REPORT

Belem, Brazil
10-14th June 2013

Technical Panel on Forest Quarantine
June 2013

Food and Agriculture Organization of the United Nations

CONTENTS

1. Opening of the Meeting

1.1 Welcome by Secretariat

[1] The members of the Secretariat present welcomed the meeting participants and thanked Mr Cósam de Carvalho Coutinho for hosting the meeting and the other local organizers for their efforts in arranging this meeting.

1.2 Welcome by Hosts

[2] The host, Mr. Cósam de Carvalho Coutinho, Director of DSV/SDA/MAPA, Esplanada dos Ministérios, Brazil, welcomed the meeting participants to Brazil and especially to the State of Para in northern Brazil and the historical city of Belem. He described the high level organisation of the Brazilian phytosanitary system to the meeting participants, and role each level of the system has in managing the phytosanitary risks to Brazil.

1.3 Selection of Chair and Rapporteur

[3] The panel elected Edson Tadeu Iede as Chair and Eric Allen as Rapporteur.

1.4 Agenda

[4] The panel members reviewed and adopted the agenda (see Appendix 1 to this report). The Secretariat noted that order of some items will be changed to more efficiently reflect the order of business for the week.

2. Administrative Matters

2.1 Documents list

[5] The panel reviewed and updated the documents list (see Appendix 2 to this report). It was noted that document 14 was not supplied to participants and the title of document 44 was not included on the documents list. Document 14 is not available for the meeting although much of the information expected to be within the document is either contained in other documents supplied or will be provided during the meeting. Document 44 is the draft of the report of the May virtual meeting of Technical Panel on Forest Quarantine (TPFQ) (agenda item 10.3).

2.2 Participants list and Introductions

[6] The Secretariat called attention to the participants list and the members reviewed their contact information (see Appendix 3 to this report). The members were also advised to update their information on the International Phytosanitary Portal (IPP).

[7] Participants introduced themselves, where they come from, their organization and their roles both domestically and in relation to the International Plant Protection Convention (IPPC).

2.3 Meeting logistics and arrangements

[8] The local organizers provided further details on the arrangements for morning and afternoon breaks, lunch, and a dinner provided by the hosts.

[9] On Thursday morning (13 June) of the meeting, the Agéncia de Defesa Agropecuária do Estado do Para (ADEPARÁ) hosted the panel on a field trip to a 12 year old forestry block at Fazenda Colibri, located in Benevides County about 35 km east of Belem. Panel members were shown three species of forest tree currently under trials for use in tropical (northern) areas of Brazil. The three species of tree under development were:

[10] - *Tectona grandis* L. f. (Verbenaceae), commonly known as Teak was introduced into Brazil in the 1970s.

[11] - *Khaya ivorensis* A. Chev. (Meliaceae), commonly called African Mahogany or Lagos Mahogany.

[12] - and a local (endemic) tree species, *Schizolobium amazonicum* Huber ex Ducke (Leguminosae – Caesalpinioideae), commonly known as Paricá.

[13] Technical staff from ADEPARÁ described the development programme and forest pest monitoring activities currently underway in the region. It was noted that efforts to bring local trees into plantation forestry had created new environments for local pest proliferation. The monitoring programs therefore also had a general purpose of detecting altered impacts of common or local pest species. The main pests of concern to the monitoring programme are:

[14] - *Maconellicoccus hirsutus* (Green) (Homoptera: Pseudococcidae.), commonly known as the pink, grape or hibiscus mealybug, was first detected in Para state in 2012.

[15] - *Hypsipyla grandella* (Zeller) (Insecta: Lepidoptera: Pyralidae), commonly known as the mahogany shoot borer, an important pest on mahogany species.

[16] - *Sinoxylon conigerum* (Gerstäcker, 1855) (Coleoptera: Bostrichidae), commonly known as the Conifer auger beetle.

[17] *Sinoxylon conigerum* is of particular concern to *Tectona grandis* (teak) plantations. This pest was first detected in Para state in 2001. The monitoring programme for this pest involves setting beetle traps (name) in a 50 meter grid at 1.5 meter level between plantation trees. The traps use ethanol as an attractant and a checked every 15 days during the monitoring period.

[18] Figure 1: An ADEPARÁ technician re-filling *Sinoxylon conigerum* monitoring trap with ethanol.

3. Review of the May Virtual TPFQ Meeting

[19] This item was brought forward in the meeting from agenda item 10.3.

[20] The panel reviewed the draft report of the May virtual meeting of the TPFQ (TPFQ_2013_Jun_44). A number of amendments were made to the report before it was adopted.

[21] It was noted that meeting reports need to be a complete and accurate record of the meeting and the technical discussions. It was agreed that a Rapporteur should be appointed for each virtual meeting.

4. Updates from Relevant Bodies

4.1 Strategic Planning Group (SPG)

[22] The SPG discussed issues concerning registration of the ISPM 15:2009 symbol: the symbol being the 'stack of timber' rather than the ISPM 15:2009 mark which is the box and the information within the box, including the symbol. It was noted that the Food and Agricultural Organization (FAO) own the ISPM 15:2009 symbol. It has been agreed that the IPPC will now take care of the registration of the symbol around the world.

[23] Discussions this year at the 8th meeting of the Commission on Phytosanitary Measures (CPM 8:2013) and in an evening session resolved to fix the problems associated with world-wide registration of the symbol. FAO funds have now been allocated to complete the task.

4.2 IPPC Bureau

[24] Nothing of direct relevance to TPFQ was discussed by the IPPC Bureau.

4.3 CPM 8:2013

[25] The Annex 1 amendments to ISPM 15:2009 were successfully adopted at CPM 8:2013. The panel thanked the Steward of this amendment for his work and the Secretariat thanked the panel for its support through the adoption process. Dielectric heating will now go up for ISPM 28:2007 adoption as a treatment for wood. The panel discussed the likelihood that there will be new information available to extend the use of dielectric heating. Radio waves are longer wavelength than microwaves and therefore have better penetration into wood so can treat wider pieces of wood.

[26] It was noted that there was little practical problem in having a 20cm restriction in ISPM 15:2009 as most (~99%) of the wood in WPM is under 20cm wide. The panel discussed the 20cm restriction further and was concerned there may be confusion between the new ISPM 28:2007 treatment schedule and ISPM 15:2009 Annex 1. The panel recommended that, with respect to dielectric heating, as new research supporting treatment of large dimensional wood has become available, there may no longer be a need to limit the wood dimensions to 20 cm as stated in Annex 1 of ISPM 15:2009. Any possible discrepancy between the proposed ISPM 28:2007 dielectric heating treatment schedule and ISPM 15:2009 Annex 1 should be considered and resolved or adjusted as necessary. Radio wave information may extend the use/practicality of dielectric heating in ISPM 28:2007, though efficacy data is required and so any ISPM 28:2007 treatment schedule is only likely to cover PWN.

[27] The panel then discussed the possibility of other treatments for ISPM 15:2009. It was noted that two of the currently submitted treatments, Ecotwin and Methyl iodide, have now been withdrawn by the submitting NPPO. Only the Sulfuryl fluoride submission is still going through the current evaluation process. All future treatment submissions will need to meet the new ISPM 15:2009 treatment criteria once these criteria have been adopted.

[28] TPPT wanted to change the call for treatments to one that is general e.g. any treatments can be submitted at any time. The Standards Committee (SC) is discussing this possibility but the process will not change in the immediate future (any change first needs to get adopted by the CPM). A member noted that the system for ISPM 28:2007 was complicated and may be limiting country involvement. The IPPC is moving to simplify the process for ISPM 28:2007 submission, evaluation and adoption.

4.4 Standards Committee

[29] In 2011 the SC made a number of requests regarding the content of any treatment criteria developed for ISPM 15:2009. These requests where mainly contained in the report of the SC-7 meeting in 2011. The SC-7:2011 stated the following with regard to the re-drafting of the ISPM 15:2009 treatment criteria:

[30] *After reviewing the member comments, the Steward had concluded that a major review and redraft should occur. There were several useful comments oriented towards revising the overall structure of the text, but also substantive questions over the use of Probit 9, other statistical elements, and other factors. The Steward noted that before redrafting can proceed, the SC will need to review some of these comments carefully, and provide guidance and direction to the Steward, the TPFQ and/or other redrafting group. The Steward considered it impossible to attempt redrafting without this guidance, and also does not have the technical expertise in this particular subject to attempt redrafting without the input of technical specialists (i.e., the TPFQ, and perhaps TPPT). The Steward agrees with many of the proposals made and these would improve the text considerably. The SC-7 noted that comments and the Steward's responses should be carefully considered during redrafting, in conjunction with SC advice and guidance.*

[31] *A. The group noted the experimental structure was very sound, but should be explained more clearly, possibly using a flow diagram. The SC-7 recommends the Steward take this work forward in consultation with the TPFQ.*

[32] *It was discussed whether the focus should be on quarantine forest and quarantine wood pests which are of concern in several areas. There was concern that ISPM 15:2009 focuses on WPM, and the focus should be on WPM and not on forest pests, but the group concluded it is the living plants that need to be protected from risks. In all cases,* Bursaphelenchus xylophilus *(pinewood nematode, PWN) and* Anoplophora glabripennis *(Asian longhorned beetle, ALB) should be efficaciously treated and this should be proven by experiments on these pests or their substitutes. It was suggested the list be more specific and not too broad and should list species of greater economic importance. It was noted that there are some efforts from industry utilizing other alternatives (such as plastic pallets, etc.), to solve the issues associated with WPM.*

[33] *B. The SC-7 recommends that, in all cases, submitted treatments shall be effective against PWN and ALB. In addition, the SC-7 requests the IFQRG and the TPFQ to reconsider the current list, focusing on forestry quarantine pests of concern in several areas. The list should be narrowed further to the lowest possible taxonomic level, i.e. Family, Genus, and, if possible, Species and should also focus on organisms to be eliminated at the point of treatment (i.e. the issue of infestation after treatment should not be considered).*

[34] *The group discussed the need for the efficacy level to be at least as high as the heat and methyl bromide (MeBr) treatments in ISPM 15:2009 and recommended that the efficacy should be determined for these two treatments in order to determine if this efficacy level could be used as the baseline for future treatments.*

[35] *D. The SC-7 requests the TPPT and the IFQRG consider the issue on statistical confidence and provide advice and guidance on reasonable confidence level that would be acceptable for ISPM 15 treatments.*

[36] The SC in November 2012 expressed concerns over the potential negative effect of wood moisture content on the penetration and therefore effectiveness of Methyl bromide fumigation under ISPM 15:2009. This issue was not discussed in detail at this meeting however the group generally agreed that there was no problem with the existing schedule. Further discussion was deferred for up-coming virtual meetings of the TPFQ.

[37] The SC in May 2013 removed bark requirements from the draft (Wood) standard that will go out for member comments in 2013. This issue was not discussed in detail at this meeting and was deferred for later discussion in up-coming virtual meetings of the TPFQ.

[38] The SC agreed that explanatory document(s) should now be included on the specification for TPFQ (2004-004) and can be discussed by the TPFQ. The main author of the ISPM 15:2009 explanatory document suggested that the three current parts of the document be combined into one document (TPFQ_2013_Jun_42). Further discussion on this issue was deferred for later virtual meetings of the TPFQ.

