood@aphis.usda.gov;	2013

Participant role	Name, mailing, address, telephone	Email address	Term expires
Member	Mr. Wang Yuejin Institute of Inspection Technology and Equipment Chinese Academy of Inspection and Quarantine No. 241 Huixinli, Chaoyang District, Beijing 100029 China Tel: +86-10-64934647 Fax: +86-10-64934647	wangyuejin@263.net.cn;	2013
Host country representative	Mr. Motoi SAKAMURA Director of Plant Protection Office Plant Protection Division Ministry of Agriculture, forestry and Fisheries 1-2-1, Kasumigaseki, Chiyoda-Ku, Tokyo 100-8950 Japan Tel: +81 3 3502 5978 Fax: +81 3 3502 3386	motoi_sakamura@nm.maff.go.jp;	N/A
Host organization representative	Mr. Hisashi SAKATA Deputy Director Plant Protection Division Ministry of Agriculture, forestry and Fisheries 1-2-1, Kasumigaseki, Chiyoda-Ku, Tokyo 100-8950 Japan Tel: +81 3 3502 5978 Fax: +81 3 3502 3386	hisashi_sakata2@nm.maff.go.jp;	N/A
IPPC Secretariat	Larry Zettler 920 Rahn Station Rd Rincon, GA 31326 USA Tele: (1) 912-754-9907 Mobile: (1) 912-547-9677	Larry.Zettler@fao.org;	N/A
IPPC Secretariat	Stephanie Dubon FAO Plant Protection Service (AGPP) Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla 00153 Rome Italy Tel: +39 06 5705 3806 Fax: +39 06 5705 4819	Stephanie.Dubon@fao.org;	N/A

APPENDIX 4: 2010-2011 TPPT Medium Term Topics and Priorities

2010-2011 Intersession TPPT Work Program

2010	General	Treatments recommended at 2006 and 2007 TPPT meeting	Treatments being developed from 2009 and 2010 TPPT meeting
August	6 Secretariat to post new and revised docs on IPP. Also missing documents on IPP. 13 Sect to send to SC revised two irradiation treatments (footnote added). 16 Rapporteur to submit draft meeting report/notes to Secretariat 31 Secretariat to submit via email consultation TPPT recommended treatments to SC: SF, Microwaves, Vapor Heat Treatment of Cucumis melo var. reticulata for Bactrocera cucurbitae, CTs	31 Leads to provide draft summary reports for letters and submit to Sect: SF – Ormsby Ecotwin – Wood HCN - Jessup Methyl Iodide - Ormsby Egypt (CT peach fruit fly) - Wood	31 Leads to provide draft summary reports for letters and submit to Sect: Cold Treatment (Turkey) - Park Spain (CT) - Mizobuchi Australia (VHT) – Wood and Park
Sept	1 Sect to send to Sect. Lead for TPFF and TPFQ Ormsby Historical data paper and request the TPFF to provide a worked example for the TPPT to discuss at the 2011 TPPT Meeting 1 TPFQ (TPPT to work with TPFQ on ISPM 15 Annex 1 timing (24 hour) for MeBr treatment, fumigation guidance) 3 Secretariat to send draft meeting report to steward for approval 16 Secretariat to send draft meeting report to TPPT 21 TPPT to send comments on draft meeting report to Secretariat 30 Sect to draft letters to Australia (duplicate, 18.2.5), Philippines (18.1.8, 18.1.9), and separating VHT for C capitata and B tryoni on mangoes (2010_TPPT_Jul_09), Phosphine to NZ,	1 Jane and Ray to develop first draft of responses to MC for CT and revised draft treatments 30 Sect to send draft letters and summary report to TPPT for approval	30 Sect to send draft letters and summary report to TPPT for approval

