

**International Forest Quarantine Research Group**  
**IFQRG-10 September 2012 Cardiff, Wales**  
**Meeting Report**

<b>1</b>	<p>Welcome address –  Eric Allen, chair of IFQRG, welcomed and thanked the group particularly thanking Hugh Evans for his organisation of the meeting. Eric gave a brief history of the group and its functionality noting the international collaboration.</p> <p>John Griffiths, Minister for Environment &amp; Sustainable Development of the Welsh Government provided a welcome to IFQRG.</p>
<b>5</b>	The IFQRG attendees gave their introductions.
<b>6</b>	<p>Meeting report from IRQRG 9 – Eric Allen</p> <p>Eric noted that the full report is available online (through the IPPC website).</p> <p><b>Action items arising from IFQRG 9 –</b></p> <p><i>01 – Review what is collectively known about efficacy of HT &amp; MeBr on key taxa (eg PWN ALB etc):</i> the analysis paper is pending (noting that Ken Thomas has retired).</p> <p><i>02 – Review table 1 in draft treatment schedule:</i> paper completed and delivered to the SC.</p> <p><i>03 – Consider efficacy schedules for test organisms:</i> an efficacy paper was ready and presented to the group.</p> <p><i>04 – Further development of the quantification of integration measures for risk reduction in wood products:</i> report not quite completed.</p> <p><i>05 – Evaluate EDN as a wood treatment:</i> Contact made to BOC, EDN progressing in a number of countries, but registration processes can be slow. Australia is close to finalising the registration of EDN. EDN is available in NZ for research. It was suggested that perhaps collaboration with countries that can access EDN should be progressed to complete research trials. QUADS might be able to elevate the issues surrounding testing/costs etc. Perhaps some guidelines can be written prior to testing – <b>IFQRG-10 Action Item 01</b></p> <p><i>06 – Continue work on evaluating bacterial pathogens in forest pests:</i> there is a need to evaluate whether bacterial pathogens are a big enough concern to add to ISPM 15 testing requirements. It was noted by Hugh that bacterial pathogens are becoming very apparent in the UK, but can they transmit on wood packaging and sawn wood? It was suggested that pathway risk analysis work may need to be completed first. - <b>IFQRG-10 Action Item 02</b></p> <p><i>07 – Develop guidance document for MeBr and microwave treatments:</i> guidance document for MeBr is almost finished – Mike Ormsby and Matus.</p> <p><i>08 – Solicit interest in determining fraudulent/non treated timber products:</i> research on wood properties in NZ hasn't begun yet. - <b>IFQRG-10 Action Item 03</b></p> <p><i>09 – Provide a web resource to direct users to existing MeBr manuals:</i> this will now be added to the manuals package and become available on the IPPC website once finalised.</p>
<b>8</b>	<b>Updates from other bodies</b>
<b>8.1-8.2.2</b>	<p>Standards Committee update - Brent Larson</p> <p>Measures adopted at CPM 7 (2012) and of relevance to forestry included: Integrated measures for P4P (2005-2), amendments to ISPM5 on Glossary of Phytosanitary Terms and the appendix on Electronic certification (ISPM 12) – e-phytos. Brent noted that there is a potential to use the</p>

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	<p>electronic data to assess volumes of commodities traded, etc (which could of course be confidential).</p> <p>The specification for safe handling and disposal of waste with potential pest risk generated during international voyages was approved and approved for member consultation was the international movement of cut flowers and branches.</p> <p>There is an opportunity for IFQRG members to provide guidance on Annex 1 to ISPM 15 and provide this to the technical panel for decision. This needs to be ready for the next meeting to be held in November 2012.</p> <p>Thomas Schroeder is drafting a diagnostic protocol for PWN. It was decided the diagnostic protocol should not include sample testing. A stand alone paper on sampling has been published in the EPPO Bulletin 2009. Advice to be provided to the IPPC standards committee.</p> <p>The joint work program between TP and IFQRG has been noted by the SC.</p> <p>There is a proposal to add handicraft to the international movement of wood standard, the SC will consider this once the international movement of wood standard is completed.</p> <p>A call for authors on diagnostic protocols for <i>Ips</i> spp. and <i>Dendroctonus ponderosae</i> was put forward. IFQRG members were encouraged to pass this information on and encourage experts to submit their nominations for these editorial teams through their NPPOs or RPPOs</p> <p>Brent also reported that the process for the adoption of standards has had some changes. A focus group was formed to look at the process for setting standards. The group made 30 recommendations, of which 24 were put forward by the CPM. One of the main changes is that instead of members only giving a topic for consideration, the SC now requires some specifications and data in addition to the topic suggestion. The member consultation period has also been changed to 150 days from 1 July to 1 December.</p> <p>Brent also asked IFQRG what other forestry standards are still required.</p> <p>Brent informed the group that there would be a science symposium at CPM-8 (2013) on probit 9.  – <b>IFQRG-10 Action Item 04</b></p>
<p><b>8.3</b></p>	<p>TPPT update - Mike Ormsby</p> <p>The Panel was established in 2004 to gather technical expertise on evaluation of treatments – dealing with ISPM28.</p> <p>A number of treatments as alternatives to methyl bromide are being evaluated, particularly as replacement fumigant. Dielectric heating and sulphuryl fluoride are being considered, but some there are issues with efficacy, especially in relation to temperature (not a linear relationship – poorer efficacy at high temperature compared with moderate temperatures) that needs to be addressed. Mike noted that further data has recently been provided on the hydrogen cyanide treatment.</p> <p>The TPPT will have face to face meeting in Japan in December.</p>
