

International Forest Quarantine Research Group IFQRG-11
28 October – 1 November 2013
Qingdao, China
Meeting Report

1.1	Welcome address – Eric Allen (IFQRG Chair) welcomed the group to Qingdao and gave a brief outline and the background history of International Forestry Quarantine Research Group (IFQRG). The chair also welcomed participants of IUFRO-alien species party that coordinated with IFQRG to participate in this meeting.
2	Opening of the meeting
3	Local information (IFQRG-11-03)
4	Meeting logistics and arrangements Kate De Groot kindly offered to serve as rapporteur
5	Introductions (IFQRG-11-04) IFQRG attendees gave their introductions (a full list of attendees is appended to this report).
6	Review and adoption of agenda (IFQRG-11-05)
6.1	List of documents (IFQRG-11-06)
7	Report of the 2012 IFQRG-10 meeting (IFQRG-11-07) – Eric Allen Eric noted that the full report is available online on the IFQRG website (through the IPPC website). One of the main bodies of work undertaken at IFQRG 10 was the ‘Cardiff Protocol’ which describes the process of calculating number of test pests that need to be used in finals stage of new treatment testing. – this concept is incorporated into the draft annex to ISPM 15.
7.1	Review of actions items from IFQRG 10 01 – Evaluate EDN as a wood treatment (Ron Mack): Ron with a support of several collaborating research labs (Pen state, FPInnovations) feels the treatment needs independent testing. There are concerns surrounding the fumigant disappearing (solubilise) in wet wood and lack of access to it to do the research NZ is currently completing some work on penetration in wet wood and consider if they will continue with large scale experiments and hope to share some results later this year. EDN has been approved in Australia and group expressed interest in seeing the efficacy data that supported the approval. here are some quite difficult processes that have to be adhered to use the gas. 02 – Contact UK scientists regarding pathway work underway on bacterial pathogens as forest pests (Hugh Evans): Hugh contacted colleagues (Sandra Denman) who are looking at bacterial pathogens and notes that work is still in progress and she needs to prove Koch's postulates. There is little information on pathway. E.g. pathway for fast movement of bacterial diseases on horse chestnut across UK. Some questions have been raised including: Could ISPM15 treatments be effective on bacteria? This has been raised as an issue as bacteria has previously not been looked at. What science is already available? Does bacteria actually move with the movement of wood? Do the treatments we have already work on bacteria? Hugh will continue to investigate. (2013 Action Item 01)

	<p>03 - Determination of fraudulent/non-treated timber products (Steve Pawson): Researchers in NZ investigated the option of detecting physical changes in wood after heat treatment was applied to determine if this might be a way to see if Wood Packaging Material (WPM) was compliant with ISPM 15. Preliminary results are promising, showing enzyme changes between 50 and 70 C.</p> <p>IFQRG members went on to discuss the issue further including the use of heat sensitive paints, portable GC “sniffing nose” thermometers, biotechnical tools etc to determine if the treatment had been applied.</p> <p>General consensus of the IFQRG members was that it might be very difficult to find something to determine if the wood had been treated or not. It might be better to enforce the requirements of ISPM 15 rather than determine if a treatment had been applied.</p> <p>Further details (what pests were found, wood ID etc) of the actual non-compliance would be helpful to be more effective in trace-back. IFQRG members could perhaps provide further assistance in regards to this. NZ interception records of borers in WPM may be useful. A subgroup of John McDaniel, Julie Aliaga, Kerry Britton, Piotr Wlodarczyk and John Janowiak agreed to draft some text on this issue. (2013 Action Item 06)</p> <p>04 - Recommendations for CPM-08 science symposium (IFQRG members) Following key issues addressed from country comments, the CPM wanted to learn more on probit 9 – Bob Griffin and Adnan Uzunovic were invited as experts to make presentations to CPM.</p> <p>05 - Apply the ‘Cardiff Protocol’ to the quarantine pest groups that are considered important in the international trade of WPM (Hugh Evans, Mike Ormsby, Steve Pawson, Bob Haack, Sandy Liebhold, Ecki Brockerhoff, Adnan Uzunovic, Eric Allen, Luis Fonseca):</p> <p>This issue was on hold until the pest groups list was finalised and discussed further by the TPFQ. It was noted that it is a great opportunity to have pest groups for trials to ensure further treatments can be used as quarantine treatments. (2013 Action item 05)</p> <p>06 - Further development of quantification of integration measures for risk reduction in wood products (Eric Allen, Mike Ormsby, Hugh Evans, Chuck Dentelbeck): The topic covers using a number of integrated measures in combination to achieve the desired risk reduction in wood products. The work is in progress. (2013 Action Item 02)</p>
8	Update of other bodies
8.1	<p>Update on IPPC standards – IPPC Secretariat</p> <p>The IPPC secretariat (Artur Shamilov) reviewed the draft ISPMs and draft specifications posted for member consultation.</p> <p>All draft ISPMs and associated background documents can be found on the IPPC website at: https://www.ippc.int/core-activities/standards-setting/member-consultation-draft-ispms</p>