2010	General	Treatments recommended at 2006 and 2007 TPPT meeting	Treatments being developed from 2009 and 2010 TPPT meeting
Oct	1 Secretariat to post meeting report publicly on IPP (before TPFF meeting) 1 Draft responses to MC for CT to TPPT for review 24 Sect to send MC on CT to SC 31 Sect to send letters to submitters with due date of 1 Feb 2011	1 Small group (Mizobuchi, Willink, Cannon, Baxter) to finalize draft responses to MC for CT 21 TPPT to send draft comments on draft letters and summary reports 21 TPPT to send responses to MC on CT to steward	21 TPPT to send comments on draft letters and summary reports to Sect
Nov	1-5 SC Meeting	15 Cannon to respond to 2010 MC comments on Irradiation, send to Sect.	
Dec	31 Sect to clean up IPP		
Feb 2011	1 Receipt of data from submitters – Sect to forward to leads to revise checklists		1 Cannon and Jessup to provide discussion document on guidance for submitting treatment soil and growing media associated with plants
April 2011		31 Leads submit completed checklists to Sect	
May 2011	7 Sect posts checklists on IPP	31 Develop guidance for NPPOs Guidance document/checklist: CT (Jessup, Willink, Baxter), VHT (Park, Mizobuchi), HTFA (Ormsby), HW (Cannon, Wood) 31 Ormsby to draft a TPPT guidance document on criteria used by TPPT to evaluate different types of treatments (from summary reports)	31 Jessup to develop discussion paper on a position on hot air treatment for multiple insects, fruits, etc.

APPENDIX 5: Summary Report for Vapour heat treatment *Cucumis melo* var. *reticulatus* for *Bactrocera cucurbitae*

Summary report of the Technical Panel on Phytosanitary Treatment's evaluation of vapour heat treatment *Cucumis melo* var. *reticulatus* for *Bactrocera cucurbitae* (2006-110)

(Prepared by the TPPT on 30 July 2010)

1. Introduction

A treatment submission proposal was submitted for a vapour heat treatment of fresh netted melon fruit for melon fly (*Bactrocera cucurbitae*) in response to the call for phytosanitary treatments in 2006. The Technical Panel on Phytosanitary Treatments (TPPT) reviewed the submission at its meeting in December 2006 and requested additional information for further consideration. The requested information on the practical application of the treatment under operational conditions was received from the submitter in 2008. At its meeting in January 2009, the TPPT evaluated it and recommended the vapour heat treatment of *Cucumis melo* var. *reticulatus* for *Bactrocera cucurbitae* to the SC for the SC to approval and e for member consultation.

2. 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). It recommended a number of principles that should be applied when evaluating temperature treatments for adoption as international standards (outlined below).

2.1 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.

2.2 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.

2.3 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.

2.4 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.

2.5 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.

2.6 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.

3. Detailed considerations for the fruit fly vapour heat treatment

The TPPT noted that the experimental research for this submission was based on the cultivar Earl's Favourite for all tests.

The TPPT noted that a large number of insects (58,000 individuals) were used in this submission, although from only 30 artificially infested fruits were employed. but in review of the research presented, the TPPT were satisfied that a satisfactory high 99.99% kill level of mortality ($ED_{99.9922}$48% at the 95% confidence level) was attained based on estimated insects treated per fruit from reps 2, 3, and 4 as in Table 2 (Iwata et al 1990). The most tolerant life stage was identified as the one day egg. The TPPT would have preferred to have that the experiment utilised more than the 30 infested fruits, but noted were satisfied that it was expedient to use a high egg load per fruit when there was no damage to fruit during the experimental procedures.,

The TPPT noted that this treatment was used domestically for about three to five years, prior to the eradication of the Melon fly from Japan in 1993, a fact that provided additional support for the effectiveness of the treatment. The TPPT also recognised that vapour heat treatments are used by NPPOs for the same pest on other fruits.

The TPPT noted that the ramp-up warming and post-treatment cooling were important parts aspects of the treatment and the TPPT decided that these parameters should be included in the treatment schedule. Since this treatment was done under ambient post-treatment cooling, the TPPT recommended that the schedule should be limited to this method.

The TPPT recognised that vapour heat treatments are used by NPPOs for the same pest on other fruits.

The treatment schedule was approved by the TPPT.

4. REFERENCES

Hallman, G.J. & Mangan, R.L. 1997. Concerns with temperature quarantine treatment research. *In* G.L. Obenauf, ed. *1997 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reduction*, San Diego, CA, USA, Nov 3–5. pp. 79-1–79-4.

Iwata, M., Sunagawa, K., Kume, K., & Ishikawa, A. 1990. Efficacy of vapour heat treatment on netted melon infested with melon fly, *Dacus cucurbitae*. *Research Bulletin of the Plant Protection Service*, Japan No. 26, 45-49.