<p><b>8.4</b></p>	<p>Requests that have been put forward to IFQRG from the TPFQ - Eric Allen</p> <ul style="list-style-type: none"> <li>• action against non-regulated pests found during inspections (Schroeder, Ormsby, Uzunovic)</li> <li>• dielectric heating and microwave treatment guidelines in particular relation to frozen wood.</li> <li>• Wood moisture and MeBr treatments</li> <li>• Wood drying in a phytosanitary treatment context</li> <li>• Wood commodity standard, pest groups that might be present/not present – the word</li> </ul>

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	<p>'present' not acceptable. Wording has been provided to the TPFQ.</p> <ul style="list-style-type: none"> <li>• What new forest standards does the group think we need. A report has been completed.</li> <li>• Environmental impacts from heat and MeBr treatments, following work from Chuck Ray. IPPC would like to have impacts information. A paper is being reviewed on how the impacts can be assessed (from USA).</li> </ul>
<b>9</b>	<b>Highlights of other meetings (IUFRO 7.03.12)</b> - this agenda item was covered by Hugh in 10.2
<b>10</b>	<b>Current phytosanitary issues</b>
<b>10.1</b>	<p>NAPPO update - Shane Sela</p> <p>Two standards have been developed. The importation of wood handicrafts standard has now been approved by the executive committee, although no country has adopted the standard yet. The panel is also working on the Christmas tree movement standard (not included in plants for planting or branches standards). The Standard is being worked through the NAPPO process and has been sent for country consultation. A heat treatment paper is also being developed (2012 IFQRG-10-10).</p> <p>Andrei Orlinki gave an update on the work being undertaken by EPPO. The forestry panel is dealing with range of major pests including PWN, EAB, ALB/CLB and a range of new emerging pests.</p>
<b>10.2</b>	<p>IUFRO Unit 7.03.12 (alien invasive species and international trade working group) update -Hugh Evans</p> <p>Several meetings have occurred already (2006, 2008 and 2012). Proceedings and some presentations are available on the Forestry Commission and IUFRO websites. Hugh noted that there has been a change of coordinator to Kerry Britton.</p> <p>Hugh noted that IUFRO links to quite a number of other groups/projects. Hugh chairs the PERMIT COST action group which is very similar to IFQRG – looking at permits (pathway analysis, pathway mitigation etc). The PERMIT COST action group is currently working on the development of improved methods for detection, control and eradication of pine wood nematode in support of the EU plant health policy (REPHRAME)</p>
<b>10.3</b>	<p>Pest research in Russia (presentation) - Oleg Kulinich</p> <p>Russia has 16 quarantine forest pests. A new Custom Union list of quarantine organisms is currently under construction. 48 species of forest organisms will be listed.</p> <p>Two forest pests, the <i>Polygraphus proximus</i> and EAB, have been introduced to the European part of Russia. EAB was thought to be introduced from wood packaging, and appears to largely attack American and European ash trees species. These trees are commonly found along highways and railways. Pheromone traps are being used and have shown to be successful in monitoring.</p> <p>Russia is also dealing with a number of other species including east elm sawfly, black locust gall midge and the flatid planthopper (<i>Metcalfa pruinosa</i> (Say))</p>
<b>11.1</b>	<p>Guide to implementation for phytosanitary standards in forestry (presentation) - Gillian Allard</p> <p>Gillian acknowledged the work of several IFQRG members in the production of the guide. The FAO have now been raising awareness (fact sheets, social media, posters and presentations) and providing training on the guide. An e-learning package has been put together (refresher course for forestry managers) at world-wide level and it's hoped this can be tailored to the regions in the future. More than 50 countries have completed the e-learning package and provided comments.</p> <p>Training is completed in modules and covers a number of subjects including plants for planting and preventing pest spread from fuel wood. More subjects are being added for example trade in forestry commodities and phytosanitary measures. Other training material that has been developed includes pest profiles, books and field manuals. Various workshops across the world have been held with many more to come. Specialists in forestry are encouraged to come forward</p>

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	<p>and assist in writing future subjects for the e-learning.</p> <p>Gillian noted that the guide has been very well received.</p> <p>If anyone would like to obtain copies of the guide or posters etc they are all available electronically for you to print.</p>
<p><b>11.2</b></p>	<p>Update on the international movement of wood standard - Mike Ormsby</p> <p>The standard will cover all wood with or without bark (not wood packaging, which is ISPM 15). The standard defines the commodity classes within wood and wood like material with similar properties to wood eg palms (but does not include bamboo). The wood that is covered in the standard is different to packaging as it tends to move to one place and stay, not like wood packaging material that continually moves internationally. The standard will outline key wood products and their associated pests and there will be a range of phytosanitary measures that countries can choose from. Mike stated it was important to reiterate that the phytosanitary measures still need to have a PRA to justify the measure action.</p> <p>There are three sections to the standard including:</p> <ul style="list-style-type: none"> <li>• description of commodity classes and pests associated or not associated with that class</li> <li>• descriptions of the phytosanitary measures that may be applicable eg removal of bark, fumigation, heat treatment, kiln drying, air drying, irradiation, pest free and low prevalence areas</li> <li>• operational procedures.</li> </ul> <p>It is expected that the draft standard will be available for June 2013 for country consultation.</p>