4.5 Other TPs or EWGs

[39] Nothing of particular relevance to TPFQ was reported by other Expert Drafting Groups (EDGs).

4.6 Secretariat Update and Review of Administrative Procedures

[40] The Capacity Development Committee (CDC) raised issues with the IPPC Secretariat around the status of the FAQ information for ISPM 15:2009 currently posted on the IPP. The CDC maintains information on a phytosanitary website that while not IPPC sanctioned, it is still useful for members. The issue of the FAQ was discussed at the May virtual meeting of the TPFQ and it was agreed that the FAQ should be removed as the explanatory documents should cover all of these issues raised in the FAQ. It was noted that explanatory documents can be maintained and updated in a timely manner and IPPC members can contact the authors of explanatory documents for clarification if required. New information could/should be vetted through the TPFQ as a courtesy. It was also noted that discussions on resolving any implementation issues and the interpretation of ISPM 15:2009 should not be linked to the IPPC Secretariat nor to TPFQ, and is not now the role of the International Forest Quarantine Research Group (IFQRG) which focusses on scientific not regulatory issues.

[41] The Secretariat informed the panel that there is currently a call for topics for standards development. The current IPPC work programme has only four specifications awaiting EDGs but many (>40) diagnostic protocols and phytosanitary treatments. If the panel wanted to submit a topic for consideration there are forms to compete which require some work. TPPT will be submitting topics for new ISPMs covering treatment types such as heat treatment, in the same manner as ISPM 18:2003. A panel member queried whether IFQRG could submit a topic during a call for topics. The Secretariat stated that given the status of IFQRG with regard to IPPC standards development, the answer to this question was ambiguous and IFQRG may like to try and see if they are successful.

[42] The Secretariat noted that there have been changes to member reporting obligations e.g. for regulated pest lists. It was hoped that enhanced member reporting would provide more useful information for standards development and implementation.

[43] The Secretariat noted that the IPPC website (IPP) has been moved to new platform but a number of problems have been experienced. Once working properly the new platform should provide more (new) tools to enhance the work of the technical panels.

[44] The IPPC has developed a support system which monitors the performance of the standards development system e.g. problems with implementation or interpreting standards. The Secretariat would appreciate input on the support system to enhance its application and versatility.

[45] The Secretariat then provided an overview of standard-setting process as it is now:

[46] - Year 1 – a call for topics, members submit topics, SC screens and CPM adopts list of topics for the work programme.

[47] - Year 2 – SC develops specifications, consults members and approves the specifications. Members are asked to nominate experts for the groups developing draft ISPMs (Expert Drafting Groups - EDGs) based on the approved prioritised specifications.

[48] - Year 3 – SC selects experts and the Expert Drafting Group (EDG) meets and drafts ISPM.

[49] - Year 4 – draft ISPM approved by SC for member consultation, consulted, and revised by the Steward.

[50] - Year 5 – draft revised draft ISPM approved for member Substantial Concerns Commenting Period (SCCP), SC approves for adoption, then follows a formal objections period before CPM approves.

[51] Member commented that there is no definition for "substantial" concerns, although there is a description of "substantive" concerns.. The panel considered that the Secretariat needs to make clear the definition of 'substantial concerns'.

4.7 Recommendations from Section 4

[52] The TPFQ:

[53] 1. *Recommended* that, with respect to dielectric heating, as new research supporting treatment of large dimensional wood has become available, there may no longer be a need to limit the wood dimensions to 20 cm as stated in Annex 1 of ISPM 15:2009. Consideration of any discrepancy between the proposed ISPM 28 DH treatment schedule and ISPM 15 Annex 1 should be added to the work programme of TPFQ and TPPT.

[54] 2. *Recommended* that the FAQ for ISPM 15 be removed from the IPP. The TPFQ considers the Explanatory document for ISPM 15:2009 will adequately meet the purpose of the FAQ.

[55] 3. *Requested* that the Secretariat make clear to members the definition of 'substantial concerns'.

5. Specifications for TPFQ and ISPM 15 Revision

5.1 Technical Panel on Forest Quarantine (2004-004)

[56] The Steward for TPFQ went through the specification (TPFQ_2013_Jun_07) to explain role of TPFQ and ensure common understanding of its function and tasks.

[57] Members discussed the possible need for a face-to-face meeting of the TPFQ to discuss submissions made on the criteria once it has gone for members' consultation. The Steward will provide advice to the SC on this issue in consultation with the Secretariat once comments are reviewed.

[58] The panel discussed the requirement stated in the specification that impacts of the ISPM on the environment and biodiversity are considered by the TPFQ. The panel felt that the scope of this task remains unclear and additional expertise on the environment/economics may be required. It was noted by SC members present that in their opinion they considered that only general comments would be required. The SC will address these concerns about this statement in the specifications at some future time once the questions for drafting groups have been developed (as per CPM 7:2012).

[59] The panel discussed the new task on implementation (task 11) and agreed that they already strive for a balance between ensuring the standards are complete and practical. The panel agreed to identify other tools that could be used to enhance implementation e.g. explanatory documents, workshops etc.

[60] The panel noted task three (brainstorming emerging forestry issues that might be considered by the panel) and agreed to include this as a standing item on TPFQ meeting agendas.

5.2 Revision of ISPM 15 (Regulation of wood packaging material in international trade): Criteria for treatments for wood packaging material in international trade (2006-010)

[61] This specification (TPFQ_2013_Jun_41) covers the whole review of ISPM 15:2009 and provides the permission or authority for developing the treatment criteria for ISPM 15:2009.

6. Update from IFQRG

[62] The IFQRG 10:2012 report was provided to the panel for information (TPFQ_2013_Jun_46). The main part of report of interest to this weeks meeting focuses on the 'Cardiff Protocol'. This protocol is the culmination of many years work to resolve the issue of identifying a biologically-based level of treatment efficacy for treatments for ISPM 15:2009.

[63] A TPFQ member reported that during IPPC member consultation in 2010 on the draft Appendix to ISPM 15 on treatment criteria, submissions were received raising concerns that the testing standards proposed were so rigorous that they would effectively prevent the development of new treatments. The major concern was in assembling the required number of experimental units of wood infested with forest pests to achieve a Probit 9 level of efficacy. It was noted that Probit 9 (or 99.9968% mortality at the 95% level of confidence) is a standard developed for dose response of fruit files, and it requires 100% mortality in a sample of at least 94,560 individuals to achieve the required confidence of 95%. The submissions considered that for many of the pests on the proposed list, it would be virtually impossible to assemble populations of this size for testing. It has also been suggested in literature that this is too stringent for commodities that are rarely infested or are poor hosts (see Follet & McQuate, 2001[1]).

[64] Options for an alternative approach to requiring Probit 9 treatment efficacy for the ISPM 15:2009 target quarantine pests were considered by TPFQ and IFQRG in 2011 and 2012. At the Cardiff meeting of IFQRG 10:2012, participants supported the use of the 'Cardiff Protocol' for determining the appropriate level of efficacy for target quarantine pests. The 'Cardiff protocol' describes a model for determining test sizes of each quarantine pest type based on pest biology and invasiveness, and the international trading patterns of wood packaging material.

[65] Use of the 'Cardiff Protocol' to determine test sizes would ensure that the number of test individuals required to demonstrate adequate treatment efficacy would reflect the incidence of quarantine pests in wood packaging material in international trade. Use of these calculated test sizes would ensure that experimental testing would be both feasible for researchers and provide an appropriate level of protection for international trade.

[66] The IFQRG has established a scientific working group to apply the 'Cardiff Protocol' to the quarantine pest groups that are considered important in the international trade of wood packaging material (WPM) (listed in the draft ISPM 15:2009 treatment protocol) to determine appropriate test sizes for use by researchers wishing to develop and test wood treatments for ISPM 15:2009. These identified test sizes would replace the requirements for Probit 9 (99.9968%) test size in the final step of the treatment criteria circulated for member consultation in 2010

[67] Based on requests from the SC in 2011 (see section 4.4 of this report), the revised list of pests attempts to target the "lowest possible taxonomic level, i.e. Family, Genus". Specific genera or species are identified for testing only where quarantine risks are significant (e.g. *Bursaphelenchus xylophilus* and *Heterobasidion* spp. a pathogenic fungus that readily produces asexual spores and could find pathway from infected WPM. Most other pathogenic fungi have very reduced likelihood of spread via WPM as the pathway). The group understood that any new treatment schedule needs to eradicate a large number and variety of pests that can be found in or on WPM. However to prove that a treatment schedule is efficacious under laboratory conditions, a screening process is proposed using a variety of pests of higher taxonomic rank to determine which of these is likely to be most tolerant to the treatment schedule. The screening step would include pinewood nematode, a species of *Heterobasidion* and pests selected from other groups relevant to WPM known to have species of quarantine significance.

[68] Lengthy discussions took place at previous IFQRG meetings regarding which pests should be used during testing. Initially, IFQRG members explored various organisms from the following broad groups or specific species: Scolytinae, Anobiidae, Bostrychidae, Buprestidae, Cerambycidae (any Anoplophora spp. or another taxon if unavailable), Siricidae, Lepidoptera, Pine wood nematode (PWN), *Heterobasidion annosum*, *Fusarium circinatum*, a tree killing *Phytophthora* spp., deep penetrating blue stain fungi, and *Cryphonectria parasitica* (chestnut blight). While understanding that all of these pests are important to be controlled by a treatment the group agreed that some may present

[1] Follett P. A., McQuate G. T. (2001) Accelerated development of quarantine treatments for insects on poor hosts. Journal of Economic Entomology 94, 1005–1011.

challenges to find or handle due to their biology. The group further discussed which of these organisms should be kept or removed from the revised list based on scientific reasoning.

[69] At IFQRG-9:2011 the IFQRG felt that the following organisms do not need to be included in the pest list:

[70] - Anobiidae: removed, as they are not significant as tree killers and are rare from interception data; They may though be considered as good testing reference species.

[71] - Lepidoptera: (Cossoid-Sessoid-Tortricoid assemblages) removed, as they are rarely intercepted; large size makes them vulnerable to sawmilling.

[72] - Siricidae: removed - challenging to collect samples for testing; possibility of using sawflies as reference species.

[73] - *Fusarium circinatum*: removed - WPM not seen as major pathway known on wood chips; potentially easy reference species.

[74] - A tree killing *Phytophthora* spp. : removed - low evidence of establishment from WPM

[75] - Deep penetrating blue stain fungi: removed – as they are saprophytes only affecting living trees when associated with aggressive bark beetles that mass attack trees; low evidence of establishment from WPM; Australia currently regulates for bluestain fungi.

[76] - Canker fungi/chestnut blight: removed. There is paucity of evidence of spread via pathway and historical evidence shows that this fungi are unlikely to be spread by WPM

[77] - Root rot fungi: removed - deemed to be very low risk of spreading via WPM.

[78] The list of pests was revised based on recommendations from IFQRG (as per SC7 May 2011 request). The revision of the list considered the pest risk importance (prevalence on wood used in WPM, interception statistics) and practical considerations (availability of specimens, possible limiting biological characteristics, etc).

[79] The final IFQRG-9:2011 recommended list from which a single organism from each group needs to be selected for Step 1 testing was: a reference screening pest, pine wood nematode (PWN), *Heterobasidion* spp., Scolytinae, Bostrychidae, Buprestidae, and Cerambycidae.