	<p>IPPC had several calls this year:</p> <ul style="list-style-type: none"> • Call for topics (usually sent every 2 years) • Call for experts (TPG, TPPT, EWGs) – Artur took this opportunity to encourage IFQRG members to nominate for experts – Closes this week – Friday <p>(Involvement entails: looking at treatments, finding new topics to be added to IPPC list, eg wood treatments. The panel leads the review and evaluation of the treatments and provides updates at the TPPT meeting. Usually one face to face meeting and other e-meetings are held during the year. All panel members (and their supervisors) sign a commitment agreement that says this work would be part of their ongoing work, not additional. Membership can last up to 5 years).</p> <ul style="list-style-type: none"> • Call for authors of diagnostic protocols – 7 submissions received this year. • Call for participants in ECCT – Expert consultation on cold treatments. Hoped to have a similar group like IFQRG set up for cold treatments. Meeting in December 2013 in Buenos Aires.
8.2	<p>CPM – IPPC Secretariat</p> <p>The amendment to annex 1 of ISPM 15 (2009) was adopted at CPM 8. This amendment added the dielectric heat treatment as an approved treatment. The successful adoption was aided by a side presentation at CPM 8 from EMITEC: the company that originally submitted the treatment to IFQRG and has been using dielectric heating for a number of years.</p> <p>A scientific session on Probit 9 was held at the last CPM meeting and Adnan provided an update on this at the IFQRG 11 meeting.</p> <p>CPM-8 (2013) agreed that ISO standards are not mandatory for implementation of ISPMs and that in the phytosanitary area; ISPMs take precedence over ISO standards; they encouraged contracting parties to take this into account.</p>
8.2.1	<p>Adopted standards – IPPC Secretariat</p> <p>International Standards for Phytosanitary Measures Adopted by CPM-8 (2013)</p> <p>The CPM:</p> <ol style="list-style-type: none"> 1. Adopted Annex 4 (Pest risk analysis for plants as quarantine pests) and core text-consequential changes to ISPM 11:2004 (2005-001), contained in this Appendix of the Report, noting that the title of ISPM 11 changed to Pest risk analysis for plants as quarantine pests and that the year of adoption of ISPM 11 changed to 2013. 2. Adopted the revision of Annex 1 (Approved treatments associated with wood packaging material) to ISPM 15:2009 (Regulation of wood packaging material in international trade) (2006-011), and consequential revision of Annex 2 (The mark and its application) to ISPM 15:2009, contained in this appendix. 3. Russian language translations of many adopted ISPMs now available.
8.2.2	<p>CPM-08 (2013) Science session on probit-9 – Adnan Uzunovic</p> <p>Adnan Uzunovic and Robert Griffin presented a science session on Probit 9 at CPM-08 (a modified version of Adnan's CPM presentation was delivered in Qingdao will be posted on the IFQRG work area).</p>

8.3	<p>TPPT – IPPC Secretariat</p> <p>Current topics for the TPPT include: Irradiation treatments, wood packaging material treatments, fruit fly treatments and soil and growing media in association with</p> <p>TPPT is currently looking at 21 treatments including 4-5 wood treatments. At the request of the submitting NPPO, the following treatments were removed until further advice can be sought:</p> <p><i>Methyl isothiocyanate and sulfuryl fluoride (Ecotwin mixture) fumigation for Bursaphelenchus xylophilus, Coleoptera: Cerambycidae, and Coleoptera: Scolytinae of wood packaging material (2007-102)</i></p> <p>SF and dielectric heat treatments are the only remaining wood treatments left for TPPT to review.</p> <p>The TPPT requested further information from the submitter on SF. Concerns were raised by the TPPT regarding the temperature level for PWN (previous studies have shown 20°C to be most effective on the egg stage of PWN) The current submission for SF showed that the treatment would be applied at 15-20°C and TPPT felt this was a little low. The submitter said that lengthening the exposure time to 48 hr would address this. The TPPT is consulting with PWN experts to see if the suggested extended length of exposure time would address their concerns.</p> <p>Dielectric heat treatment –The submission for dielectric heat treatment was for all wood, not just WPM so the TPPT was asked to review this treatment instead of the TPFQ.</p> <p>The TPPT has updated their criteria for treatment evaluation and this is now publically available.</p>
8.4	<p>TPFQ - Eric Allen</p> <p>The TPFQ met in Brazil in June 2013. The main goal was to review the country comments on the treatment criteria annex to ISPM 15. A draft was completed and is now ready for the Standards Committee (SC).</p> <p>The next step will be to finalise the draft and have it ready for the SC, who will meet in May 2014. If they agree that it is ready, it will go for member comment in 2015.</p> <p>Tasks for IFQRG are:</p> <ul style="list-style-type: none"> • Publish a document to describe the science behind the Cardiff protocol. • Engage the IFQRG group experts to determine test sample size requirements for the Cardiff protocol • Provide guidance on the importance of isolate variability • Provide information on the pest groups in the treatment criteria document, why groups are included or excluded.
9	<p>Highlights of other meetings</p>
9.1	<p>Braunschweig IUFRO PWN meeting – Hugh Evans</p> <p>The IUFRO PWN (WG 7.02.10) conference was held 15-18 October 2013 in Germany. The conference had a very good international representation. In total, 41 oral presentations and 22 posters represented the current research activities concerning the pine wood nematode, its vector and related microorganisms and pine wilt disease worldwide.</p> <p>The meeting report is available at http://pub.jki.bund.de/index.php/BerichteJKI/issue/view/858.</p>