<p><b>11.2.1</b></p>	<p>Wood production methods that mitigate quarantine pests (presentation) – Eric Allen</p> <p>There are opportunities in sawn timber to apply mitigation measure along the chain from felling to production. Wood is visually examined along the line for size and quality etc, so in theory there is an opportunity to look for pests at the same time. Timing of harvesting could also assist in pest mitigation (only cutting when pests are not present) and scaling, debarking and grading can visually show further pests.</p> <p>Multiple and combined measures may result in an equivalent or improved risk reduction. There is a need to move away from a single treatment measure as sometimes it is not optimal to, for example heat treat wood. To achieve a desired outcome, maximum pest levels would need to be stated and there would be a requirement to know pest biology (when do they breed etc) These actions would have to be defined to quantify the mitigation measures of each measure.</p> <p>ISPM 28 describes how to look at measuring efficacy for mitigation measures/treatments.</p> <p>It was noted that the PERMIT COST Action is looking at pathway mitigation. There are problems establishing maximum pest levels for the pests that are unknown. Perhaps a standard/generic maximum pest level needs to be established, grouping pests by lifestyle or taxonomic level.</p>
<p><b>11.3</b></p>	<p>Treatment criteria discussion paper for ISPM 15 – developing efficacy schedules - Mike Ormsby</p> <p style="text-align: center;"><b>Cardiff Protocol</b></p> <p>During IPPC member consultation in 2011 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 will 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 flies, 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</p>

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	<p>that this is too stringent for commodities that are rarely infested or are poor hosts (see Follet &amp; McQuate, 2001<sup>1</sup>).</p> <p>Options for an alternative approach to requiring Probit 9 treatment efficacy for the ISPM 15 target quarantine pests were considered by TPFQ and IFQRG in 2011 and 2012. At the Cardiff meeting of IFQRG 10, participants supported the use of the 'Cardiff Protocol' for determining the appropriate level of efficacy for target quarantine pests. The 'Cardiff protocol' (2012 IFQRG 10-13) 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.</p> <p>Use of the 'Cardiff Protocol' to determine test sizes would ensure that the number of test individuals or replicates 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.</p> <p>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 WPM (listed in the ISPM 15 treatment protocol) to determine appropriate test sizes for use by researchers wishing to develop and test wood treatments for ISPM 15. These identified test sizes would replace the requirements for Probit 9 (99.9968%) test size in the final step (step 3 in appendix 1 of IFQRG 9 report) of the treatment criteria circulated for member consultation in 2011.</p> <p>The group discussed the criteria and will add to the paper, ready to be worked through by the TPFQ.</p> <p>Some of the concerns raised by the group included:</p> <ul style="list-style-type: none"> <li>• Understanding the formulas, and a need to see the different scenarios (temporal parameters-effects of pathway analysis).</li> <li>• The need for credibility for the modelling</li> <li>• The need for experts to work out the numbers for step 3.</li> </ul> <p>A small group, led by Hugh Evans, will develop the ideas for taking the science forward around the template presented by Mike Ormsby (concentrating on insects at this stage, but will need another group on nematodes and fungi as things develop). The group will aid developers globally in relation to particular pests with minimum input to numbers of organisms to be tested. Suggested members, Mike Ormsby, Steve Pawson, Bob Haack, Sandy Liebhold, Ecki Brockerhoff, Adnan Uzunovic, Eric Allen, Luis Fonseca. <b>IFQRG-10 Action Item 05</b></p> <p>Terms of Reference:</p> <ul style="list-style-type: none"> <li>• Consider the organism groups listed in Appendix 1 of protocol published last year, relative to the MPL model (The Cardiff Protocol).</li> <li>• Run the model for each group and assess data quality, sensitivity testing and look for general principles.</li> <li>• Consider cost-benefit analysis of the methodology based on either a species/genus-specific model versus a 'one-for-all' protocol.</li> <li>• Consider how the protocol can be applied to fungi and nematodes.</li> <li>• Use the outcome to re-phrase the text in the protocol for submission to the TPFQ.</li> </ul>
11.4	<p>Dielectric heating draft guidance document – Mike Ormsby.</p> <p>The CPM recognised that there is a need to start using new treatments to get experience in those treatments. Guidance documents in that case are needed to get the best conditions set so the treatments can begin. A working group has written the draft document (which is a guidance document not a standard). The group discussed the draft guide.</p>
12.	<b>Research Reports</b>
12.1	<b>Phytosanitary Policy and Regulations</b>