7. Criteria for Treatments for Wood Packaging Material in International Trade (2006-010)

[80] This agenda item was introduced by a number of background documents to the panel including the draft criteria (2010) that went for member consultation; comments received during country consultation (TPFQ_2013_Jun_09); the Stewards comments on those member comments (TPFQ_2013_Jun_10); and a description/summary of the text developed by IFQRG in response to requests from TPFQ and SC in 2011 (see section 6 of this report).

7.1 History of the development of the ISPM 15 Treatment Criteria

[81] The document (TPFQ_2013_Jun_13) noted that the story began 12 years ago with recognition at ICPM 03 (2001) that there was a need for a consistent and transparent process for developing and approving treatment schedules.

[82] A list of pest groups was added to ISPM 15:2002 during its first approval at ICPM 04 (2002). The list did not come from the EDG that drafted the standard.

[83] The work done over the last 10 years by TPFQ and IFQRG has been to identify a:

[84] - more appropriate list of target pests for ISPM 15 treatments;

[85] - step-wise approach to developing treatment schedules;

[86] - method of identifying a correct treatment level of protection/efficacy.

[87] The panel discussed where all the parts of this information should be held. Ultimately all interested parties need to be able to identify what they need to do to develop and get treatment schedules approved for ISPM 15:2009. The Panel agreed that it will need to discuss this further during the development of the treatment criteria. The text of ISPM 15:2009 provides guidance for NPPOs who may work with a number of audiences: the main text is for the NPPOs; Annex 1 is for treatment providers; the treatment criteria will be for treatment developers as well as the submitting NPPOs.

[88] The 'Cardiff Protocol', as it is currently drafted, is for ISPM 15:2009 only. But the protocol introduces principles of biologically-based efficacy levels in trade that are relevant to all phytosanitary issues. The panel was made aware of the wider phytosanitary issues this protocol potentially has in international phytosanitary trade.

7.2 Member Comments on Draft ISPM 15 Criteria (2010).

[89] During member consultation on the draft ISPM 15 Treatment Criteria in 2010, members provided 328 comments on the text of the draft. These comments were considered by the panel as they redrafted the text of the criteria. Since during the redraft most of the original text of the 2010 draft was either modified or replaced by new text, many of the comments have become irrelevant. However, the most critical comments were addressed by the panel during the redraft. A selection of the substantive member comments from the 2010 member consultation on the draft ISPM 15:2009 Treatment Criteria and how they were addressed by the panel are included in appendix 4 of this report.

7.3 Report from the Invited Expert

[90] The invited expert provided the following information to the panel based on a seminar given at CPM 8:2013 session:

[91] Many species of insects, nematodes and fungi may colonize wood, especially recently dead or dying trees. Such lower quality wood used for manufacturing WPM is recognized as high-risk pathway. ISPM 15:2002 was adopted in 2002 to address this phytosanitary risk. ISPM 28:2007 – Phytosanitary treatments for regulated pests, does not specify the required efficacy for ISPM 15:2009 treatments.

[92] ISPM 15:2009 mentioned the possibility of the adoption of new treatments but provided no specific guidelines on their required efficacy or treatment development. In 2010 a draft appendix "Submission of new treatments for inclusion in ISPM 15", which contained evaluation criteria for new treatments was released for member consultation. The draft included an extensive list of target pests (including quarantine pests) and proscribed probit 9 as a required level of efficacy. Members criticised the criteria as being too stringent and too complex. IFQRG reviewed the SC comments and worked on alternative approach especially to address list of pests, and probit 9.

[93] Alternative treatments for WPM are urgently needed. Currently used methods such as the HT schedule were adopted based on efficacy data for PWN and its vectors; Methyl bromide has historically been accepted for variety of pests but did not go through the rigorous process prescribed in the draft criteria.

[94] The panel has noted that wording in ISPM 15:2009 related to the expected outcome of the standard changed "practically eliminate" to "significantly reduce" the risk of introduction and spread of phytosanitary pests. The panel understood that complete elimination of risk is not achievable in practice as it would practically imply the complete elimination of trade.

[95] The Probit 9 requirement in the draft criteria and the extensive list of pests were considered serious impediments to new treatment development and adoption. Initially there were many discussions, approaches, confusion, requests and disagreements but during the process of negotiation, education

and increased understanding, IFQRG in principal agreed on an alternative approach at its meeting in 2011. Two papers were published based on these discussions:

[96] - Haack R. A., Uzunovic A., Hoover K., Cook J. A. (2011) Seeking alternatives to probit 9 when developing treatments for wood packaging materials under ISPM No. 15 EPPO bulletin 41:39-45.

[97] - Schoremeyer M., Thomas K., Haack R. A., Uzunovic A., Hoover K., Simpson J. A., Grgurinovic C. A. (2011) Appropriateness of probit-9 in the development of quarantine treatments for timber and timber commodities. Journal of Economic Ecology 104: 717-731.

[98] The definition of efficacy equals "*The ability to produce a desired amount of an effect*". The definition of reliability (statistical): "*The effectiveness of the treatment at a given confidence intervals*". Efficacy can be expressed as the probability that an infested piece of WPM is successfully treated, with the reliability that the same result will be obtained again and again with repetition. This is expressed as decimal portion of 1.0. It should be remembered that the experimental support for the efficacy needs to represent the whole population of the pest around the world. The question therefore is "*What is the magic number of pests to test and how many times to repeat the experiment for good statistics?*"

[99] There are two available methods to attain level of efficacy: either by 'brute force', exposing a sample of a size required to demonstrate the required level of efficacy, or by the extrapolation of mortality curve using a probit or equivalent analysis.

[100] Probit 9 was suggested based on work with fruit flies in fruit; wood products and pests are different. There was questionable scientific reasoning to justify its use for all pests. Results obtained through modeling or extrapolation will always give overestimated values. Many tests have to be done through brute force method. As there is scarce availability of a number of key quarantine pests (e.g. ALB), it would be impossible to find 93,613 individuals for testing. Some pest types lack definable separate units for testing (e.g. fungi).

[101] IFQRG came up with a 3-Step approach:

[102] Step 1: Estimate the lethal dose for the most tolerant pest of quarantine importance that is found in WPM (lab test).

[103] Step 2: Replicate experiments at the estimated lethal dose for the most tolerant pest (lab test).

[104] Step 3: Confirm under simulated operational condition and provide statistical efficacy (simulated field test).

[105] Any approved treatment would be assessed on an ongoing base in subsequent real-life experience, and either kept, modified or withdrawn (e.g. discussions on HT tolerance of European Ash Borer (EAB)).

[106] In Step 1 the aim would be to complete a screening for tolerance (low replication) by testing one available species from 7 representative pest groups: a reference-easy-to-rear insect (e.g. from Sitophilus, Oryzaephillus, Trogoderma or Ambrosia beetle genera); a Scolytinae (bark beetle); a Bostrychidae (horned powder post beetle); a Buprestidae (metallic wood boring beetle);a Cerambycide (large wood borer); Pine wood nematode; and a decay fungus from the *Heterobasidion* genus.

[107] Other pests from the original list were dropped, after justifications were discussed (e.g. relevance to wood products and significantly reduced risk of pathway via WPMs (e.g. Anobiidae, Lepidoptera: (Cossoid-Sessoid-Tortricoid assemblages, Siricidae, *Fusarium circinatum*, tree killing *Phytophthora* spp., deep penetrating blue stain fungi, canker fungi/chestnut blight, root rot fungi)

[108] Step 2 would involve replicated experiments (with no survivors) at the estimated lethal dose using the most tolerant pests determined during step 1. This would use a minimum sample size of 60 experimental units, which achieves 0.95 statistical reliability at the 95% confidence level. If possible

test one or two doses above or below the estimated lethal dose. If there are survivors, increase dosage until no survivors.

[109] Step 3 would use the most tolerant pests under simulated operational conditions using wood samples similar in size to WPM and infested to levels that reflect field conditions. The 'Cardiff Protocol' would be used to estimate the number of pests that should be treated taking into account the biology of the pest, the pest relationship with WPM, and the trading patterns of WPM internationally.

[110] The panel then discussed the presentation given by the invited expert:

[111] Sample size – for pests that are found in very large numbers and are not necessarily discrete populations e.g. nematodes/fungi, developers should treat a piece of wood as a single unit. At the 95% level of confidence, treating a total sample size of 60 pieces of wood with no survivors provides a 0.95 level of statistical reliability in the treatment schedule. There is only one of two possible results for each piece of wood; target organisms are all dead (a success) or there are survivors (a failure). If the target organisms survive the treatment schedule fails for that piece of wood or if there is no surviving target organisms the treatment schedule succeeds for that piece of wood.

[112] Replication of experiments in confirmatory trials (i.e. step three of the process proposed by IFQRG (TPFQ_2013_Jun_16) – for pieces of wood or individual target pests, replication needs to be considered as per ISPM 28:2007. The panel considered that at least 3 replications are required for each sample (i.e. each set of treatment parameters (e.g. heat time and temperature)). Appropriate controls should be used with each replicate. The total number of wood pieces or target individual pests included in the replicates is considered the sample size (e.g. three replications of 20 pieces of wood will equal a total sample size of 60 pieces of wood).

[113] List of target pests – IFQRG have worked on the list of target pests for a number of years. The most recent list was considered appropriate to address the risks of pests in or on the wood that affect forests and the most practical for treatment schedule development although it is recognised that significant assumptions are being made (e.g. selection of a few species out of 20,000+ species in some of the families).

7.4 Review of Draft Treatment Criteria

[114] Two small working groups within the panel were established in preparation for the panel deliberation on the draft treatment criteria for ISPM 15. These working groups:

[115] **a)** reviewed the members comments on the draft criteria to identify the significant concerns (see section 7.2 of this report);

[116] **b)** reviewed the text of the draft criteria and updated with text from IFQRG (and subsequent modifications).

[117] Panel had an overview of the text of the draft criteria edited with the modified IFQRG text. The IFQRG text originated from IFQRG 9:2011 and needed to be modified to accommodate the IFQRG 10:2012 development of the 'Cardiff Protocol'.

[118] The panel worked through the redrafted text provided by one of the working groups and as modified by the panel during the week.

[119] ***Text of the overview of the criteria***

[120] The draft text under consideration stated that the treatment developer needs to "*consult with experts (e.g. statisticians and pest biologists) at an early stage in the process in order to select candidate pests and design any required experiments appropriately.*" The panel discussed the suitability of this statement in the text. Should the treatment provider contact the TPFQ or the TPPT, or should they contact their NPPO who should then contact the Secretariat or technical experts as appropriate? The panel discussed at some length the role of the NPPO, TPPT and the Secretariat in providing advice to

treatment developers on experimental design. The panel considered that the NPPO should be the first point of contact should science experts contacted by the treatment developer not be able to resolve the problem. The NPPO could then contact the Secretariat for further guidance if required. As the TPPT evaluates submissions there is a potential conflict of interest if they also provide advice on how the research should be carried out.