	<p>Thomas Schroeder is stepping down as the coordinator for IUFRO 7.02.10 and that Dr. Katsunori, Nakamura-Matori will be taking up the position. The next IUFRO meeting may be held in conjunction with a PERMIT meeting in Portugal, November 2014.</p>
9.2	<p>Ash Dieback – FRAXBACK (IFQRG-11-10) – Eric Allen</p> <p>The COST funded FRAXBACK action, held the 4th MC meeting & workshop on 'Frontiers in ash dieback research 4-6 September 2013 in Malmö Sweden.</p> <p>The meeting report including abstracts from the 4th meeting has been loaded on the IFQRG website, document number: 2013 IFQRG-11-10. The report and other information about FRAXBACK action can also be found on their website: http://www.fraxback.eu/index.php.</p>
9.3	<p>Qingdao IUFRO 7.03.12 – Kerry Britton, KV Sankaran, Hugh Evans</p> <p>IUFRO 7.03.12 organized a session on Sustainable Management of Invasive Forest Pests at the Second International Congress on Invasion Biology at Qingdao, October 2013.</p> <p>Three invited keynote speakers highlighted their countries experiences and research results to manage pinewood nematode (PWN): Dr. Jian-Re Ye, Nanjing Forestry University; Dr. Keiko Kuroda, Kobe University, and Dr. Hugh Evans, UK Forest Research, Aberystwyth. Other topics discussed in the session were emerald ash borer, Asian longhorned beetle and citrus longhorned beetle. Key research reported included:</p> <ul style="list-style-type: none"> • A key feature of infection by PWN in naïve hosts is that the nematodes can enter and colonize the tree during the vector beetles' maturation feeding. • In Japanese red and black pines, in the early stages PWN disperse mainly in the cortex and resin canals, • They move in the cambium down to the roots, triggering resin production, which kills ray and axial parenchyma cells. • Chemical signals from the pupating beetle larvae stimulate the formation of the dauerlarvae (LIV stage). These can be differentially up-regulated by the presence of some fungal associates in China. • The EU has modified an evapo-transpiration model to predict the future range and severity of pine wilt in Europe. • PWN continues to spread in Japan. Active outreach is needed to ensure accurate information reaches practitioners, and the general public whose love of pine forests sometimes impedes active management. • Japan has produced more than one hundred resistant cultivars of red and black pine, but resistance is not the same as immunity. Under high pest pressure even resistant pines can succumb. <p>The EAB spreading in Europe appears to be moving at 12km per year and there is a high possibility that it has crossed over to the Ukraine.</p> <p>Participants also went on a field trip to view a PWN area in Lao Shan National Park. Participants observed tree removal and stump treatments. They also visited a wood processing facility where vector larvae are harvested to rear biological control agents.</p> <p>IUFRO 7.03.12 participants made further presentations during the IFQRG meeting</p>