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<b>12.1.1</b>	<p>Risk assessment approach to phytosanitary treatments (presentation) – Steve Pawson.</p> <p>NZ has approx 1.75 million ha of forest, mostly of <i>Pinus radiata</i>. China and India are the main markets for NZ. Exports in NZ have increased over the years and the fading out of MeBr will pose an issue for NZ. Export forecasts up to 2040 have been predicted with a steep incline in 2030. Currently wood is treated with phosphine (which is experimental and can only be done in the hull of ships) and MeBr. Debarking and heat treatment are accepted by some markets, but not all however these treatments are very infrequently used operationally.</p> <p>Drivers for change are the MeBr problems including mandatory recapture by 2020, growing public opposition health concerns, political pressure regarding recapture and the use of other chemicals.</p> <p>A new research project (systems approach) shows that in winter alternative treatments may not be needed as there are no pests present. Other fumigants are being looked at for the summer period including sterilisation. This project will be the largest program on quarantine treatments for forestry in NZ.</p> <p>The research project will be to build an Integrated Phytosanitary Pest Management (IPPM) systems approach to look at pest complex and its distribution, thermal development models, phenology, landscape context, (amount of plantation, age source of material) and flying biology to gain knowledge on pest pressures at a given time. This should mean that the probability of infestation or reinfestation can be assessed.</p> <p>Once the pest pressures have been established a Bayesian model will be used to assist with some of the uncertainty with respect to parameter estimation and model predictions.</p> <p>A quick review on Mebr, SF, phosphine, EDN and less toxic ethyl formate, carbonyl sulfide and methyl isothiocyanate will look at penetration, they will test the penetration of the most promising fumigants and then undertake pest efficacy trials.</p> <p>Joule Heating is also being tested and results have shown that ISPM 15 requirements can be achieved. Changes in the wood properties are currently being assessed. Joule heating has a favourable cost comparison to MeBr.</p> <p>Linear accelerators for cold sterilisation are also being researched, based on extending the work already completed on <i>Prionoplus reticularis</i>.</p> <p>Steve asked that if anyone has any experience with thermal development models with wood borers and bark beetles and/or other systems approaches to please contact him.</p>
<b>12.1.2</b>	<p>Plants for planting – tools for mitigation (presentation) - Kerry Britton via Skype.</p> <p>It was suggested that collaboration between IUFRO 7.3.12 and IFQRG regarding a systems approach to plants for planting could be set up.</p> <p>The US has a few plants for planting systems approaches already in place and Kerry thought it would be beneficial to share these with any others that might be out there. The University of California's National Centre for Environmental Analysis and Synthesis (NCEAS) is looking at plants for planting in relation to forest pests as increases in pest have been seen over the years. There are pathways for 82 forest pests in the US.</p> <p>Even though some of the plants for planting have had pathway mitigations measures, there have still been pests that have come through on plants and established, we need to look to how we can add to those mitigation measures to cover more pests.</p> <p>ISPM 36 was adopted in March 2012, which countries are now free to implement, but concerns on how and when have been raised. It was suggested that science could help to implement this standard.</p> <p>Perhaps IFQRG could look at some of the more highly traded plants and make some initial evaluations. Some of this work is being done through the PERMIT COST Action and the EU</p>

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	<p>project ISEFOR.</p> <p>Concerns were raised about whether IFQRG was the right group to be assessing the implementation of standards. Brent Larson, IPPC Secretariat, noted that the best way forward might be to talk to the IPPC implementation officer, look at what science or research might be already be planned and work together to make sure there is not duplication.</p> <p>The group also thought another way forward could be to look at any existing systems approaches already available (ie Canada, US and NZ), how well they are working and assess what science might be missing to be built upon by IFQRG. IFQRG participates should provide this information to Chair.</p> <p>Rene and Kerry Britton to report to IFQRG-11</p>
<p><b>12.1.3</b></p>	<p>What role can the systems approach play in preventing the introduction of invasive alien species – Hugh Evans</p> <p>All countries have lists of prohibited pests. These lists are limited and many organisms are not listed but have established in different parts of the world. There is a need to recognise that these lists need to be built upon.</p> <p>Living material needs to be managed by a systems approach as you cannot apply majority of the treatments that are available for non-living material.</p> <p>Hugh gave a basic overview of ISPM 14 which deals with systems approaches. A systems approach is most effective if measures are applied in the early stages of the movement of plants including growing (pest free areas, pest free place of production for plants for planting), harvesting and packing.</p> <p>The challenge now is how to manage the complexity and pest carrying capacity of plants for planting as a pathway. Work to quantify some of these aspects is ongoing in the PERMIT COST Action and in the EU ISEFOR project.</p>