[121] The panel looked at the title of the criteria and reworded it to remove redundant words and, based on member comments, to better reflect the guidance nature of the document. The panel discussed whether the criteria should be an annex or an appendix. The panel considered that the text is prescriptive and sets a process that must be followed to successfully submit a treatment schedule for ISPM 15. As such the criteria should be an annex rather than an appendix. The Secretariat noted that when it comes to amending annexes or appendices, there is no reduced or simplified process when compared to amending the main text of an ISPM.

[122] The panel considered that treatment developers should be expected to review and report on existing literature for science already developed that may support or show issues with their treatment schedule.

[123] The panel looked at the table of pests of concern to WPM in international trade considering member comments made during consultation on the draft criteria. The suggestion to include 'quarantine' in front of pests was rejected as local non-quarantine pests may be used in testing if they belong to one of the listed families. While we are only concerned with quarantine pests in international trade we want to ensure treatment developers are not limited to using quarantine pests only, especially when local pests would be suitable. It is also acceptable to use pests that are globally distributed e.g. not of quarantine concern internationally, as these may be more practical.

[124] Asian longhorn beetle (ALB) and Pine wood nematode (PWN): The group discussed why ALB should no longer be specifically named in the list of pests of concern (the family group is included). The panel considered that ALB is a "pest of today" and as such reflects countries concerns at this time. In the future other pests may become a focus of international concern and necessitate a change in the list in ISPM 15:2009. By remaining general e.g. at the family level, we "future-proof" the list. In contrast, PWN should be kept as a named organisms since it is the only species in this genus of concern on wood (*B. cocophilus* is a pest of palms). The panel discussed the possible use in testing of *B. mucronatus* rather than PWN. This had been included before as a possible surrogate and would still be appropriate as long as their response to the treatment schedule was demonstrated to be comparable to one of the listed target species/groups (e.g. PWN).

[125] The panel discussed the need for a table of target pests in the criteria. The table is used as a reference in the rest of the text. The panel agreed to keep this information in table form.

[126] A member comment made during consultation on the draft treatment criteria in 2010 raised a question on the need for efficacy testing against bark beetles given WPM must be de-barked. The panel noted that bark beetles remain a target for the treatment schedule as WPM is not bark free but rather can have small pieces of bark remaining. While these small pieces of remaining bark will prevent re-infestation of the wood by bark beetles, it would not prevent mature bark beetle larvae or pupae from completing their life cycle. The treatment schedule therefore still needs to be effective against bark beetles.

[127] A discussion ensued on the wording of the description of the list of target groups and species, with the panel not wanting to suggest that the list represented all pests of WPM. The list actually represents a list of selected groups or organisms that are of greatest risk in the international movement of WPM.

[128] The panel discussed more specifically the list of pests and pest groups included in table 1. The chapeau should also contain some text on the criteria used to select that pests or pests groups in table 1. The principles behind why a group or species is included or not included in the list were as follows:

[129] Based on the work of IFQRG 9:2011 (TPFQ_2013_Jun_48), the panel considered that the following organisms from table 1 in the draft criteria (2010) (TPFQ_2013_Jun_08) do not need be included in

the pest list. The panel noted that at the time IFQRG was considering using reference species rather than pest species, and the 'Cardiff Protocol' had not been developed. The panel now considers reference species are no longer necessary or suitable.

[130] The panel considered that the list could be provided at the lowest taxonomic level possible (e.g. species level). The seven pest groups agreed to below were derived through consideration of regional differences of pest species distribution and toward the goal of arriving at a practical number of species to be tested. Some pest groups were excluded based on consideration of their overall pest risk or the fact that they were not likely to be present at the time of treatment.

[131] - Anobiidae: removed, as they are not significant as tree killers and are rare from interception data.

[132] - Lepidoptera: (Cossoid-Sessoid-Tortricoid assemblages) removed, as they are mostly on the outside of trees, are rarely intercepted, and their large size makes them vulnerable to sawmilling.

[133] - Siricidae: While IFQRG recommended removal based on the challenge of collecting samples for testing, TPFQ considered that these reasons were no longer valid given the application of the 'Cardiff Protocol' to reduce test numbers. During the Belem meeting the chair of IFQRG contacted IFQRG entomologists requesting re-evaluation of the 2011 IFQRG recommendation excluding the Siricidae. Two members responded, supporting the inclusion of the Siricidae, providing literature references and guidance on techniques for the collection of representative specimens for testing (TPFQ_2013_Jun_49).

[134] - *Fusarium circinatum*: removed - WPM not seen as major pathway.

[135] - A tree killing *Phytophthora* spp.: removed - low evidence of establishment from wood or WPM.

[136] - Deep penetrating blue stain fungi: removed - saprophytes only affect living trees when associated with aggressive bark beetles that mass attack trees. There is little evidence of establishment of these fungi from wood or WPM.

[137] - Canker fungi/chestnut blight: removed. There is paucity of evidence of spread via the WPM pathway and historical evidence shows that these fungi are unlikely to be spread by WPM.

[138] - Root rot fungi: removed - deemed to be very low risk of spreading via WPM.

[139] The panel concluded therefore with the following list of seven pest groups or species for table 1 in the treatment criteria: Bostrychidae, Buprestidae, Cerambycidae, Scolytinae and Siricidae; a *Heterobasidion* species; and *Bursaphelenchus xylophilus*.

[140] It was noted that the term 'Treatment schedule' (*The critical parameters of a treatment which need to be met to achieve the intended outcome (i.e. the killing, inactivation or removal of pests, or rendering pests infertile, or devitalization) at a stated efficacy*) is also defined in ISPM 5:2012 and will need to be reflected in the criteria. The panel defined the terms related to pest "mortality" and "survival" for the criteria incorporating the definition of treatment schedule and more specifically the different forms of the intended outcome (e.g. killing, inactivation or removal of pests, or rendering pests infertile, or devitalization).

[141] The panel discussed the purpose or focus of the steps in the process. The panel discussed the value of linking at least initially each step to parts of ISPM 28:2007. It was noted that the process is laid out into steps for ease of description however actual research may occur in a less structured way with steps potentially being combined.

[142] It was agreed that the first steps (1 and 2) in the process were focused on using laboratory studies to narrow down as many of the treatment parameters (list in ISPM 28:2007) as possible. The parameters include appropriate treatment dose, most tolerant pest species, most tolerant life stage, and potential condition of the wood during treatment (e.g. moisture content, density, dimensions).

[143] The panel considered that all tests should have appropriate controls. This text would be added in the chapeau.

[144] ***Text of Step One: Screening Process***

[145] The panel discussed the need to test all of the life stages of the pests and pest species within each group under consideration or provide adequate justification for why only some or one was tested. The same principle applies to the species selected from each group. Treatment developers should ensure that a literature review has been completed to identify any published evidence of species and/or life stage tolerance. The life stages tested should be those of species in the whole group (rather than just the selected species) likely to be associated with the WPM at the time the wood is treated. All appropriate life stages from all groups should be considered independently, however not all need be tested if adequate justification can be provided for not doing so e.g. if it is known older life stages are more tolerant to the treatment schedule, then the testing could focus on the oldest life stage that would be associated with the wood in the WPM at the time of treatment.

[146] The panel discussed what the target 'test unit' could be. It would depend on the target pest in the experiment but for fungi or nematodes the test unit would be a piece of wood and for insects an individual insect, all usually at a single life stage or group of life stages. This is because fungi and nematodes within wood can not be easily separated and pseudo-replication avoided. Therefore each piece of wood containing the fungal or nematode population should be considered as one unit. As these pieces of wood are likely to contain many of the life stages of the test organisms, the need to test these life stages separately may also be avoided. In the case of small insects, to avoid pseudo-replication the number of tested individuals may need to be higher than would otherwise be required as at least 5 pieces of wood should be used and there may be more than one of these insects per piece of wood.

[147] For test units that are individuals, these pests should be tested in-situ (*in-vivo*) unless it has been shown that the pest has an equivalent response to the treatment *in-vitro*. The text from the original draft of the criteria (paragraph [23] of TPFQ_2013_Jun_08) was used here.

[148] The panel discussed the need for the use of isolates not only for fungi but also for insects given that local populations can have different levels of virulence. While this should not be mandated for insects it could still be encouraged as far as is possible in the text. The panel concluded that there was little published information that different populations have significant differences in treatment tolerances in general. Also the panel has not asked for widespread testing of other species of insects (inter-species) which are likely to show significantly more variation than intra-species testing. IFQRG will look at this in more detail.

[149] The panel discussed the need to ensure the treatment developer is aware of the mechanism(s) (i.e. physical or chemical) the treatment schedule affects or acts on the different types of organisms in table 1. This is important in helping the evaluators, the Technical Panel on Phytosanitary Treatments (TPPT), understand the possible limitations (or not) of the treatment schedule.

[150] The panel discussed the need for the treatment developer to ensure the test species selected from each group was the most appropriate from the information known to demonstrate the effectiveness of the treatment schedule. Characteristics such as pest biology, tolerance to the treatment schedule etc, should be considered using existing (published) information. For example some Scolytidae adults overwinter in soil litter while others do so in wood. This may be significant if adults were the most resistant life stage to the treatment schedule. EAB is more tolerant of heat than other Buprestid species. In both of these instances the treatment developer could still use their local example but would need to explain how they have managed any differences with the more appropriate test species.

[151] ***Text of Step Two: Effect of Physical Parameters***

[152] The panel discussed the scope of step 2 and agreed that the intent is to identify the effect of physical parameters on the delivery (application) of the treatment schedule in line with the requirements of

section 3.1 of ISPM 28:2007. The panel considered it necessary to include a comprehensive list of the parameters in the criteria to enhance clarity and guidance to treatment developers.

[153] The panel recognized that the testing of physical parameters could not be achieved using the most resistant pest as this pest may only survive in wood of certain parameters e.g. PWN in pine wood. Testing of these parameters may not need to involve exposing pests as the limitations can be tested using physical measurements e.g. concentration of fumigant, temperature etc. These parameters only need to be tested if alternative justifications can not be provided (e.g. temperature through profile of wood must be met). Guidance should be provided on the range or "book ends" of conditions required for each parameter e.g. examples of most dense and least dense wood, dry wood (~10%) vs wood with high moisture content (~100%). The panel agreed that guidance would be required to ensure both adequate consideration of the global diversity of these parameters and limit the extent of testing required. The panel also noted that limitations in the physical abilities of the treatment schedule may not limit to any great extent the versatility of the treatment schedule in international use (e.g. 20cm limitation on methyl bromide and dielectric heating).

[154] The panel discussed what would be a suitable outcome or endpoint of any treatment schedule applied to WPM. It was discussed if pest sterilization (i.e. rendering pests unable to reproduce) would be appropriate given the nature of the wood and pest association, and the nature of irradiation. The panel considered that the treatment developer needs to demonstrate that the required treatment parameters are achieved throughout the profile of the wood and are practical and appropriate to managing the risks of pests in WPM in international trade. ISPM 5:2013 defines the outcome of the as being the "*killing, inactivation or removal of pests, or for rendering pests infertile or for devitalization***"**. This concept needs to be reflected in the text of the criteria.

[155] The panel agreed that it was appropriate to allow treatment developers to demonstrate the successful application of the treatment schedule under different physical parameters without the need to expose pest species. For example, demonstrating that a lethal fumigant dose or lethal temperature is achievable through an explanation of the chemical or physical properties of wood. The text was modified to allow this to occur in step 2.