10	Current phytosanitary issues
10.1	<p>Regional Plant Protection Organisations (APPPC, COSAVE, EPPO, NAPPO etc) – Artur Shamilov, Shane Sela, Andrei Orlinski</p> <p>EPPO</p> <p>The main activities of the EPPO forestry panel in 2012-13 included:</p> <ul style="list-style-type: none"> • EAB <i>Agrilus planipennis</i> • Cerambycids: ALB, CLB • New emerging pests and PRAs for <i>Oemona hirta</i>, <i>Polygraphus proximus</i> & <i>Agrilus planipennis</i> • Phytosanitary forest news • Forest pest interceptions • Safe use of biological control agents <p>EPPO has developed 3 standards on ALB and CLB and EAB, providing guidance on measures and detections etc. The main difficulty in completing the standards was getting consensus of from all the EPPO countries. The standards were adopted in September and will be found on the EPPO website.</p> <p>PRAs have been completed on the Lemon Tree Borer, Four-eyed Fir Bark Beetle (FFBB) and Emerald Ash Borer (EAB). The process to adopt these PRAs can take some time, approx. one year.</p> <p>IFQRG members discussed the EAB PRA and asked why EPPO had a requirement to take 2.5 cm off the wood as a phytosanitary measure when it has been found that once the wood has been debarked, one centimetre would be enough to eliminate all life stages (particularly pupal chambers). Ron Mack is involved in US work on this issue and will hopefully have results soon.</p> <p>EPPO has a panel on biological control agents which was formed in 2008. The panel developed 3 documents in relation to biological control agents including:</p> <ul style="list-style-type: none"> • PM 6/1(1) First import of exotic biological control agents for research under contained conditions • PM 6/2(2) Import and release of non-indigenous biological control agents • PM 6/3(4) List of biological control agents widely used in the EPPO region ("Positive List") <p>Other activities for EPPO included:</p> <ul style="list-style-type: none"> • Phytosanitary news (which anyone can subscribe to via the EPPO website) • Plant pest interceptions • Comments on new draft ISPMs including the new standard on the international movement of wood. <p>NAPPO</p> <p>NAPPO has been working on the development of a technical document for the use of heat treatment in wood and WPM. The paper has been drafted and can be found on the NAPPO website.</p> <p>NAPPO and APPPC are also working on the development of a workshop for the implementation of ISPM 15. The objective is to improve compliance in the application of ISPM 15. The workshop is planned for March/April 2014</p> <p>The technical advisory group has completed a guidance document for the biological control for emerald ash borer (EAB) including management, biocontrol agents and regulatory procedures guiding the use of the biocontrol agents. The document can be found on the IFQRG (2013 IFQRG-11-20) and NAPPO websites.</p> <p>The NAPPO work plan for 2013/14 includes completing the ISPM 15 workshop and</p>

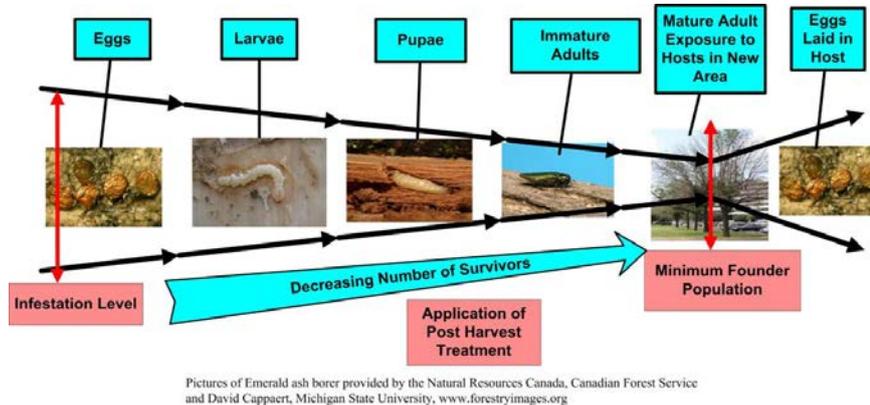
	<p>developing a regional standard on the potential use of systems approaches to manage pest risks associated with the movement of wood (including providing guidance on how integrated measure could be used). It was noted that different countries are working on similar ideas and perhaps there is an opportunity to share information and knowledge. IFQRG could be a very suitable forum to provide further advice from a scientific perspective.</p> <p>The EU WPM manufacturing industry (contact Filipa Pico) is working to have an international forum to share its concerns regarding lack of harmonization applying ISPM15 and identify important consensual changes to propose an ISPM15 update to IPPC. The EU WPM manufacturing industry might be interested in the workshop.</p>
10.2	<p>EU projects: COST (REPHRAME, PERMIT) – Hugh Evans</p> <p>COST - COST is an intergovernmental framework for European Cooperation in Science and Technology, allowing the coordination of nationally-funded research on a European level. COST funds pan-European, bottom-up networks of scientists and researchers across all science and technology fields. These networks, called 'COST Actions', promote international coordination of nationally-funded research. COST does not fund research itself, but provides support for networking activities carried out within COST.</p> <p>REPHRAME – Is the Research Extending Plant Health Risk And Monitoring Evaluation. REPHRAME has a Stakeholder Observer group that can ask questions and make suggestions to changes of direction or interpretation of the results, please let Hugh know if you would like to be a stakeholder. Stakeholders may be funded to attend a meeting.</p> <p>PERMIT – Is the Pathway Evaluation and pest Risk Management In Transport. The action has 4 working groups covering: pathway characterisation, development of generic risk mitigation measures, analysis of the level of education and ID of research and data gathering needs. PERMIT also holds training workshops to assist new scientists. A conference will be occurring next year to finish the action. PERMIT has 26 COST countries.</p>
11	<p>Standards development</p>
11.1	<p>Management of phytosanitary risks associated in the international movement of wood (IFQRG-11-08) – Shane Sela</p> <p>Background: In 2007 the CPM added the topic to the work program. The SC approved the specification in May 2008. The draft ISPM was reviewed, revised and approved for member consultation by the Standards Committee (SC) who met in May 2013. Members have until 1 December 2013 to provide comments through their IPPC contact point.</p> <p>The IFQRG participants were asked if they had any scientific issues in the standard that could be provided as comments from IFQRG:</p> <p>[9] The paragraph 'wood packaging material that has not been treated and marked in compliance with ISPM 15:2009 and is moved in international trade is covered within the scope of this standard' appears to be conflict with ISPM 15, if it is WPM shouldn't it just come under ISPM 15? This is actually refers to wood that may be sold to another country to be made into WPM, then treated and stamped. The following revised text will be submitted as an IFQRG comment:</p> <p><i>Wood components that have not been treated or marked in compliance with ISPM 15:2009 that are intended for use as wood packaging material for use in international trade are covered within the scope of this standard.</i></p>