<p><b>12.1.4</b></p>	<p>Overview of FEFPEB (presentation) - Gil Covey</p> <p>The FEFPEB is the European Federation of wooden pallet and packaging manufacturers. Stakeholders represented are the EU, DG, FAO, NPPO, IFQRG, industries, international partners and wood pallet councils.</p> <p>Major developments affecting the wooden pallet industry include the changes to ISPM15, competition from renewable energy, chain of custody/certification and competition from plastic.</p> <p>An assessment has been done on extending ISPM 15 for domestic distribution within the European Union and on the impacts of the extension which has been given to the European commission for consideration.</p> <p>Gil noted that some ISPM15 conditions are hard to implement/interpret like multiple stamps on repaired pallets.</p>
<p><b>12.1.5</b></p>	<p>MeBr Manual – Mike Ormsby</p> <p>IFQRG and the TPFQ set up a working group to draft a MeBr guidance package for ISPM 15. This has now been transferred to IFQRG and is in the process of being developed; the package will link with MeBr manuals that various countries have already written.</p> <p>Brent Larson showed the group the new website for phytosanitary resources which is hosted by IPPC. The new website has a wide range of information including e-learning, databases, tools, guides, projects and operating procedures. The website is <a href="http://www.phytosanitary.info">www.phytosanitary.info</a></p>
<p><b>12.1.6</b></p>	<p>Blue stain fungi on ISPM 15 compliant wood packaging in Australia (presentation) David Letham</p> <p>Concerns were raised over Australia actioning ISPM 15 compliant wood packaging due to the</p>

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	<p>presence of active blue stain fungi. Australia reviewed the position and found that less than 5% of wood packaging was being inspected, Blue stain fungi could be present in wood packaging without visible blue stain and the quarantine status of blue stain fungi was unknown. Based on discussions with experts on blue stain fungi at IFQRG 9, there is little evidence to support a pathway for exotic blue stain fungi to move or be transferred from ISPM 15 treated wood packaging and establish in the environment. Australia ceased actioning ISPM 15 certified wood packaging with active blue stain fungi in June 2012.</p> <p>Additional discussion on blue stain with experts at IFQRG 10 pointed out the following: although several types of microorganisms may discolour wood, the preeminent cause is blue stain fungi typically from the “so called” ophiostomatoid genera (<i>Ophiostoma</i>, <i>Ceratocystis</i>, <i>Leptographium</i> and few others). They may also include non-ophiostomatoid genera e.g. <i>Sphaeropsis</i> (<i>Diplodia</i>) and <i>Lasiodiplodia</i>, known to cause bluestain in warmer climates.</p> <p>Although the ISPM-15 standard was set in place largely to control insects and nematodes, the fungi, have been increasingly scrutinized. Fungi of phytosanitary concern often include ones capable of causing vascular wilts, root or foliar disease, heartrots and saprots, rust fungi and canker causing fungi. True blue stain fungi are none of these. The large majority of blue stain fungi are either opportunists colonising fallen trees or true saprotrophs, living on dead wood material e.g surface blue stain fungi commonly found on sawn wood. When found in standing trees they are often associated with specific aggressive beetles that attack healthy trees through pheromone-orchestrated mass attack (e.g. <i>C. polonica</i> with <i>Ips typographus</i>; <i>L. wingfieldii</i> with <i>Tomicus piniperda</i>, <i>C. laricicola</i> with <i>Ips cembrae</i>, <i>O. montium</i> and <i>O. clavigerum</i> with <i>Dendroctonus ponderosae</i>). However as the genera <i>Ophiostoma</i> and <i>Ceratocystis</i> also include some true plant pathogens (e.g. <i>Ophiostoma ulmi</i> and <i>O. novo-ulmi</i>, <i>L. calophylli</i>, <i>L. wagneri</i>, <i>C. fagacearum</i> <i>C. fimbriata</i>) blue stain fungi are on occasion confused with these true pathogens that cause disease but do not cause blue stain. It is not appropriate to consider ophiostomatoid fungi that currently contain over 500 species, as a general phytosanitary threat but rather specifically focus on a few true pathogens from these genera and on their associated pathways.</p> <p>The experts also pointed out that blue stain fungi detected in Australia on imported wood packaging are not pathogens, but rather saprophytic. The four species (<i>Ophiostoma piceae</i>, <i>O. quercus</i>, <i>O. floccosum</i> and <i>O. piliferum</i>) are typical representatives of surface blue stain fungi, commonly present on sawn wood around the world.</p>
<b>12.2</b>	<b>Wood Treatments</b>
<b>12.2.1</b>	<p>Efficacy of radiofrequency (RF) in ALB and EAB in roundwood (presentation) – Ron Mack.</p> <p>The group worked up dose amounts, looked at the lethal temperatures, heating patterns and survivorship.</p> <p>Power density calculations (energy in, energy out) were described and showed minimum and maximum power density that would be needed at each degree for different wood (due to different moisture contents). It was noted by an IFQRG member that this information is helpful to equipment manufacturers.</p> <p>Ash and maple was used and results showed the thin bark on maple makes a difference to the way the wood heats, creating an opposite heating pattern to the ash. Once the bark had been peeled off, the wood then heated with the same patterns as ash.</p> <p>Adnan Uzunovic added to Ron’s presentation on the lethal temperatures required for PWN using RF energy –</p> <p>Nematodes can be found throughout wood, so any survival is a good indication of cold spots. A larger piece of wood was used and tested at 13 different temperatures to find 100% mortality. Using the IR images, if the wood was heated to over 56°C a 100% mortality rate was achieved.</p> <p>In relation the results above, the issue of research already completed using conventional heating showing that PWN could be killed at 52°C, was raised, but this was when wood was treated for ½ hour. If you are only going to expose PWN for a shorter time (1 minute), using dielectric heating it</p>



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	needs to get to 56 °C.