[156] ***Text of Step Three: Validation of the Effective Treatment Level***

[157] The panel agreed that at stage 3 of the testing the spread of doses was not necessary given that Stage 1 testing confirms the dose over a range and Stage 4 confirms the efficacy using the 'Cardiff Protocol' to set the level (rather than probit 9) (e.g. the original intent was to avoid the need for the probit 9 requirement). It was also noted that treatment schedules have already been accepted into ISPM 28:2007 without the submitter providing dose curves for the treatment schedule.

[158] The panel discussed the test size of 60 test units and the need for replications (or not). This step is for the treatment developer only and provides them with some more confidence that they have the correct dose for use in operational trials. Therefore the panel agreed that replication was not required however treatment developers would use replicates if they required further confidence. The panel considered any reference to the level of confidence provided by this step was not appropriate as replications are not specified and it is covered in Step 4.

[159] ***Text of Step Four: Validation under Operational Conditions***

[160] The panel discussed the parameters of the operational testing (Step 4). While the treatment schedule should cover all types and sizes of WPM, testing in stage 2 may have indicated that the efficacy of the treatment schedule is limited in one or more parameters (e.g. maximum of 20cm wide wood). This limitation may still allow for a versatile treatment schedule (e.g. a treatment schedule that can be applied to the majority of WPM). The operational or confirmatory testing should be carried out within the effective parameters of the treatment schedule. Treatment developers should also recognize that use of limited parameters in operational testing will limit the use of the treatment schedule in the standard (by the same parameters e.g. maximum of 20cm wide wood).

[161] The panel discussed the limitations on testing all operational conditions as the target pest may not survive in all of these conditions e.g. PWN will not survive in hardwoods. The operational conditions therefore need to reflect (or compromise) both the physical parameters of WPM in trade and the requirement for survival of the target test species.

[162] The panel discussed how the treatment developer should respond to a treatment schedule failure at this stage in the testing (Step 4 operational validation). The treatment developer has a number of options including increasing the dose or going back to step 1 and doing more testing to determine why the treatment schedule failed. This should be self evident to treatment developers and need not be stated in the criteria. Should a failure occur however, the treatment developers should be able to explain why that failure happened or provide a new treatment schedule where testing demonstrated no treatment failures.

[163] The panel reviewed the description of the "Cardiff Protocol" for the text of the criteria. The panel discussed why this method should only be relevant to insects and not fungi or nematodes. It was agreed that fungi infest wood as many parts of a single organism and attempting to count them as individuals would not be possible. Large numbers of nematodes can be treated in a single piece of wood however this results in significant pseudo-replication. Treating many pieces of wood containing nematodes at a natural infestation level avoids a significant amount of pseudo-replication as long as each piece of wood is considered a single test unit.

[164] The panel discussed the issue of reference species or substitutes (surrogates) and whether they should be allowed with appropriate justification. The panel agreed that the use of reference species or substitutes should not be excluded subject to the provision of suitable justification by the treatment submitter.

[165] The panel discussed the situation when wood pieces are fixed together under operational conditions increasing the width of the wood (e.g. wood pallets). The panel noted that any limitations on the application of the treatment schedule based on the conditions of the validation experiments would need to be stipulated in the treatment schedule (e.g. Methyl bromide fumigation has a penetration limit of 20cm so stacks of wood must be spaced (separated) to ensure the combined width does not exceed 20cm).

[166] Pallet aggregation – it needs to be considered that pallets aggregated at one place may be from different origins and may be of different ages etc. The number of pallets and other numbers used in the 'Cardiff protocol' estimates are conservative. These numbers just provide biological reality to the number of pests required to demonstrate, in the final step, the level of full-scale testing required to demonstrate operational suitability. To ensure consistency in the application of the criteria the panel agreed this value should be stipulated. A paper developed by an IFQRG working group in 2012 canvassed WPM suppliers in the US and EU and estimated this number to be 300. The panel accepted this number for the draft of the criteria.

[167] The panel also agreed that the wood volume of a single unit of WPM needs to be stated for consistency. Shortemeyer *et al* (2011) provided an average wood volume for a pallet and this was included in the formula for reference.

[168] A Maximum Pest Limit (MPL) was originally defined in Baker *et al* (1990)[2]. The panel adjusted the definition to make it appropriate for ISPM 15:2009.

[169] The panel discussed the need for widely available published information on how to apply the 'Cardiff Protocol' and worked examples. The task for getting a publication competed prior to the May 2014 meeting of the SC will be passed to IFQRG.

[2] Baker R.T, Cowley J.M, Harte D.S, Frampton E.R (1990) Development of a maximum pest limit for fruit flies (Diptera: Tephritidae) in produce imported into New Zealand. Journal of Economic Entomology 83: 13-17.

8. Review of Issue of Moisture Content in Wood and Methyl Bromide Penetration

[170] This issue was not discussed at this meeting. The issue will be added to the agenda of a future virtual meeting of the panel.

9. Handicrafts Specification

[171] The panel discussed the relative merits of having the TPFQ draft the proposed Handicrafts ISPM rather than establishing an Expert Working Group (EWG). The panel considered that an EWG could be established to include the appropriate experts; some of which may come from TPFQ. Comments from TPFQ members should be made through their country comments on the specification.

10. Other Business

[172] The panel discussed the use of share point to facilitate the work of the panel in developing and editing documents. The Secretariat will attempt to trial the use of this system for the work of the TPFQ.

11. Follow-Up Actions for the Next TPFQ Meeting

[173] The panel agreed to hold their next virtual meeting on Thursday the 18th of July, 2013. The meeting would discuss the draft report of the June meeting in Brazil, the joint TPFQ/IFQRG work programme, and the TPFQ work programme (including outstanding items from this meeting).

12. Close of the Meeting

[174] The panel thanked the invited expert for his contribution to the work of the panel and appreciated his effort and expertise. The panel also thanked the local organizers for their support during the meeting, and the efforts they made to provide local types of food for the meeting participants to enjoy.

[175]

Appendix 1: Agenda

AGENDA ITEM	DOCUMENT NO.	PRESENTER
1. Opening of the meeting		
1.1 Welcome by the IPPC Secretariat		LARSON/ ORMSBY
1.2 Welcome by the Hosts		LOCAL ORGANISER
1.3 Election of the Chair		ORMSBY
1.4 Election of the Rapporteur		CHAIR
1.5 Adoption of the Agenda	TPFQ_2013_Jun_01	CHAIR
2. Administrative Matters		
2.1 Documents List	TPFQ_2013_Jun_02	ORMSBY
2.2 Participants List	TPFQ_2013_Jun_03	ORMSBY
2.3 Local Information	TPFQ_2013_Jun_04	ORMSBY
3. Updates from relevant Bodies		
3.1 Items arising from 2012 October Strategic Planning Group (SPG)	TPFQ_2013_Jun_05	LARSON/ ORMSBY
3.2 Items arising from 2012 October Bureau	TPFQ_2013_Jun_05	LARSON/ ORMSBY
3.3 Items arising from CPM 8 (2013)	TPFQ_2013_Jun_05	LARSON/ ORMSBY
3.4 Items arising from 2013 May SC	TPFQ_2013_Jun_05	LARSON/ ORMSBY
3.5 Items arising and updates from other Technical Panels	TPFQ_2013_Jun_05	LARSON/ ORMSBY

3.6 Update from the IPPC Secretariat
• Standard Setting
  ○ Call for Treatments
  ○ Calls for Experts
• Communications
• Information Exchange
• Capacity Development
• Implementation Review and Support System (IRSS)
	TPFQ_2013_Jun_06	LARSON

3.7 Specifications for: Technical Panel on Forest Quarantine (2004-004) Revision of ISPM 15 (Regulation of wood packaging material in international trade): Criteria for treatments for wood packaging material in international trade (2006-010)	TPFQ_2013_Jun_07 TPFQ_2013_Jun_41	LARSON
4. Revision of ISPM 15 (Regulation of wood packaging material in international trade): Criteria for treatments for wood packaging material in international trade (2006-010)	TPFQ_2013_Jun_08 TPFQ_2013_Jun_09 TPFQ_2013_Jun_10 TPFQ_2013_Jun_11 TPFQ_2013_Jun_12 TPFQ_2013_Jun_48 TPFQ_2013_Jun_49	

AGENDA ITEM	DOCUMENT NO.	PRESENTER
4.1 History of the development of the ISPM 15 Treatment Criteria	TPFQ_2013_Jun_13	ALLEN/ORMSBY
4.2 IFQRG Working Group report	TPFQ_2013_Jun_14	UZUNOVIC
4.3 Draft Treatment Criteria 2010 (IFQRG Report)	TPFQ_2013_Jun_15	ORMSBY
4.4 Description of the 'Cardiff Protocol'	TPFQ_2013_Jun_16 TPFQ_2013_Jun_17 TPFQ_2013_Jun_18 TPFQ_2013_Jun_19 TPFQ_2013_Jun_20 TPFQ_2013_Jun_21 TPFQ_2013_Jun_22 TPFQ_2013_Jun_23 TPFQ_2013_Jun_24 TPFQ_2013_Jun_25 TPFQ_2013_Jun_26	ORMSBY
5. Review of issue of Moisture Content in wood and Methyl Bromide penetration		
5.1 Report from SC November 2012	TPFQ_2013_Jun_27	ORMSBY
5.2 TPFQ Report to SC (2012) and references	TPFQ_2013_Jun_28 TPFQ_2013_Jun_29 TPFQ_2013_Jun_30 TPFQ_2013_Jun_31 TPFQ_2013_Jun_32 TPFQ_2013_Jun_33 TPFQ_2013_Jun_34 TPFQ_2013_Jun_35 TPFQ_2013_Jun_36 TPFQ_2013_Jun_37	
6. Revision of Explanatory Documents		
6.1 ISPM 15 (*2013*) explanatory document	TPFQ_2013_Jun_38	SELA
6.2 HT explanatory document	TPFQ_2013_Jun_38	SCHRÖDER
6.3 MeBr explanatory document	TPFQ_2013_Jun_38	MATSUI / ORMSBY
7. Management of phytosanitary risks in the international movement of wood (2006-029)		
7.1 Report from SC May 2013.	TPFQ_2013_Jun_39	ORMSBY
7.2 Updated Wood Standard for Member Consultation in 2013	TPFQ_2013_Jun_40	ORMSBY
8. Specification on Handicrafts ISPM ()		
8.1 Topic description approved at SC May 2013 for member consultation.	TPFQ_2013_Jun_42	ORMSBY
9. Recommendations to the SC		CHAIR
10. Other business		
10.1 Virtual Tools • IPP (www.ippc.int) • OCS (www.ocs.ippc.int) • Adobe Connect • Share Point	TPFQ_2013_Jun_43	ORMSBY

AGENDA ITEM	DOCUMENT NO.	PRESENTER
10.2 Engaging Experts		ORMSBY
10.3 Approval of the Report of the MAY Virtual Meeting of TPFQ	TPFQ_2013_Jun_44	ORMSBY
10.4 ISPM 15 (2009) with updated Annex 1 (2013)	TPFQ_2013_Jun_45	SCHRÖDER
10.5 IFQRG/TPFQ joint work programme	TPFQ_2013_Jun_46	ALLEN
11. Follow-up Actions for next TPPT Meeting		
11.1 TPFQ Work Programme and Medium Term Plan	TPFQ_2013_Jun_47	ORMSBY
12. Close of the meeting		CHAIR