APPENDIX 6: Surrogate Species

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 responds 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

Selected References

ASTM. 2002. Standard Terminology Relating to Biological Effects and Environmental Fate. Standard E 943-00 in: *Annual Book of Standards. Vol. 11.05 Biological Effects and Environmental Fate; Biotechnology; Pesticides.* ASTM International, West Conshohocken, PA

Ormsby, M. 2009. Developing phytosanitary treatments for international trade. *In*: IUFRO International Forest Biosecurity Conference Incorporating the 6th International Forest Vegetation Management Conference. 16-20 March 2009, Rotorua, New Zealand *Eds*: Margaret Richardson, Carolyn Hodgson, Adrienne Forbes. New Zealand Forest Research Institute Limited.

Raimondo, S., Vivian, D.N., and Barron, M.G. 2010. Web-based Interspecies Correlation Estimation (Web-ICE) for Acute Toxicity: User Manual. Version 1.1. EPA/600/R-10/004. Gulf Breeze, FL.

Wenger, S. J. 2008. Use of Surrogates to Predict the Stressor Response of Imperiled Species. *Conservation Biology*, 22(6):1564–1571.

APPENDIX 7: Summary Report for evaluation of wood packaging material treatments

Summary Report for the TPPT's evaluation of wood packaging material treatments

1. Introduction

At its meeting in July 2010, the TPPT evaluated 6 treatment submissions for wood packaging material and recommended two treatments for the SC to approve for member consultation. All of the evaluated treatments were submitted in response to a call for wood packaging material treatments following the criteria laid out in ISPM 15: 2002 in 2006 and 2007.

At its November meeting in 2008, the Standards Committee agreed the following criteria (established for wood packaging material treatments included in ISPM 15:2002) should be used for all treatments submitted in response to the 2006 and 2007 call for treatments, when considering wood packaging material treatment suitability for inclusion in ISPM No. 15:2009

"…. that for inclusion in ISPM 15:2009 [*the treatment*] should be evaluated for equivalence to the current ISPM 15:2002 methyl bromide treatment in the following manner. It must be demonstrated in compliance with ISPM 28:2007 and to be at least 99.99683% effective against *Anoplophora glabripennis* (Asian longhorn beetle) and *Bursaphelenchus xylophilus* (Pinewood nematode) or appropriate surrogates."

The Technical Panel on Forest Quarantine also considered that the treatments should be generally accepted to be effective against most invertebrate forestry pests likely to be associated with wood packaging material.

2. Wood packaging material treatments

2.1 General considerations for wood fumigation treatments

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

2.1.1 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.

2.1.2. 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.

2.1.3 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.

2.2 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).

2.2.1 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.

2.2.2. 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.

2.2.3 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.

2.2.4 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.

2.2.5 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.

2.2.6 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.

2.3 Detailed considerations for wood packaging material treatments

The panel came to the following specific conclusions regarding the recommended treatment submissions. They are recorded in the order of consideration by the TPPT.

2.3.1 Sulfuryl Fluoride fumigation

The TPPT first evaluated this treatment in July 2007 and considered that evidence from published papers, commercial reports and experience with years of use supported the conclusion that fumigation with Sulfuryl fluoride was effective against most invertebrate forestry pests likely to be associated with wood packaging material. The panel also considered that Barak *et al.* (2006) had established that Sulfuryl fluoride fumigation was at least 99.99683% effective against *Anoplophora glabripennis* (Asian longhorn beetle) life stages found in debarked wood. However the panel requested the submitter provide further information on the following aspects considered potential critical to treatment efficacy:

- The TPPT could not determine the level of efficacy of this treatment against *Bursaphelenchus xylophilius* (Pine wood nematode) as no information was provided on either the numbers of test individuals required to demonstrate statistically the target efficacy level, or through fitting dose-response data to known mortality curves.
- Levels of resistance may vary significantly between life stages, and ratios of life stages in wood may also vary. The submission did not provide information demonstrating which life stage of *B. xylophilius* was most resistant to Sulfuryl fluoride fumigation, and which life stages are most likely to be present in wood packaging material during the most likely period of treatment application.

- An incubation period is important for the efficacy of mortality testing of *B. xylophilius*. Mortality should be measured using a Baermann funnel at 6 and 21 days (of incubation) after treatment. The submission did not indicate how long after treatment the mortality measurements were made.