	<p>One member suggested that SWP components are adequately addressed in the standard in paragraph 74: 1.2 Sawn Wood; that paragraph 9 is unnecessary.</p> <p>[124] is the statement about the 100mm correct? Ron noted that yes this was the general consensus at the moment, but there may be some updated figures on this as work is continuing. Piotr noted that the sentence specifies 'some' fumigants, meaning this is not referring to all fumigants.</p> <p>[61] Table one pest groups: some refinement of the description of fungi is needed; Adnan suggested alternative wording for IFQRG to consider A revision was done and some additional information added to the draft; comments will be sent to IPPC as a formal comment from IFQRG.</p> <p>[61] Some Lepidoptera may need to be added, which will be done through a country comment.</p> <p>IFQRG members discussed the process for standard setting and the importance of having the right experts contributing to the specifications and the standard. Some IFQRG members suggested that might be helpful to have industry experts involved in the drafting of the specifications and the draft standard from the beginning. The CPM/IPPC secretariat commented that they have in past brought industry experts in to assist in matters of concern when drafting the documents. They also commented that the standard process has many steps that allow comments to be provided a number of times throughout the process. Chair comment: IFQRG promotes scientific input from all members and encourages their scientific contributions to national and international processes through their NPPOs, RPPOs, IFQRG and the IPPC.</p> <p>IFQRG members also raised the point that comments need to go through their NPPOs and that this was a filtering system that may stop some industry comments making it to the CPM and re-iterated that industry should be included in the start of the drafting process.</p> <p>2013 Action Item 03: Submit IFQRG comments on wood standard through the IPPC Online Comment System (OCS) - Allen</p>
11.2	<p>ISPM 15 Treatment criteria (IFQRG-11-12, IFQRG-11-13, IFQRG-11-14) - Piotr Włodarczyk (this agenda item was addressed after 11.3)</p> <p>A history of the development of ISPM 15 and the new treatment criteria was given. The full document outlining the history can be found on the IFQRG website, document: '2013 IFQRG 11-12'.</p> <p>The main concern topics raised during the 2010 Member Consultations to the draft annex for ISPM 15 – new treatment criteria were the list of pest groups to be used for testing and the statistical model used in the evaluation of the efficacy of submitted treatments (Probit-9).</p> <p>IFQRG-9 and IFQRG-10 brought the development of the three-step process and 'Cardiff Protocol' as an alternative to Probit-9 and defined the pest list. The TPFQ met in June, 2013 to revise the draft annex.</p> <p>Proposals agreed to by the TPFQ included a major re-draft and a change of the title (which is now 'Process for testing new treatments for ISPM 15'). The TPFQ also agreed that the new treatments criteria should be an annex as opposed to an appendix.</p> <p>Future steps:</p> <ul style="list-style-type: none"> • The draft will be submitted to the Standards Committee (SC) at its meeting in May, 2014 for consideration