Appendix 2: Documents List

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
TPFQ_2013_Jun_01	**1.5**	Agenda Tentative V1 (ORMSBY)	2013-04-23
TPFQ_2013_Jun_02	**2.1**	Documents List Preliminary (ORMSBY)	2013-04-23
TPFQ_2013_Jun_03	**2.2**	Participants List (ORMSBY)	2013-04-23
TPFQ_2013_Jun_04	**2.3**	Local Information (MOLLER/ORMSBY)	
TPFQ_2013_Jun_05	**3.1 to 3.5**	Items arising from other relevant bodies	2013-05-29
TPFQ_2013_Jun_06	**3.6**	Update from IPPC Secretariat	2013-05-29
TPFQ_2013_Jun_07	**3.7**	Specification on TPFQ (2004-004)	
TPFQ_2013_Jun_08	**4.0**	Criteria for Treatments for ISPM15 - Country Consultation	2013-04-23
TPFQ_2013_Jun_09	**4.0**	Compiled Comments from Country Consultation	2013-05-29
TPFQ_2013_Jun_10	**4.0**	Steward notes on Compiled Comments	2013-04-23
TPFQ_2013_Jun_11	**4.0**	Treatment Criteria Decision Tree	2013-04-23
TPFQ_2013_Jun_12	**4.0**	TPFQ Report to SC on Revision of Treatment Criteria (November 2012)	2013-04-23
TPFQ_2013_Jun_13	**4.1**	History of ISPM15 Treatment Criteria Development	2013-04-23
TPFQ_2013_Jun_14	**4.2**	IFQRG Working Group Report (EVANS)	2013-04-23
TPFQ_2013_Jun_15	**4.3**	Ormsby et al (2008) IFQRG Report on Treatment Criteria	2013-04-23
TPFQ_2013_Jun_16	**4.4**	Data for the Cardiff Protocol (2012)	2013-04-23
TPFQ_2013_Jun_17	**4.4**	TPFQ_July_09_Fungi and Wood	2013-04-23
TPFQ_2013_Jun_18	**4.4**	Adachi I. (1994) Development and life cycle of *Anoplophora malasiaca* (Thomson) (Coleoptera: Cerambycidae) on citrus trees under fluctuating and constant temperature regimes. Applied Entomology and Zoology 29: 485-497.	2013-04-23
TPFQ_2013_Jun_19	**4.4**	Bartell S.M., Nair S.K. (2003) Establishment risks for invasive species. Risk Analysis 24: 833-845.	2013-04-23
TPFQ_2013_Jun_20	**4.4**	CPM 8 (2013) Review of Phytosanitary Security Based on a Probit9 Treatment Standard. Prepared by R. Griffin.	2013-04-23
TPFQ_2013_Jun_21	**4.4**	Mitomi M., Kuroda E., Okamoto H. (1990) Ecological study of the white-spotted longicorn beetle, *Anoplophora malasiaca* Thomson (Coleoptera: Cerambycidae). I. Investigation of adult emergence holes in citrus orchards in Kagawa Prefecture. Japanese Journal of Applied Entomology and Zoology 34: 7-13.	2013-04-23
TPFQ_2013_Jun_22	**4.4**	Selness A. R., Venette R. C. (2006a) Minnesota pest risk assessment. *Sirex noctilio* Fabricius [Hymenoptera: Siricidae]. PRA-SNOC-001: pp 26.	2013-04-23

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
TPFQ_2013_Jun_23	**4.4**	Selness A. R., Venette R. C. (2006b) Minnesota pest risk assessment. Emerald Ash Borer, *Agrilus planipennis* (Fairmaire) [Coleoptera: Buprestidae]. PRA-APLA-001: pp 26.	2013-04-23
TPFQ_2013_Jun_24	**4.4**	Togashi K. (1989) Factors affecting the number of *Bursaphelenchus xylophilus* (Nematoda: Aphelenchoididae) carried by newly emerged adults of *Monochamus alternatus* (Coleoptera: Cerambycidae). Applied Entomology and Zoology 24: 379-386	2013-04-23
TPFQ_2013_Jun_25	**4.4**	Togashi K. (1990) Life table for *Monochamus alternatus* (Coleoptera, Cerambycidae) within dead trees of Pinus thunbergii. Japanese Journal of Entomology 58(2): 217-230	2013-04-23
TPFQ_2013_Jun_26	**4.4**	Zondag R., Nuttal M. J. (1977) *Sirex noctilio* Fabricius (Hymenoptera: Siricidae). FRI, NZ For. Serv., Forest and Timber Insects in New Zealand 20: 1-7.	2013-04-23
TPFQ_2013_Jun_27	**5.1**	SC response to Moisture Content in Wood	2013-05-29
TPFQ_2013_Jun_28	**5.2**	Report from SC November 2012 on Moisture Content and Meth bromide	2013-05-29
TPFQ_2013_Jun_29	**5.2**	Barak A.V., Wang Y., Xu L., Rong Z., Hang X., Zhan G. (2005) Methyl Bromide as a Quarantine Treatment for *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in Regulated Wood Packing Material. J. of Econ. Ent. 98(6): 1911-1916.	2013-04-23
TPFQ_2013_Jun_30	**5.2**	Defo M., Brunette G. (2006) Forest Products Journal. A log drying model and its application to the simulation of the impact of bark loss. Forest Products Journal 56 (5): 71-77.	2013-04-23
TPFQ_2013_Jun_31	**5.2**	Denig J., Wengert E., Simpson W. (2000) Drying Hardwood Lumber. USDA Forest Service Technical Report FPL-GTR-118. 138pp.	2013-04-23
TPFQ_2013_Jun_32	**5.2**	Liese W., Knigge, H. & Ruetze, M. (1981) Fumigation experiments with methyl bromide on oak wood. Material und Organismen 265-280	2013-04-23
TPFQ_2013_Jun_33	**5.2**	Liukkoxs K., Elowsson T. (1999) The Effect of Bark Condition, Delivery Time and Climate-adapted Wet Storage on the Moisture Content of Picea abies (L.) Karst. Pulpwood. Scandinavian Journal of Forest Research 14 (2): 156-163	2013-04-23
TPFQ_2013_Jun_34	**5.2**	Osunkoya O, Sheng T, Mahmud N-A, Damit N (2007) Variation in wood density, wood water content, stem growth and mortality among twenty-seven tree species in a tropical rainforest on Borneo Island. Austral Ecology 32 (2): 191–201	2013-04-23
TPFQ_2013_Jun_35	**5.2**	Rhatigan R. (1996) Toxicity of Methyl Bromide to Fungi Inhabiting Dahurian Larch Wood. MSc Thesis: pp 159.	2013-04-23

DOCUMENT NUMBER	AGENDA ITEM	DOCUMENT TITLE (PREPARED BY)	DATE POSTED / DISTRIBUTED
TPFQ_2013_Jun_36	**5.2**	Simpson W, TenWolde A (1999) Physical properties and moisture relations of wood. Wood handbook: wood as an engineering material. Madison, WI : USDA Forest Service, Forest Products Laboratory. General technical report FPL GTR-113: 3.1-3.24	2013-04-23
TPFQ_2013_Jun_37	**5.2**	Suzuki E. (1999) Diversity in specific gravity and water content of wood among Bornean tropical rainforest trees. Ecological Research 14 (3): 211-224	2013-04-23
TPFQ_2013_Jun_38	**6.1 to 6.3**	ISPM 15 (2013) explanatory documents	2013-05-29
TPFQ_2013_Jun_39	**7.1**	SC (May 2013) update on wood standard	2013-05-29
TPFQ_2013_Jun_40	**7.2**	Management of phytosanitary risks in the international movement of wood (2006-029)	2013-05-29
TPFQ_2013_Jun_41	**3.7**	Specification 31 on ISPM 15 revision	2013-05-29
TPFQ_2013_Jun_42	**8.1**	Draft specification on wood products and handicrafts made from raw wood (2008-008)	2013-05-29
TPFQ_2013_Jun_43	**10.1**	Virtual tools	2013-05-29
TPFQ_2013_Jun_44	**10.3**	Draft Report of the TPFQ MAY Virtual Meeting	2013-05-29
TPFQ_2013_Jun_45	**10.4**	ISPM 15:2009 with updated Annex 1 (2013)	2013-05-29
TPFQ_2013_Jun_46	**10.5**	Report of IFQRG Meeting Cardiff 2012	2013-05-29
TPFQ_2013_Jun_47	**11.1**	TPFQ Work Programme 2013-2014	2013-05-29
TPFQ_2013_Jun_48	**4.0**	Report of IFQRG Meeting Cardiff 2011	2013-06-12
TPFQ_2013_Jun_49	**4.0**	Humble, L.M. 2013 Scientific recommendation on the suitability of including Siricidae in the ISPM 15:2009 treatment criteria	2013-06-12

Appendix 3: Participants List

Participant role	Name, mailing, address, telephone	Email address	Membership Confirmed	Term expires
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Member	Mr. Victor **AGYEMAN** Director, Forestry Research Institute of Ghana (FORIG) University Box 63, KNUST, Kumasi, GHANA Tel: +233-24-4844171 or +233-51-60122 Fax +233-51-60121	agyemanvictor@yahoo.com	2011 (SC Nov)	2016
Member as Chair of IFQRG	Mr. Eric **ALLEN** Chair, International Forestry Quarantine Research Group, and Research scientist Canadian Forest Service Natural Resources Canada Pacific Forestry Centre 506 West Burnside Road Victoria, BC V8Z 1M5, CANADA Tel: (+1) 250 298 2350; Fax: (+1) 250 363 0775	eallen@nrcan.gc.ca	2011 (SC Nov)	2016
Member	Mr Edson Tadeu **IEDE** EMBRAPA Centro Nacional de Pesquisa de Florestas Estrada da Ribeira Km 111 CEP: 83.411-000 Colombo, Paraná, BRAZIL Tel: (+55) 41 3675 5600 / 5727 Fax: (+55) 41 3675 5601 / 5737	edson.iede@embrapa.br	2011 (SC Nov)	2016

Participant role	Name, mailing, address, telephone	Email address	Membership Confirmed	Term expires
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Member	Mr. Mamoru **MATSUI** Senior officer, Kobe Plant Protection Station Ministry of Agriculture, Forestry and Fisheries Kobe district (2nd) government building Hatoba-cho 1-1, Chu-ou-ku Kobe, Hyogo, 650-0042, JAPAN Tel: (+81) 78 331 2376 Fax: (+81) 78 331 2387	matsuim@pps.maff.go.jp	2011 (SC Nov)	2016
Member	Mr. Thomas **SCHRÖDER** Scientist/Project Manager Julius Kuhn-Institut Federal Research Centre for Cultivated Plants Institute for Plant Health Messeweg 11/12 38104 – Braunschweig, GERMANY Tel: (+49) 531 299 3381; Fax: (+49) 531 299 3007	thomas.schroeder@jki.bund.de	2011 (SC Nov)	2016
Invited Expert	Dr. Adnan **UZUNOVIC** Research Scientist, Mycologist 2665, East Mall, Vancouver, (BC), Canada, V6T 1W5 Tel: (+1) 604-222-5729; Fax: (+1) 604-6222-5690	adnan.uzunovic@fpinnovations.ca	N/A	N/A
IPPC Secretariat	Mr. Michael **ORMSBY** Senior Adviser, Science and Risk Assessment Ministry for Primary Industries P.O. Box 2526 Wellington, NEW ZEALAND Tel: (+64) 4 894 0486; Fax: (+64) 4 894 0733	Michael.Ormsby@fao.org	N/A	N/A
IPPC Secretariat	Mr Brent **LARSON** Standards Officer AGPP – IPPC Secretariat Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla 00153 Rome, ITALY Tel: +39 06 5705 4915 Fax: + 39 06 5705 4819	brent.larson@fao.org	N/A	N/A