The treatment was re-submitted with the requested information. Based on a report by Sousa *et al.* (2010), the panel considered that evidence for 99.99683% efficacy against *Bursaphelenchus xylophilus* (Pinewood nematode) supported a partial schedule. The two schedules recommended by TPPT are:

- 3200 minimum target CT dosage (g-h/m^3) over 24 hours between 15^OC and 17.9^OC;
- 1400 minimum target CT dosage (g-h/m^3) over 24 hours for 30^OC and above.

The TPPT also considered a number of other conditions were also required for application of these schedules, including a limitation of wood cross section to 20 cm, debarking before treatment, and other operational requirements.

While the data supplied did not support the proposed schedules between 17.9^OC and 30^OC, the panel considered this partial schedule would be of value.

2.3.2 Microwave Treatment

The TPPT first evaluated this treatment in July 2007 and considered that a treatment using dielectric heating (microwaves) is a type of heat treatment. As such the panel considered the large volume of published papers, commercial reports and experience with years of use supported the conclusion that a heat treatment was effective against most invertebrate forestry pests likely to be associated with wood packaging material.

The panel concluded that as available research had established that all life stages of *Anoplophora glabripennis* (Asian longhorn beetle) were significantly less tolerant to heat treatment than *Bursaphelenchus xylophilus* (Pinewood nematode) (Fleming *et al.* 2003), the submitter needed to demonstrate that the heat treatment was at least 99.99683% effective against *Bursaphelenchus xylophilus* (Pinewood nematode) only. The panel requested the submitter provide further information on the following aspects considered potentially critical to treatment efficacy:

- The TPPT could not determine the level of efficacy of this treatment against *Bursaphelenchus xylophilus* (Pine wood nematode) as the experimental procedure used for inoculating the wood could not be considered equivalent to operational conditions. Complete mortality of at least 94,400 nematodes is required to demonstrate an efficacy level of greater than or equal to 99.99683% at the 95% level of confidence. Using naturally or suitably inoculated samples of wood, nematode numbers should be measured or estimated before and after the treatment in both test samples and controls. Soma *et al.* (2003) provides an example of an experimental design demonstrating treatment efficacy against nematodes in wood.
- Levels of resistance may vary significantly between life stages, and ratios of life stages in wood may also vary. The submission did not provide information demonstrating which life stage of *Bursaphelenchus xylophilus* was most resistant to microwave irradiation, and which life stages are most likely to be present in wood packaging material during the most likely period of treatment application. In the absence of knowing the most resistant life stage, evidence should be provided that all life stages of the nematode associated with wood packaging material during the most likely period of treatment application, including the dispersal stage, were present in significant proportions at the time of treatment efficacy testing.
- Further information should be provided on the limitations of the application of microwave irradiation treatment on dry wood and steps that should be taken to avoid combustion of the wood packaging material during treatment.
- Further clarification should also be provided on the importance of heating up time on treatment efficacy.

In response to the request for information the submitter:

- provided sufficient evidence that the heat treatment was at least 99.99683% effective against *Bursaphelenchus xylophilus* (Pinewood nematode) (Hoover *et al.* 2010);
- confirmed that combustion can only occur if wood lacking any free water (completely dehydrated) were to exceed temperatures of 270-300^{O}C;
- confirmed that heating-up time had an effect on treatment efficacy but that the efficacy was not overly sensitive to this factor.

The TPPT recommended the following schedule to SC for member consultation:

- Heat treatment of debarked wood of not more than 20 cm in cross section to achieve, from ambient temperature within 30 minutes, a minimum of 60 °C for 1 minute throughout the profile of the wood.

2.3 References

Barak A. V., Wang Y., Xu L., Rong Z., Hang X. and Zhan G. 2005. Methyl Bromide as a Quarantine Treatment for *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in Regulated Wood Packing Material. J. Econ. Entomol. 98(6): 1911-1916

Barak A., Y. Wang, G. Zhan, Y. Wu, L. Xu, and Q. Huang. 2006. Sulfuryl fluoride as a quarantine treatment for *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in regulated wood packing material. J. Econ. Entomol. 99(5): 1628-1635

Fleming M.R., K. Hoover, J.J. Janowiak, Y. Fang, X. Wang, W. Liu, Y. Wang, X. Hang, D. Agrawal, V.C. Mastro, D.R. Lance, J.E. Shield, and R. Roy. 2003. Microwave irradiation of wood packing material to destroy the Asian longhorned beetle. Forest Prod. J. 53(1):46-52.