	<ul style="list-style-type: none"> • The SC may decide to send the draft for Member Consultation in 2014 (July - November) • Country comments (2014) will be considered by the SC-7 in May, 2015, the draft will be adjusted and sent for Substantial Concerns Commenting Period (July - September) • “Substantial concerns” comments will be considered by the SC in November, 2015 and the draft may be sent to the CPM for adoption in March 2016. <p>The IFQRG discussed the challenges of finding meaningful data to use in the MPL equation of the Cardiff protocol; little is published and variability within pest groups makes it difficult to generalize about risk factors related to life histories. Member comments included:</p> <ul style="list-style-type: none"> • Records are available for interceptions and subsequent establishments, perhaps this information could be used to work out the numbers needed in the Cardiff Protocol. • Where invasion success is high in an organism, test numbers should be higher. If the pest is an aggressive invasive species, a higher number than 60 should be used • Pest organisms with a higher risk of establishment are of greater concern and therefore a higher statistical reliability is needed to provide confidence that such organisms have been adequately treated. Greater assurance of treatment success would be evident if 0.97 or 0.99 reliability instead of 0.95 were required in tests of these organisms in the final confirmatory step of the protocol. This would change the number of test organisms from 60 (0.95) to 100 (0.97) or 300 (0.99). Rather than using a formula to determine sample sizes, perhaps prescribing an appropriate statistical reliability and corresponding sample size for pest groups would be more appropriate. <p>2013 Action Item 04: Comments on treatment Criteria will be passed on the TPFQ for their consideration. – Allen</p> <p>2013 Action Item 05 - Subgroup to develop and publish peer-reviewed paper linking pest-related variables used in the MPL equation (final stage of Cardiff Protocol) to reliability statistics (0.95, 0.97, 0.99) to establish recommended test numbers for pest groups. – possible authors: Mike Ormsby, Hugh Evans, Adnan Uzunovic, Sandy Liebhold, Ecki Brockerhoff</p>
11.3	<p>Review of ‘Cardiff Protocol’ – Adnan Uzunovic (this agenda item was addressed before 11.2)</p> <p>The International Forest Quarantine Research Group (IFQRG) was asked by the Secretariat of the Food and Agricultural Organisation (FAO), International Plant Protection Convention (IPPC) to evaluate more suitable levels of efficacy for treatments on wood packaging material moving in international trade.</p> <p>The ‘Cardiff Protocol’ estimates a treatment efficacy target in the last stage of 3 step process of efficacy testing, that reflects the biology of the pest, the pest relationship with wood packaging, and the trading patterns of wood packaging internationally.</p> <p>“Cardiff Protocol” model takes into account following:</p> <ul style="list-style-type: none"> ▪ The biology of the pest ▪ The relationship between the pest and the wood packaging ▪ The international trading patterns of wood packaging material <p>The ‘Cardiff Protocol’ describes a biological systems approach to determine the required level of efficacy for any risk-mitigating measures and would consider all factors along the biological pathway: including host or commodity infestation, pest</p>

development and survival, and population ecology effects related to invasion and persistence (e.g. the Allee effect, see Stephens *et al.* (1999) for further information). For a wood borer associated with wood packaging material moving in international trade, this could resemble a system depicted in the diagram provided in figure 1.

Figure 1: The invasive pathway of emerald ash borer (*Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae)) in international trade.



For ease of description, within the biological system there are three particular points defined (see figure 1):

- the **host infestation level**, which is the number of individuals of the pest in question that infest the host or commodity under consideration;
- the **maximum pest limit (MPL)**, which is the maximum number of individuals of the pest that can remain after the risk-mitigating measure has been applied. The MPL will apply to the point in the biological system where the measure is applied;
- the **founder population**, which is equivalent to the population size required to establish the pest in the new area.

IFQRG members discussed the sample size determination at length. IFQRG members felt it shouldn't be up to the researchers to determine these numbers and felt it would, at the very least, be appropriated to work out some minimum numbers for each pest group.

Ecki Brockerhoff noted that he has a PhD student who is working on a project testing the minimum number of pests (individuals of a species) needed to establish in a new location and this would be very helpful in determining what level of treatment efficacy is needed to prevent establishment.

The IPPC secretariat suggested that over the next year, numbers could be determined, before the document is sent for member consultation next year.

A suggestion from IFQRG would be to include some numbers to begin with even if the numbers are too high/conservative so treatment researchers can begin trials. The numbers could then be amended once new information becomes available eg completion of the PhD.

The question was then posed - Is IFQRG comfortable with the formula at least for now and then numbers can be continued to be worked on and amended later? General consensus was that this may be the best approach as it is very important to give researchers something to start with or risk not having any new treatments being developed in lieu of phasing out methyl bromide.