Participant role	Name, mailing, address, telephone	Email address	Membership Confirmed	Term expires
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Brazil NPPO Local Contact	Mr Marco Antonio **ARAUJO DE ALENCAR** Coordinator of Phytosanitary International Affairs Ministry of Agriculture, Livestock and Supply Esplanada dos Ministerios Brasilia DF 70043900 Phone: (+55) 61 32182416 Fax: (+55) 61 32254738	marco.alencar@agricultura.gov.br	N/A	N/A

Appendix 4: Responses to Selected Member Comments

Comment Number	Proposed rewording	Explanation	Steward's Response
4	Add a flow diagram of the process.	To clearly illustrate the process.	TPPT could be asked to prepare this if the SC desires a flow chart. The steward recalls that a "decision tree" was presented in the version of this draft submitted to the SC in May 2009 and that the SC removed it. The steward has sent a copy of that document to the Secretariat for reference purposes.
TPFQ Response	The panel considers that a flow diagram would not add any further clarity to the drafted text of the criteria, which includes a bulleted description of the process.		
7	It should be clarified how treatment comprising of several elements would fit within the Step 2 (screening) (e.g. combining chemical product and temperature treatment).		Good point – but this will need expert input, i.e., from TPFQ and/or TPPT to develop the text. SC to review and indicate if TPFQ should develop this
TPFQ Response	The criteria allow for the submission of treatments that apply more than one element.		
9	Suggest adopting more than one treatment method. Implement system approach in wood treatment to be applicable and cost effective		Good point – but this will need expert input, i.e., from TPFQ and/or TPPT to develop the text. SC to review and indicate if TPFQ should develop this.
TPFQ Response	The ISPM 15:2009 treatment criteria are for treatments only. A framework for developing and approving systems approaches for ISPM 15:2009 has not as yet been developed.		
17	This draft appendix requires major revision. The whole document is very much dependent on the groupings in Table 1, which are not based on sound biological taxonomic groups but on disease symptoms. This is not acceptable in a ISPM like this, which should be based on biology.		More details on the reasons why, and alternative proposals, are needed in order that revision can be conducted appropriately
TPFQ Response	Table 1 now contains pests or pest groups listed taxonomically.		

Comment Number	Proposed rewording	Explanation	Steward's Response
18	The U.S. is concerned that the testing standards proposed in this Appendix to ISPM 15 are so rigorous that they will effectively prevent the development of new treatments. The major difficulty lies in assembling the required number of experimental units of wood infested with forest pests to achieve Probit 9. Probit 9 is a standard developed for dose response of fruit flies, and it requires 99.9968% mortality in a sample of at least 100,000 individuals with a probability (p-value) of <0.05. For many of the pests on the proposed list, it would be virtually impossible to assemble populations of this size for testing. The larvae of these pests are 100 times larger than fruit flies and only occur sparsely in infested logs, so a whole forest would have to be infested and cut to test for efficacy at Probit 9. It has been suggested that this is too stringent for commodities that are rarely infested or are poor hosts (see Follet. P.A. and G.T. McQuate, 2001). The currently approved treatments were never tested with this level of rigor, and they might very well not pass muster if they were tested today. If we discourage new treatment development we will maintain the status quo, relying on current, less effective treatments. For example, Myers et al showed only 90% of emerald ash borer pre-pupae are killed by 56/30. Ramsfield, T.D. and Dick, M.A, 2010, recently reported that only two of 11 wood-inhabiting fungi tested were reliably killed by 56/30 (with 99.99% confidence). While ISPM 24 calls for equivalency of phytosanitary measures, we would hope to see better efficacy in ISPM 15 treatments than this. But to establish criteria as restrictive as those proposed in this draft Appendix will make this unlikely. The scope of this draft appendix to ISPM 15 has been expanded to include fungi and fungi-like organisms which were not considered as quarantine pests at the time ISPM 15 was developed. The appendix should reflect the same scope as the standard. Contaminating pests or other organisms that enter the wood packaging material after treatment are outside the scope of ISPM 15. Is there sufficient scientific justification to state these organisms can be transported in WPM and impact the health of a forest? An agreement of the scope of quarantine pests associated with WPM has become the road block to current attempts to develop new treatments. Countries cannot agree on what quarantine pests need to be tested. To compound the problem, new quarantine pests are identified in different parts of the world which can extend this research work for a long period of time.		The intent was to ensure that Probit 9 would not necessarily apply in each case (as per para. 29). However, the general basis remains Probit 9. The steward agrees that this is a very valid concern and urges the SC to consider this comment carefully and act on it appropriately. The SC will need to determine their position on this, in relation to all comments made, and to provide the appropriate guidance to the body tasked with redrafting this document.
TPFQ Response	The re-drafted criterion replaces the requirement for probit 9 testing levels with a formula that determines the testing level based in part on the biological attributes of the target pest. This should ensure the level of testing is feasible. The list of pests that need to be screened for treatment development were selected to reflect those most likely to move on WPM in international trade.		
26	Suggest that it be split into subsections with the following subheadings: Factors to be tested (paragraph 7) Quarantine test groups (Paragraph 8) Step-wise testing process (Paragraph 9).		To be considered, in conjunction with other comments made on reorganizing the text, by drafting group with direction, as appropriate, from SC on how to redraft. To be addressed during redrafting
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
44	Treatment developers should take account of the fact that the ISPM 15 treatments may be applied to round wood, sawn wood or manufactured wood packaging material.	Insert new paragraph. It should be noted that the treatment could be applied to wood as well as manufactured wood packaging material.	The steward supports this proposal – to be addressed during redrafting
TPFQ Response	This proposal has been incorporated into the text of the re-drafted criteria.		
45	The following ~~criteria provide a~~ step-wise process ~~that the submitter should follow~~ should be followed in the testing or development of justification for a new phytosanitary treatment for potential inclusion in ISPM 15. Included with each step is information that is intended to clarify how to interpret and respond to ~~each criterion~~ the requirements.	Text moved from paragraph 9 and modified slightly (to simplify the text and refer to requirements rather than criteria)	The steward supports this proposal– to be addressed during redrafting
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		
46	The ~~step-wise~~ process is broadly organized into two parts. Initially (steps 1-3), submitters of treatments should confirm that ~~all~~ the pest groups associated with wood packaging material presented in Table 1 are susceptible to the proposed treatment, including specific consideration of seven key pest species or genera, and submitters should identify ~~that~~ the pest most resistant to the treatment ~~is identified~~. Following this screening process, ~~M~~more detailed efficacy testing (steps 4-5) of this most resistant ~~species~~ pest is then used to provide confidence that the treatment is sufficiently effective against all ~~organisms~~ pests associated with wood packaging material from all origins.	Text moved from paragraph 10 and modified slightly ('organism' changed to 'pest', refer specifically to the different steps, mention seven key species that have to be considered at step 2, introduce the concept of a screening process, and add the word 'sufficiently' before 'effective' in the last sentence for consistency with para 29)	The steward supports this proposal with the reservation that "resistant" should be changed to "tolerant" – to be addressed during redrafting, and some reservations (though not particularly significant) over changing "species" to "pest" as mentioned above since substitute species subjected to testing may in fact not be pests
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
47	Table 1 ~~provides a listing of~~ lists the most important quarantine pests and pest groups of particular importance for wood packaging material. Pests selected from the pest groups indicated in Table 1 should be used for ~~evaluation purposes~~ the screening process as indicated in steps 1-3. ~~Steps 1-3 below provide g~~Guidance is provided for determining selection of an appropriate pest~~(s)~~, or an appropriate substitute organism~~(s)~~, for testing.	Text moved from paragraph 7 and simplified to be clearer. However, this paragraph and Table 1 (para 8/ our para 5e) may be more appropriately placed after the first mention of the table in step 1 rather than in the Introduction – steward to consider. Editorial proposals: 1st sentence - addition of 'pests and' before pest groups because an individual pest is mentioned in Table 1. We also propose a third column should be added where individual pests for specific consideration are listed (see comment on paragraph 8 (5e). 2nd sentence – reference to screening process to aid clarity 3rd sentence - clarification that one target organism is tested.	The steward supports this proposal – to be addressed during redrafting
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
48	Table moved from paragraph 8. However, it may be more appropriate to move this table to step 1– steward to consider. For clarity, include a third column with the names of the specific organisms to be considered in step 2. Indicate the family names. The use of common names for groups of pests can be confusing. For consideration by the steward: We question the inclusion of all the groups of pests, particularly whether wood packaging material would be a pathway for introduction of some of the groups. Please provide the justification for their inclusion. In cases where there is a lack of evidence, please delete them from the table. Specific comments: 1. Bark beetles. ISPM 15 now requires the removal of bark, what is the reason for their inclusion. 2. Termites and carpenter ants. Although the original version of ISPM 15 listed termites as a pest group that was practically eliminated by HT and MB, termites and carpenter ants are generally considered to be contaminating pests, so outside the scope of ongoing protection of ISPM 15. 3. For fungi, please provide strong evidence that wood packaging material is a pathway for the introduction of fungi, specifically decay fungi, deep penetrating blue stain fungi, rust fungi. Some of these could be considered contaminating pests and therefore outside the scope of ongoing protection of ISPM 15. 4. Bacteria are important pests, indicate whether they should be considered e.g. Brenneria spp; would wood packaging material provide a pathway?		Either location appears to be acceptable. Perhaps including the table in the introduction increases its significance, hence the steward leans towards including it as para 5e. The steward agrees with the suggestion of adding a third column with the pests identified as essential for testing. Originally family names were presented, but were withdrawn due to the large number of names. However, the drafting group should be asked to return to the use of family names and the steward agrees with this proposal. (the inclusion of common names could still be useful in conjunction with this). The TPFQ debated long and hard on which groups to include. For justification, the TPFQ's reports should be referred to. The steward suggests that the individual numbered comments be communicated to the TPFQ with a request for responses to be prepared by the experts.
TPFQ Response	The list of pests in table 1 have now been revised using criteria that ensured only important pests or pest groups likely to be associated with and establish in new areas via the movement of WPM in international trade. The pests or pest groups are now identified taxonomically.		
49	The ~~ISPM 15~~ treatment evaluation process relies on the principle that all kinds of ~~sources of existing~~ relevant information (e.g. unpublished research data, literature) ~~should~~ may be considered to support each step in the process.	Unnecessary reference. Simplification and clarification. 'All sources of information' sounds onerous, when this is not the intent	The steward would suggest partial use of this proposal, as follows: The ISPM 15 treatment evaluation process relies on the principle that all kinds of sources of existing relevant information (e.g. unpublished research data, literature) ~~should~~ may be considered to support each step in the process.
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
89	~~Table 1~~ ISPM 15 Annex 1 provides a listing of the most ~~important quarantine~~ significant pest groups associated with wood packaging material. Candidate pests for treatment can be selected from the pest groups indicated in ~~Table 1~~ ISPM 15 Annex 1 ~~should be used for evaluation purposes.~~ Steps 1-3 below provide guidance for determining selection of an appropriate pest(s), or an appropriate substitute organism(s), for testing.	The information on Table 1 is already listed in ISPM 15, Annex 1. Global change. Fungi and fungi-like organisms are secondary pests and should not be included in the Appendix. "Significant pest groups" wording aligned with ISPM 15 Annex 1. Agreement on the scope of "important quarantine pests" has become a road block to current attempts to develop new treatments.	1 and 4) The latest and current version of ISPM 15:2009 no longer contains the listing of pests/organisms, so it is vital to include it here. 2) The use of quarantine pests is in keeping with the text used in ISPM 15 itself and should, therefore, be retained. 3) "Should" appears to be necessary On the rationale provided, the SC should consider this very carefully and provide appropriate guidance to the drafting group
TPFQ Response	The latest and current version of ISPM 15:2009 no longer contains the listing of pests/organisms, so it is vital to include it here.		
92	Termites (insert new line) ~~and~~ ~~c~~Carpenter ants	Carpenter ants (Hymenoptera) and termites (Isoptera) are in 2 different insect orders and are biologically different - should be on separate lines	Depends on SC response to above comments. If family names are to be used as the basis, then this comment should be acted upon.
TPFQ Response	This comment no longer applies to the text of the re-drafted criteria.		
93	canker fungi decay fungi deep penetrating blue-stain fungi oomycetes ~~rust fungi~~ vascular wilt fungi	Rust fungi should be removed from the list of Fungi and fundi-like organisms. Rusts are obligate parasites with an alternate host and it would be difficult (if not impossible) to study them in a lab/field environment.	This comment seems appropriate. However, the TPFQ inserted rust fungi and, along with the biological comments made in comment No. 48 and below, should be asked to consider this for addressing during redrafting.
TPFQ Response	The list of pests in table 1 have now been revised using criteria that ensured only important pests or pest groups likely to be associated with and establish in new areas via the movement of WPM in international trade. The pests or pest groups are now identified taxonomically.		
105	This information is already provided in ISPM 15 Annex 1. Fungi and fungi-like organisms are secondary pests. ISPM 15 was not designed for secondary pests. Including them in the Table will expand the scope of ISPM 15. Treated material that adsorbs moisture can become infested with fungi at a later date. A recent Canadian study shows our current treatments do not work against fungi. The original purpose of ISPM 15 was to reduce the risk, not to eliminate it. In addition, bark beetles are no longer relevant since the revisión of ISPM 15 includes debarking wood. Bark beetles in debarked wood would not survive. Wood flies are primarily found in decaying wood, so are they really a serious pest of WPM, likely to be encountered in trade?		The latest and current version of ISPM 15:2009 no longer contains the listing of pests/organisms, so it is vital to include it here. The TPFQ inserted fungi and, along with the biological comments made in comment No. 48 and below, should be asked to consider this for addressing during redrafting. The steward suggests that these comments be communicated to the TPFQ with a request for responses to be prepared by the experts.