Hoover K., A. Uzunovic, B. Gething, A. Dale, K. Leung, N. Ostiguy, and Janowiak J. J. 2010. Lethal temperature for pinewood nematode, *Bursaphelenchus xylophilus*, in infested wood using microwave energy. *In press.*

Soma Y., Goto M., Naito H., Ogawa N., Kawakami F., Hirata K., Komatus H. and Matsumoto Y. 2003. Effects of Some Fumigation on Pine Wood Nematode *Bursaphelenchus Xylophilus* infesting Wooden Packages. 3. Mortality and Fumigation Standards for Pine Wood Nematode by Methyl Bromide. Research Bulletin Plant Protection Japan 39: 7-14

Sousa E., L. Bonifácio, P. Naves, M. Lurdes Silva Inácio, J. Henriques, M. Mota, P. Barbosa, M. Espada, T. Wontner-Smith, S. Cardew, M. J. Drinkall, S. Buckley and E. M. Thoms. 2010. Studies to validate the proposed fumigation schedules of Sulfuryl fluoride for inclusion in ISPM 15 for the eradication of pine wood nematode (*Bursaphelenchus xylophilus*) from wood packaging material. *Unpublished Report*.

APPENDIX 8: Summary Report for Sulfuryl fluoride treatment

Summary Report for Sulfuryl fluoride fumigation of wood packaging material

(2006-102)

July 2010

By M. Ormsby

The Technical Panel on Phytosanitary Treatments (TPPT) considered the information provided on Sulfuryl fluoride fumigation for ISPM 15 in the submissions made in 2006 (TPPT document reference: 2006-TPPT-102), 2007 (TPPT document reference: 2007-TPPT-104) and 2010 (TPPT document references: 2010-TPPT-Jul-87). The TPPT evaluated this information as recommended by the Technical Panel on Forest Quarantine[1] (TPFQ) as directed by the Standards Committee[2] (Report of the Standards Committee, November 2007, paragraph 26.3) The panel also acknowledged receipt of additional information submitted during 2010 in support of the treatment.

The TPPT notes that the treatment submission form provided by the submitting NPPO has not been updated by the NPPO to incorporate the information provided for evaluation in 2010. While the TPPT evaluated this new information and came to the conclusions detailed below, these conclusions are unable to be formally considered by the Standards Committee until they have been submitted by the NPPO, and the treatment submission form updated appropriately.

Based on this evaluation the TPPT could support a partial treatment schedule only at this time, and recommended that the treatment is resubmitted with additional information for evaluation to recommend an entire schedule at their next meeting.

The TPPT recognizes the efforts taken by the submitter to respond to the questions asked of them by the TPPT in 2009. The additional information provided successfully responded to a number of the questions posed by the TPPT: namely the potential differences in the levels of treatment resistance between life stages; the effect of moisture content on treatment efficacy; and suitable evidence that at least part of the Sulfuryl fluoride fumigation schedule is at least 99.99683% effective against *Bursaphelenchus xylophilus* (Pine wood nematode) at the 95% level of confidence[3]. However the TPPT identified the following issues with the supporting information that are still outstanding and will need to be resolved should the entire treatment schedule be required:

- The TPPT could not determine the level of efficacy of this treatment against *Bursaphelenchus xylophilus* (Pine wood nematode) for temperatures within a range greater than 18^{O}C and less than 30^{O}C.

The TPPT considered the evidence provided for efficacy against *Bursaphelenchus xylophilus* at temperatures greater than 30^{O}C and between 15 and 18^{O}C indicated that Sulfuryl fluoride fumigation at the doses achieved complete mortality of at least 94,400 nematodes to demonstrate an efficacy level of greater than 99.99683% at the 95% level of confidence[4]. The TPPT considered the evidence was insufficient to support a claim of equivalent treatment efficacy for temperatures outside this temperature range.

If you have any specific questions or require access to some additional expertise, arrangements can be made to help put you in contact with other experts knowledgeable in this area. The lead from the

[1] Annex 4, Report of the TPFQ meeting, Moscow, 2-6 July 2007, section "Methyl Bromide Alternatives – Arrangements for treatment submissions for inclusion of new treatments in ISPM 15 made during 2006 and 2007"

[2]

[3] See Couey H M, Chew V (1986) Confidence limits and sample size in quarantine research. Journal of Economic Entomology 79: pp 887-890 for guidance on how to calculate levels of efficacy.