<b>12.2.2</b>	<p>Dielectric heating in frozen wood (presentation) - Kelli Hoover.</p> <p>Work already completed by Henin showed that wood samples of 9x9cm using microwave at 2.45GHz 28.8kW would reach 60°C on the surface, but the internal temperatures of larger pieces of frozen wood could not reach this.</p> <p>Testing in RF showed that, at 19MHz, on frozen wood that was 18x18cm, the internal temperature would exceed the surface temperature.</p> <p>The group then discussed the term 'frozen wood' and sampling sizes. The issue of what actually constitutes as 'frozen' was discussed. The sampling size words of 'to not exceed 20cm' was found to be restrictive and a smaller working group was formed to discuss these two issues.</p> <p>Suggested rewording:</p> <p>[21] Dielectric heating is a process that is caused by a dielectric radiation. When dielectric heating is used, the piece or the stack must be heated to achieve a minimum temperature of 60 °C for 1 minute throughout the profile of the wood (including its surface). The prescribed temperature must be reached within 30 minutes from the start of the treatment<sup>2</sup>.</p> <p>We recommend that the text on size limitation of 20 cm be removed because it is duplicated in section [24] item 2. This text includes size limitation for how to properly treat wood using 2.45 GHz already.</p> <p>The duplication reads:</p> <p>[24] 2. For wood exceeding 5 cm in thickness, dielectric heating at 2.45 GHz requires bidirectional application or multiple waveguides for the delivery of microwave energy to ensure uniformity of heating.</p> <p>The issue with treating &gt; 20 cm size wood or stacks is only relevant for 2.45 GHz MW and this is taken care of by the wording in [24] 2. To restrict the size of wood that can be treated with any other frequencies of dielectric heating (915 MHz MW or radio frequency) is unnecessary and would probably prevent the industry from using the technology at all because the big advantage of RF, for example, is that you can treat dunnage and bulk treat stacks of wood. RF, for example, can heat wood of any size and stacks of wood without any problem because of almost limitless depth of penetration.</p> <p>Any changes to the wording needs to be submitted though the country consultation process and the IPPC representative. Kelli provided text to the US NPPO.</p>

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<p><b>12.2.3</b></p>	<p>Pinewood Nematode (PWN) effect on mechanical properties of Maritime pine - modules of elasticity (MOE) in bending (presentation) - Filipa Pico.</p> <p>Maritime pine is in abundance in Portugal and is very important economically for Portugal.</p> <p>MOE is a useful non-destructive test for wood strength and other related properties. Maritime pine is the most important tree species in Portugal.</p> <p>MOE literature values were highly variable, along with specific gravity of the wood. Likely source of PWN in PT is China, based on work in PHRAME. Wilt development is typical in PT. Research into whether wood properties are changed by nematode infestation; Used direct transfer of nematodes from piece to piece to infest the recipient pieces. Then carried out standard tests for MOE. PWN was only detected in sapwood; highly variable numbers of nematodes. Not all the boards were successfully infested. Numbers of nematodes over time were measured over a period of 80 days. There were no differences in SG in healthy versus infested wood, which was also the case for MOE. The wood that was already infested from the field had different SG to the non-infested or laboratory infested material.</p>
<p><b>12.2.4</b></p>	<p>Heat treatment review – Eric Allen</p> <p>NAPPO asked if Eric could lead a group to finalise a discussion paper on the applicability of the current standard for heat treatment for wood products considering that certain pests such as the emerald ash borer have demonstrated a tolerance to treatments. It is hoped that IFQRG might be able to assist with some questions posed by this paper.</p> <p>The paper will cover a number of topics including literature, protocols, physiology and integrated measures. A number of questions were put forward; how organisms respond to treatment, how wood is heat treated, what problems-challenges are there with heat treatment, what are the other integrated measures of heat treatment.</p> <p>If anyone could assist Eric, please send information to him as soon as a possible.</p>
<p><b>12.2.5</b></p>	<p>Bark treatment for pinewood nematode (presentation) - Luis Fonseca</p> <p>The performance of natural versus artificial heat treatment was evaluated on coniferous bark for the elimination of PWN. Results showed that natural heat treatment (composting) was not effective for the elimination of PWN. After screening and testing, nematodes were still present particularly in smaller sized bark. Natural heat treatment can provide some very high very fast rising temperatures but not all zones of the heap have these results.</p> <p>The alternative to natural heat treatment is a continuous steam system, which was found to be successful in eliminating PWN. This equipment can get the temperatures to 80°C and over. Testing used nematodes that were mostly in juvenile stage (JIII). After treatment and incubation 100% mortality was found.</p> <p>Advantages for natural heat are less costs, but nematodes can still survive. Steam systems can be costly and have high energy consumption, but they work against the nematodes.</p>