11.4	<p>Draft ISPM specification – Wooden Handicrafts (IFQRG-11-09) – Shane Sela</p> <p>A draft specification for ISPM: Wood products and handicrafts made from raw wood was approved for member consultation by the Standards Committee by e-decision in January 2013. The member consultation period was 1 June – 31 July 2013 which has now closed. The drafting panel is yet to be decided but it is planned to be a expert working group, likely including a member of TPFQ.</p> <p>Shane noted it would be very helpful for IFQRG members to provide assistance and information to the EWG as required.</p>
11.5	<p>Draft ISPM plants for planting growing media (IFQRG-11-11) – Kerry Britton</p> <p>The draft ISPM on the movement of growing media in association with plants for planting in international trade was revised and approved for member consultation by the Standards Committee (SC) who met in May 2013.</p> <p>The standard provides guidance for the evaluation of pest risks associated with growing media accompanying plants for planting and describes phytosanitary measures to facilitate pest risk management of such growing media used in the international movement of plants for planting. Bulk growing media and growing media as contamination of a commodity are not considered in the standard. Animal and human health risks associated with growing media are also not considered.</p> <p>Members have until 1 December 2013 to provide comments through their IPPC contact point.</p> <p>Some concerns raised by IFQRG members in the draft ISPM were:</p> <p>Annex 1a –</p> <ul style="list-style-type: none"> - gravel, sand, silt constituents are listed with a low pest risk, these can be mixed together to form soil and should be high. - the reference to worms. - peat may not be ranked high enough. <p>There should be more fungi added to the list, not just <i>Tilletia</i>, perhaps the list of pests needs to be reviewed (the standards committee has asked country members to comment on the list of pests).</p> <p>IFQRG members encouraged to provide individual comments/concerns to their NPPOs for submission to the IPPC.</p>

11.6	<p>Methyl bromide – Wood moisture content (IFQRG-11-15) – Eric Allen</p> <p>Summary: During the April 2012 meeting of the Standards Committee Working Group (SC-7), a member noted that tropical wood species may contain high moisture contents which may affect the permeability of methyl bromide treatment as prescribed in ISPM 15:2009. The Secretariat indicated that sawn wood dries relatively rapidly once bark has been removed and therefore moisture content of wood was unlikely to affect treatment. The SC-7 requested that the Technical Panel on Forest Quarantine (TPFQ) consider the effects of high levels of moisture on methyl bromide penetration. The TPFQ in cooperation with members of the International Forest Quarantine Research Organization (IFQRG) has subsequently reviewed current literature.</p> <p>The TPFQ considers that it is evident that methyl bromide can penetrate into wood with reasonably high moisture contents (MC). However, there are limits to depth of penetration due to other factors addressed within the guidance already provided in ISPM 15:2009. High moisture content wood can be found in both tropical and temperate zones. Wood drying occurs because of a moisture gradient in the wood. The MC of sawn wood components used in the manufacture of wood packaging material (WPM) will decline rapidly under normal air-drying conditions. It is therefore likely that the MC of these sawn wood components will be below that of freshly sawn wood at the time of treatment, and within a range that allows for sufficient methyl bromide penetration.</p> <p>Further practical guidance for NPPOs is needed, could IFQRG assist with this? Some members of the TPFQ are writing an explanatory document, this should be sufficient. The document hasn't been given to the IPPC as yet. This will be ready for the next standards committee in May 2014.</p>
12	<p>Research reports – PDF versions of the research report PowerPoint presentations will be posted on the IFQRG word area.</p>
12.1	<p>Phytosanitary policy and regulations</p>
12.1.1	<p>Review of prohibition on myrtaceous timber imports into Australia (IFQRG-11-16) – David Letham and Chris Howard (presented by John Nielsen)</p> <p>Myrtaceous timber imports into Australia from countries with <i>Puccinia psidii sensu lato</i> were prohibited in 2004 following the detection of viable contaminant spores of this fungus on Brazilian Eucalyptus timber, its associated wrapping, and the outer surfaces of the shipping containers that held the goods.</p> <p>Following a review of this policy, which considered recent research on spore survival and the risk of surface contamination from spores of this fungus on all commodities, Australia removed the prohibition on myrtaceous timber imports from countries with the pathogen.</p>
12.1.2	<p>A historical perspective on international plant quarantine regulation in the US and its consequences – Sandy Liebhold</p> <p>A historical perspective on international plant quarantine regulation in the US was presented highlighting current issues regarding the plants for planting pathway.</p>