Comment Number	Proposed rewording	Explanation	Steward's Response
TPFQ Response	The list of pests in table 1 have now been revised using criteria that ensured only important pests or pest groups likely to be associated with and establish in new areas via the movement of WPM in international trade. The pests or pest groups are now identified taxonomically.		
132	Pest species from these groups may have fundamentally different responses to the proposed treatment.	Totally agree. Fungi have different responses and many of them are not killing at temperature and time suggested in the standard. More research on new treatments, particularly with the ophiostomatoides is needed.	For SC and TPFQ to take note of.
TPFQ Response	The list of pests in table 1 have now been revised using criteria that ensured only important pests or pest groups likely to be associated with and establish in new areas via the movement of WPM in international trade. The pests or pest groups are now identified taxonomically.		
134	Information should be gathered regarding the differences in treatment responses between ~~quarantine~~ the most significant pest species associated with wood packaging material for the pest groups listed in ~~Table 1~~ISPM 15 Annex 1. ~~Pest species from these groups may have fundamentally different responses to the proposed treatment. If this is the case, then Steps 2-5 will require information to be presente don independent reponses for each of the pest groups.~~	What is a quarantine pest for some countries may be indigenous somewhere else. The term "quarantine pest" is not universal for each pest. The last two sentences will make research difficult. It makes it sound like a researcher has to have all the pests tested to Probit 9. This would be extremely hard to do.	The text of ISPM 15 relates to quarantine pests and it is the intent here. SC to discuss and provide guidance to redrafting group. The comments on the table of pests appear to relate an out of date version of ISPM 15. There is no table with pest groups in ISPM 15:2009
TPFQ Response	The re-drafted criterion replaces the requirement for probit 9 testing levels with a formula that determines the testing level based in part on the biological attributes of the target pest. This should ensure the level of testing is feasible. The pests that need to be screened for treatment development were selected to reflect those most likely to move on WPM in international trade.		
147	The initial ~~first~~ effects of heat treatment on organism viability occur when intercellular proteins begin to denature and disrupt vital cellular processes. Such protein denaturation occurs in all organisms. However, some organisms or life stages have mechanisms that provide a limited tolerance to these temperature effects. ~~In~~ With regard to pests ~~of~~ associated with wood packaging material, only a very few quarantine pests ~~of wood~~ of concern in international trade are known to have an ~~slightly~~ elevated tolerance to heat treatments.	Better wording The meaning of 'pests of wood' is unclear. ISPM 15 is dealing with pests associated with WPM. The major concern is really with 'forest pests', i.e. pests of trees that may be carried with infested or contaminated wood.	Agreed – to be addressed during redrafting
TPFQ Response	This comment has been effectively addressed in the revised text of the criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
166	... used in international trade: *Anoplophora glabripennis*, *Sirex noctilio*, *Bursaphelenchus xylophilus*, a species from the genus *Monochamus*, ...	*"Sirex noctilio"* is a very important pest of WPM economically . References; • CAB international (2003) Crop Protection Compendium 2002 Edition. Wallingford, UK • Madden J. L. (1988) *Sirex* in Australia. Dynamics of Forest Insect Populations – Patterns, Causes, Implications- . (ed. Berryman A. A.), pp407-429. Plenum Publishing Corporation, New York, USA:408-429	For TPFQ to consider, based on guidance form SC. The TPFQ had carefully deliberated on which species to include for essential testing.
TPFQ Response	The list of pests that need to be screened for treatment development were selected to reflect those most likely to move on WPM in international trade. On consideration of Sirex, a test species from the Siricidae, has now been included on the list.		
303	In developing this schedule, treatment efficacy should be demonstrated in the type(s) and dimensions of wood packaging material and environmental conditions (e.g. temperature, moisture content) most likely to result in challenging for the treatment being unsuccessful in question.	The concern is that the treatment does not work not that its challenged and then pulls through.	This seems to be an appropriate change – to be addressed during redrafting
TPFQ Response	This comment has been effectively addressed in the revised text of the criteria.		

Comment Number	Proposed rewording	Explanation	Steward's Response
304	~~A schedule~~ Treatment parameters must be developed to ensure that the required efficacy is consistently reached or exceeded during production and treatment of wood packaging material under normal operating conditions. In developing ~~this schedule~~ treatment parameters, treatment efficacy should be demonstrated in the type(s) and dimensions of wood packaging material and environmental conditions (e.g. temperature, moisture content) most challenging for the treatment in question. The ~~schedule~~ treatment parameters should clearly document the limitations on efficacy of treatment applications (e.g. penetrability, water solubility) and clearly indicate any restrictive conditions in use of the treatment (e.g. penetration limitations of some fumigants may restrict the dimensions of the wood for which successful treatment is feasible).	The word "schedule" should be removed as the term is not entirely appropriate and could be confusing as a "schedule" normally implies fumigation. In theory, the treatment could be something else such as irradiation, moisture control, preservation (e.g. chemical impregnation), etc. A better term would be "treatment parameters" which in some circumstances may be a schedule.	Agreed – to be addressed during redrafting
TPFQ Response	Treatment schedule is a term defined under ISPM 5 and includes the concept of treatment parameters.		
305	Delete: (penetration limitation....is feasible.) Add: "The restrictive penetrations of some fumingants means that it can't be used for large pieces of wood."	For clarity	Steward feels that "limited penetration of some fumigants . . . " would be a clearer change – this was addressed during redrafting
TPFQ Response	The issue of limitation to treatments was addressed during redrafting. However, since the text was largely rewritten, neither of the sentences mentioned in the comment appears in the current draft.		

Comment Number	Proposed rewording	Explanation	Steward's Response
306	A schedule must be developed to ensure that the required efficacy is consistently reached or exceeded during ~~production and~~ treatment of wood packaging material under normal operating conditions. In developing this schedule, treatment efficacy should be demonstrated in the type(s)~~,~~ ~~and~~ dimensions and moisture content of wood ~~packaging material~~ and environmental conditions (e.g. temperature, ~~moisture content~~ relative humidity) most challenging for the treatment in question. The schedule should clearly document the limitations on efficacy of treatment applications (e.g. penetrability, water solubility) and clearly indicate any restrictive conditions in use of the treatment (e.g. penetration limitations of some fumigants may restrict the dimensions of the wood for which successful treatment is feasible).	The efficacy refers to the treatment and not to others wood packing production stages. The moisture content of the wood affect the treatment efficiency. The moisture content is an intrinsic factor of the wood and not an environmental factor.	Certain production methods may be linked to treatments, e.g., as kiln during is to heat treatment. However, the steward aggress that the deletion can be made without problems Agreed on other two changes too. To captured in redraft
TPFQ Response	This comment has been effectively addressed in the revised text of the criteria		
307	A schedule must be developed to ensure that the ~~required~~ level of efficacy obtained in step 4 will be ~~is~~ consistently reached or exceeded during production and treatment of wood packaging material under normal operating conditions.	Better wording	Agreed – to be captured in redraft
TPFQ Response	This comment has been effectively addressed in the revised text of the criteria		
309	The schedule should clearly document the limitations on efficacy of treatment applications (e.g. penetrability, water solubility) and clearly indicate any restrictive conditions in use of the treatment (e.g. penetration limitations of some fumigants may restrict the dimensions of the wood, including sections comprising more than one piece joined together, for which successful treatment is feasible).	Point of clarification	Agreed – to be captured in redraft

Comment Number	Proposed rewording	Explanation	Steward's Response
TPFQ Response	This comment has been effectively addressed in the revised text of the criteria		
314	Delete (step 5)	Steps are repetitive. Refer to ISPM 28 so the Appendix is more harmonized with the standard.	ISPM 28 has been demonstrated to be inadequate for the development of criteria for development of new treatments for wood packaging. Thus, deleting these sections will not resolve that problems. This para provides specificity that is not present in ISPM 28 and relates specifically to wood packaging.
TPFQ Response	The text has been mostly deleted and a few sentences linking the submitter to ISPM 28 left for guidance.		