[4] See Couey H M, Chew V (1986) Confidence limits and sample size in quarantine research. Journal of Economic Entomology 79: pp 887-890 for guidance on how to calculate levels of efficacy.

TPPT is M. Ormsby and we encourage you to interact with your lead to help progress your submission. Contact information+ Michael Ormsby, E-mail: Michael.Ormsby@maf.govt.nz).

APPENDIX 9: TPPT Medium Term Plan of Work

TPPT 5-Year plan: 5 meetings. One call a year (possible calls: modified atmosphere for FF, heat treatment for FF, wood treatments)

2010

Call for modified atmosphere as treatment for FF

2011

Meeting: follow up to temperature treatments, ISPM 15, modified atmosphere as treatment for FF
ASAP after 2011 TPPT Meeting: Call for soil and growing media
Call for topics: propose fruit pests other than fruit flies, cut flowers and foliage.
Follow up to previous submissions

2012

Meeting: generic irradiation, soil and growing media
Call for irradiation treatments
Call for fruit pests other than fruit flies (if adopted onto WP)
Follow up to previous submissions

2013

Meeting: irradiation treatments, fruit pests other than fruit flies
Call for topics propose wood treatments, plants for planting, containers
5-year membership terms end
Follow up to previous submissions

2014

Meeting?
(if adopted to WP) Call Wood treatments, plants for planting, containers
Some new members
Follow up to previous submissions

2015

Meeting? wood treatments, plants for planting, containers
Follow up to previous submissions

APPENDIX 10: Summary Report for the evaluation of cold treatments for fruit flies

1. Introduction

The SC has reviewed treatments evaluated by the Technical Panel on Phytosanitary Treatment (TPPT) and recommends seven cold treatments for member consultation.

2. Cold Treatments

2.1 General considerations

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

2.1.1 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.

2.1.2. Genotype of insect

It is possible that laboratory-bred colonies of insects may become more susceptible to temperature-based treatments over time, available information did not indicate that any research had been undertaken to demonstrate whether this is an issue in reality. It was considered 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.

2.1.3 Pre-treatment acclimation

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

2.1.4 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.

2.1.5 Scale of treatment application

Any possible reduction in effectiveness of temperature treatments that may occur when treatments are scaled up and applied in commercial conditions should be taken into consideration when applying these treatments.

2.1.6 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 will be specified in the treatment schedule.

2.2 Detailed considerations for each cold treatment

The following are specific conclusions in regards to the evaluation of these treatments. They are recorded in the order of consideration.

It should be noted that for cold treatments the commodity must reach the treatment temperature before treatment commences, commodity temperature should be monitored during treatment and the temperature should not exceed the stated level. Pre-cooling of the commodity is required.

2009-Draft-Cold Treatment-01: Cold treatment of *Citrus sinensis* for *Ceratitis capitata*

Efficacy data were based on the publication by De Lima *et al.* (2007) and Anon (2007a). Three schedules were produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 18 days for cultivar 'Navel' ($ED_{99.9982}$, 95% confidence level) and for cultivar 'Valencia' ($ED_{99.9979}$, 95% confidence level)
- 3 °C for 20 days for cultivar 'Navel' ($ED_{99.9980}$, 95% confidence level) and for cultivar 'Valencia' ($ED_{99.9979}$, 95% confidence level)
- 2 °C for 21 days for cultivars 'Washington Navel', 'Salustiana', 'Valencia' and 'Lue Gim Gong' ($ED_{99.9917}$, 95% confidence level)

Data for the third schedule were based on unpublished technical reports. However, the TPPT noted that ISPM No. 28 does not require data to be published and the data had been independently verified by Japanese and Chinese experts. As the initial response to cold treatment of all cultivars in the third schedule was not significantly different, the treatment efficacy for this group of cultivars was determined through testing of cultivar 'Valencia' only.