<p><b>12.2.6</b></p>	<p>Moisture reduction as a phytosanitary measure – infestation after treatment (presentation) - Eric Allen</p> <p>Living trees contain about 50% of weight in water (made up of free water and bound water). Most pests require moisture content above the fibre saturation point for optimal growth and development. Some nematodes, fungi and insects can survive with low moisture content. Most life stages of pests are killed with treatments and subsequent infestation requires a suitable substrate (bark, moisture, phloem for nutrition). Drying (air or kiln) can reduce or prevent the reinfestation.</p> <p>Studies have found that it's very hard to rewet dried wood, which could give further confidence of the drying to work for reinfestation.</p> <p>The group asked if a drying requirement was added to ISPM 15, could the requirement to debark</p>

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	<p>be removed? It was noted that this might be very useful for the wood standard.</p> <p>The group discussed the issue of separating the concepts of heat treatment and moisture reduction. They need to be addressed separately, moisture reduction is an added step to treatment. The concept of utilising moisture reduction in a systems approach was also discussed.</p> <p>It was concluded that although moisture reduction alone is inadequate, if it was combined together with a treatment it could significantly reduce the chances of infestation after treatment.</p>
<p><b>12.2.7</b></p>	<p>Wood moisture content and fumigant penetration – Mike Ormsby and Ron Mack</p> <p>A concern was raised to the CPM in relation to annex 1 of ISPM 15 that MeBr would not work on wood with high moisture content. TPFQ was tasked at looking at this issue, which has subsequently been raised at IFQRG for members to address.</p> <p>A report (Matsui) found that moisture content in sapwood of softwoods in North America could be as high as 200% in comparison to tropical wood, which is up to 80%. The report showed fumigation experiments on wood with moisture contents up to 90%. These experiments showed there are some penetration issues – MeBr didn't go into (and come out) the wood as quickly, but it did eventually. This lead to the question about the wood that has moisture contents up to 200% and whether there might be problems with penetration in wood with the higher levels.</p> <p>Work already done has shown that moisture content up to 70% treated with MeBr has good and effective penetration. Sawn timber will have lower moisture content as compared to roundwood making it more favourable for fumigant penetration therefore this issue is less relevant for most wood packaging.</p> <p>The final agreement of the group in regards to providing advice back to the TPFQ was that: IFQRG did not consider that this issue required urgent attention as current practices in wood packaging production adequately addressed the issues. However it was recognised that further research on fumigant penetration could be carried out on the issue. (research is ongoing in the US and NZ on this topic)</p>
<p><b>12.2.8</b></p>	<p>A potential of Tru-core (R) treatment process to sanitise wood or significantly reduce pest risk ( a presentation prepared by Kop-coat and presented by Adnan Uzunovic</p> <p>Chemical treatments used in wood protection have been discussed before at IFQRG as possible phytosanitary measure. The novel Tru-core technology has been presented to the group to consider its potential as possible alternative treatment to ISPM 15 or as a part of a systems approach. The presenter pointed out that compared to other wood treatments the TRU-CORE technology is claimed to achieve full penetration to the core of treated wood both in green, dried wood and in refractory species after short 12-24 hour activation period following dip or spray application.</p> <p>The IFQRG members found it as an interesting technology that should be investigated further, but efficacy data would be needed to prove it can kill pests in situ. It could be used as a systems approach. Perhaps Steve Pawson could investigate its potential because the technology is already used in New Zealand.</p> <p>Some of the issues with this technology were noted by the group, including the fact that the chemicals has to be registered in most countries meaning that companies have to declare what the chemical makeup is and they may resist this, that there is no efficacy data and not all chemicals used are effective against all pests. Also, many countries don't want to deal with chemically treated waste wood.</p>
<p><b>12.3</b></p>	<p><b>Pest Detection Techniques</b></p>
<p><b>12.3.1</b></p>	<p>Burnt Pine Longicorn – marine vessel risks – David Letham presentation (on behalf of authors Rees, Hickey and Snedden)</p> <p>Pest biology and climate data are used to develop risk rating model for cruise ships travelling between NZ and Australia. A similar approach is being evaluated for vessels that could be contaminated with Asian Gypsy Moth.</p>

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<b>12.3.2</b>	<p>Fungi in traded wood commodities, phytosanitary treatments and genomic based detection tools (presentation) - Adnan Uzunovic</p> <p>Treatments have historically looked at insects and nematodes, but not fungi. With the new plants for planting ISPM, fungi may now need to be addressed.</p> <p>To diagnose and identify a disease cause is challenging and misidentification can lead to shipments be inadvertently destroyed or asymptomatic material released. Symptoms can be the same and some pathogens can look the same as saprotrophs for example.</p> <p>Quarantine labs face these challenges daily, as there are many different pathogens, hosts and commodities. DNA-based detection tools have seen to be very promising tool to aid ID versus culture-based detection methods. DNA-based methods are perceived to be rapid, sensitive, accessible etc. An example of this is to use DNA tools to identify presence of <i>P. ramorum</i> where two people can successfully assess up to 1500 samples per week.</p> <p>One large project that is developing genomics-enhanced diagnostic tool is Tree Aggressor Identification using Genomic Approaches (TAIGA) funded by Genome Canada. The group is set to develop DNA-based detection assays with high output, focusing on detecting the presence of the most unwanted pathogens or unknown ones with pathogenicity genes. 19 genomes were already sequenced.</p> <p>As the success of the project is measured by a successful, beneficial and commercial application of these tools (e.g. to aid the trade and at the same time to help to significantly reduce pests), stakeholders and peers have been consulted. The feedback indicated that end users for the tools were not clearly defined. The tools may significantly help to deal with plants for planting pathway. The tools may not distinguish living from dead pathogens and may detect insignificant amounts. It was also commented by IFQRG that it might be very difficult and time consuming to identify the vast number of pathogenicity genes in forest pathosystems. IFQRG recognised the value of a document that would review fungi and their potential threat on different commodities.</p>
<b>12.4</b>	<b>Pest Epidemiology</b>
<b>12.4.1</b>	<p>Korean research of pinewood nematode (presentation) – Seong Hwan Kim.</p> <p>The research was done to understand the situation, generate information and find an integrated approach for control. The research allowed Korea to understand the insect vector behaviour, the nematode itself and what damage it was causing.</p> <p>PWN (<i>Bursaphelenchus xylophilus</i>) was first discovered in 1988 in the south and by 2006 it had spread to the north. Felling, tree burning, fumigating with metham sodium, trunk injections and aerial spraying have all been used to keep the vector/nematode under control (with further research being carried out on biological controls and resistance trees). It was found that both the European and Asian forms of <i>Bursaphelenchus mucronatus</i> appear in Korea.</p> <p>Surveillance including ground and aerial monitoring is carried out, with up to 30k fines for the movement of wood internally/domestically.</p> <p>Molecular diversity and pathogenicity testing, tree responses and population analysis was carried out. Modelling of spread was completed to gain an understanding of where the PWN might continue to spread. It is assumed that the nematode came from China (first found in 1982) and Japan (first found early 1900's). It was noted by IFQRG that it's surprising it took so long for the nematode to establish in Korea.</p> <p>The vectors (<i>M saltuarius</i> and <i>M alternatus</i>) taxonomy, monitoring, detection, flying ability, interactions with microbes were all researched.</p> <p>Key findings are that certain bacteria may affect pathogenicity and nematode reproduction.</p>

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<b>13</b>	Review and adoption of IFQRG-10 Report				
<b>13.1</b>	Work Program for 2012-13				
	<b>IFQRG Action Item No</b>	<b>Action Item description</b>	<b>Expected date</b>	<b>IFQRG member(s) responsible</b>	<b>Deliverable: Submission to: (TPFQ, TPPT, IPPC, Secretariat) - Journal Publication</b>
	01	Evaluate EDN as a wood treatment	Feb 1 2013	Ron Mack	Report to IFQRG chair
	02	Contact UK scientists regarding pathway work underway on bacterial pathogens as forest pests	Feb 1 2012	Hugh Evans	Report to IFQRG chair
	03	Determination of fraudulent/non-treated timber products	Feb 1 2012	Steve Pawson	Report to IFQRG chair
	04	Recommendations for CPM-08 science symposium	November 15 2012	IFQRG members	Provide suggestions to IFQRG chair
	05	Apply the 'Cardiff Protocol' to the quarantine pest groups that are considered important in the international trade of WPM	Feb 1, 2013	Hugh Evans Mike Ormsby Steve Pawson Bob Haack, Sandy Liebhold, Ecki Brockhof Adnan Uzunovic Eric Allen Luis Fonseca	Report to IFQRG chair to circulate through IFQRG members then to TPFQ
	06	Further development of quantification of integration measures for risk reduction in wood products	Feb 2013 carried over from 2011-12	Eric Allen Mike Ormsby Hugh Evans Chuck Dentelbeck	Report to IFQRG chair
<b>13.2</b>	Date and location of IFQRG-11				
	Discussions are underway to coordinate the next IFQRG meeting with an Invasive Alien Species Congress being organized in China October 23-28, 2013 in Qingdao, Shandong Province. An alternative location could be Rome. Dates to be determined.				