2009-Draft-Cold Treatment-02: Cold treatment of *Citrus reticulata* × *Citrus sinensis* for *Ceratitis capitata*

Efficacy data were based on a publication by De Lima et al. (2007) using the tangor cultivars 'Ellendale' and 'Murcott'. Two schedules were produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 18 days ($ED_{99.9972}$, 95% confidence level)
- 3 °C for 20 days ($ED_{99.9972}$, 95% confidence level)

The level of efficacy of the treatment in experiments using cultivar 'Murcott' was slightly lower than for cultivar 'Ellendale', therefore the efficacy relating to 'Murcott' was used for the schedule.

2009-Draft-Cold Treatment-03: Cold treatment of *Citrus sinensis* for *Bactrocera tryoni*

Efficacy data were based on a publication by De Lima *et al.* (2007) using several orange cultivars. Two schedules with different levels of efficacy for different cultivars were produced with the intended outcome of larval mortality at the stated efficacies:

- 2 °C for 16 days for cultivar 'Navel' ($ED_{99.9973}$, 95% confidence level) and for cultivar 'Valencia' ($ED_{99.9960}$, 95% confidence level)
- 3 °C for 16 days for cultivar 'Navel' ($ED_{99.9988}$, 95% confidence level) and for cultivar 'Valencia' ($ED_{99.9976}$, 95% confidence level)

It was considered whether to combine the results of the data obtained at 2 °C and 3 °C to produce a combined efficacy for the 2 °C schedule for this treatment (see note 2.3.5).

2009-Draft-Cold Treatment-04: Cold treatment of *Citrus reticulata* × *Citrus sinensis* for *Bactrocera tryoni*

Efficacy data were based on a publication by De Lima *et al.* (2007) using the tangor cultivars 'Ellendale' and 'Murcott'. Two schedules were produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 16 days ($ED_{99.9968}$, 95% confidence level)
- 3 °C for 16 days ($ED_{99.9989}$, 95% confidence level)

The level of efficacy of the treatment in experiments using cultivar 'Murcott' was slightly lower than for cultivar 'Ellendale', and therefore the efficacy relating to 'Murcott' was used for the schedule.

It was considered whether to combine the results of the data obtained at 2 °C and 3 °C to produce a combined efficacy for the 2 °C schedule for this treatment (see note 2.3.5).

2009-Draft-Cold Treatment-05: Cold treatment of *Citrus limon* for *Bactrocera tryoni*

Efficacy data were based on a publication by De Lima *et al.* (2007) using the lemon cultivar 'Lisbon'. Two schedules were produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 14 days ($ED_{99.9935,}$ 95% confidence level)
- 3 °C for 14 days ($ED_{99.9928,}$ 95% confidence level)

It was considered whether to combine the results of the data obtained at 2 °C and 3 °C to produce a combined efficacy for the 2 °C schedule for this treatment (see note 2.3.5).

2009-Draft-Cold Treatment-06: Cold treatment of *Citrus paradisi* for *Ceratitis capitata*

Efficacy data were based on unpublished technical reports (Anon, 2007b and 2007c), both schedules of which had been accepted by Japanese experts and the 2 °C schedule by Chinese experts. Four grapefruit cultivars ('Marsh Seedless', 'Star Ruby', 'Henninger's Ruby' and 'Rouge la Toma') were analysed at the lower temperature and no significant differences were found in the lethal time for the different cultivars. None of the treated 35,893 and 36,052 third instar larvae survived at 3 °C or below for 23 days and at 2 °C or below for 19 days, respectively. Two schedules were produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 19 days ($ED_{99.9917,}$ 95% confidence level)
- 3 °C for 23 days ($ED_{99.9916,}$ 95% confidence level)

The TPPT noted that these schedules are used by several NPPOs.

2009-Draft-Cold Treatment-07: Cold treatment of *Citrus reticulata* cultivars and hybrids for *Ceratitis capitata*

Efficacy data were based on unpublished technical reports (Anon, 2007d). The TPPT noted, however, that the NPPOs of Japan and China have reviewed and accepted these data. This schedule was developed using the following cultivars and hybrids: 'Clementinas Group' (*Citrus reticulata,* Clemenule), 'Ellendale' (*Citrus reticulata* × *C. sinensis),* 'Nova' (*C. reticulata* × Tangelo 'Orlando' (*Citrus reticulata* × *C. paradisi*)) and 'Murcott' (*Citrus reticulata* × *C. sinensis,* Tangor). One schedule was produced with the intended outcome of larval mortality at the stated efficacy:

- 2 °C for 23 days ($ED_{99.9918,}$ 95% confidence level)

2.3 Issues associated with the development of the treatment descriptions for cold treatments

When drafting the treatment descriptions from the different submissions, it was noted that one submission related to two fruit flies on a number of different hosts. One other submission was for one fruit fly species and host commodity combinations. The notes below outline some of the more important decisions that were taken in regards to the treatment descriptions.

2.3.1 Each treatment should be for an individual fruit fly species.

2.3.2 For fruit fly hosts, it was noted that according to information available, several countries had found different *Citrus* species responded to cold treatment differently. It was decided that treatments should therefore be for separate *Citrus* species.

2.3.3 Regarding cultivars of *Citrus* species, it was noted that according to information available, certain research had shown that different cultivars of *Citrus sinensis* (orange) responded differently to cold treatments and it was decided to quote the treatment efficacies for the different cultivars of *C.*

sinensis separately in the treatment description, unless all the cultivars tested responded similarly to the treatment. For the other *Citrus* species, available information did not note different responses by cultivars and therefore treatment descriptions were not differentiated according to cultivar for these species. In these cases, where data were submitted for different cultivars, the lowest efficacy level was quoted as the efficacy of the treatment.

2.3.4 Minimum level of efficacy that was required for cold treatments was considered and it was decided that an ED of 99.99 was the minimum level acceptable for an international standard.

2.3.5 For some treatment submissions, where an experiment involved treatments at both 2 °C and 3 °C, it was noted that all the experimental parameters apart from temperature were the same for these experiments and the possibility of commingling them was considered to produce an ED value for the 2 °C treatment schedule. After discussion, it was decided not to take this approach, but it should be noted that it would have resulted in a higher overall efficacy level for the 2 °C treatment.

2.3.6 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. In the future, once several treatments for the same *Citrus* species and fruit fly combination have been adopted, it is proposed that the different schedules should be combined into a table format if possible.

2.3.7 It was noted that the nomenclature for *Citrus reticulata* and hybrids was inconsistent in the submissions and it was decided to standardize the naming of *Citrus* species and hybrids in treatments in accordance with the nomenclature in Cottin, R. 2002. *Citrus of the world: a citrus directory*. France, INRA-CIRAD.

2.3.8 Regarding temperatures sensitivities (e.g. 2 °C +/- 0.5 °C), these were not added to the treatment schedules. In some submissions the temperature limits were quoted, but it was noted that experimental probes were often more sensitive than commercial probes. It was therefore decided to include a sentence in the treatment descriptions indicating that the commodity temperature should not exceed the stated level. Commercial operators would need to take into account the normal working range of their equipment in order to meet this requirement.

References

Anon. 2007a. Annex: Quarantine cold treatment of oranges for medfly (*Ceratitis capitata* Wied.). Document number 2007-TPPT-109a. Submission by Argentina in response to the 2007 IPPC call for treatments.

Anon. 2007b. Annex: Quarantine cold treatment of grapefruits for medfly (*Ceratitis capitata* Wied.). Document number 2007-TPPT-110a. Submission by Argentina in response to the 2007 IPPC call for treatments.

Anon. 2007c. Annex: Quarantine cold treatment for grapefruits for medfly (*Ceratitis capitata* Wied.). Document number 2007-TPPT-111a. Submission by Argentina in response to the 2007 IPPC call for treatments.

Anon. 2007d. Annex: Quarantine cold treatment of tangerines and hybrids for medfly (*Ceratitis capitata* Wied.). Document number 2007-TPPT-112a. Submission by Argentina in response to the 2007 IPPC call for treatments.

De Lima, C.P.F., Jessup, A.J., Cruickshank, L., Walsh, C.J. & Mansfield, E.R. 2007. Cold disinfestation of citrus (*Citrus* spp.) for Mediterranean fruit fly (*Ceratitis capitata*) and Queensland fruit fly (*Bactrocera tryoni*) (Diptera: Tephritidae). *New Zealand Journal of Crop and Horticultural Science*, 35: 39–50.

Hallman, G.J. & Mangan, R.L. 1997. Concerns with temperature quarantine treatment research. *In* G.L. Obenauf, ed. *1997 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reduction*, San Diego, CA, USA, Nov 3–5. pp. 79-1–79-4.