12.1.3	<p>Comparing national legislations for the import of live plants – Rene Eschen</p> <p>National phytosanitary legislations for plants for planting were compared, focusing on effectiveness of import regulations on pest establishments, inspection strategies, post-entry quarantine and other procedures.</p> <p>Rene asked IFQRG members if they can assist with information on the below:</p> <ul style="list-style-type: none"> • effect of changes in legislation on establishment of new species • trade and movement of pests, as well as effectiveness of phytosanitary measures • and contact for further country comparisons <p>IFQRG members asked about the potential for illegal imports to be higher if the restrictions and regulations for imports are too restrictive.</p> <p>It was noted that the EU and US use a more trade focused “Black-list” approach, rather than a quarantine focussed “white-list” approach like Australia and NZ.</p>
12.1.4a	<p>Addressing pest risk in plants for planting – Kerry Britton</p> <p>An example of integrated systems for plants for planting was described focusing on the US-Canadian nursery certification pilot program. An evaluation of this pilot was completed and can be found on www.anla.org – ‘USNCP Evaluation March 2011’.</p> <p>Kerry noted that there was not enough pre-pilot data to see if the nursery stock was actually cleaner. The same issue arose with ISPM 15, in that there wasn’t enough pre data to complete comparisons.</p>
12.1.4b	<p>Cost sensitive risk assessment for invasive species in the US – Mike Springborn</p> <p>The goals of risk assessment of potential plant trade are a balance of trade benefits with invasion risk and integrate statistical and decision components. The results show estimated net benefits from screening species for invasive species risk are substantial.</p> <p>IFQRG members discussed how, who and what kind of taxes, levies you could apply to imports and whether it would be better to apply the cost to those who bring the biggest risk. It was noted that it would be very hard to apply the costs to the importer if the Government/regulatory body had made the policy allowing the import in the beginning.</p>
12.1.4c	<p>Risk assessment in live species trade – Mike Springborn</p> <p>An economic decision-making framework was described for determining whether the overall biological risk is justified by the trade benefits, applicable to different taxonomic groups and geographic regions.</p>
12.1.5	<p>Quarantine regulations in India – Forest pests – Kavita Gupta</p> <p>India has had its share of exotic pest introduced including pests from USA, middle east, Mexico, UK and Pakistan.</p> <p>India has a number of legislations including:</p> <ul style="list-style-type: none"> • The Environment (Protection) Act 1986 • The Biological Diversity Act 2002 • The Indian Wildlife (Protection) Act, 1972 <ul style="list-style-type: none"> • Wild Life (Protection) Amendment Act, 2002 • The Forest (Conservation) Act, 1980 • Plant Quarantine (Regulation of Import into India) Order 2003
12.1.6	<p>Japanese risk assessment for forest commodities – Kimiko Okabe</p> <p>A risk assessment was recently published in Human Ecol. Risk Assessment (2012)</p>

	<p>for pests found in wood commodities. Potential threats identified include ants, exotic carpenter bees, and phoretic mites.</p>
<p>12.1.7</p>	<p>Cost-benefit analysis of ISPM15 – Eckehard Brockerhoff and Mike Springborn</p> <p>Brockerhoff: The objectives of the project were to measure the effects of ISPM15 on “borer” interception & establishment rates in the US and to complete a cost-benefit analysis. This project was part of a project on benefits and costs of phytosanitary policy at ‘NCEAS’ (National Center for Ecological Analysis and Synthesis at the University of California, Santa Barbara)..</p> <p>Conclusions drawn from the project are:</p> <ul style="list-style-type: none"> • ISPM 15 has reduced borer arrivals • Actual arrival rates by species are unknown • Interceptions: useful proxy for arrival rate • Relationship between arrival rate & establishment is not linear • Modelling interception – establishment relationship is useful for assessing policy effects • Caveat: other pathways exist (timber, live plants, etc.) but wood packaging is probably the most important for borers • Recording of quality interception records important! Of particular importance is recording negative data, so that approach rates can be estimated. <p>Springborn: Many papers have been brought together to realise the net benefits of ISPM 15. Pest damage can be up to 34 million each (per pest, per year). Costs of implementing ISPM 15, increases the costs of trade.</p> <p>Results showed that in the absence of ISPM 15, cumulative establishments of pests could be 300-350 by 2050, with ISPM 15 would reduce this to 200-250. Current net present values (NPV) show that it would be negative to implement ISPM 15, but this is due to the initial set up, but by mid 2020s, you would ‘break even’ and past that would show a positive result. If we could reduce the cumulative establishment (by better implementing ISPM 15) you could ‘break even’ earlier than 2020.</p>
<p>12.1.8</p>	<p>Quarantine regulations in Vietnam – Pham Quang Thu</p> <p>Pham explained the Vietnam agricultural structure showing 3 main areas including the Vietnamese Academy of Forest Sciences.</p> <p>The Plant Protection Department was formed in 1961 and its main roles are to:</p> <ul style="list-style-type: none"> • to carry out plant protection extension activities, • to administer plant quarantine activities at the national level, • to conduct pesticide management including pesticide registration and residue control, • and food safety management relating to phytosanitary. <p>Plant Quarantine sits under the Plant Protection department and includes two technical units and an operational unit.</p> <p>Vietnam would like to address a number of problems they face including completing a PRA for wood, training their staff and bringing their skills up and completing more national standards.</p>

12.1.9	<p>Management of PWN Associated with <i>Pinus kesiya</i> in Vietnam – Pham Quang Thu</p> <p>A research study was completed to assess the status of PWN in Vietnam. The study looked at the nematode and beetle taxonomy, the disease incidences and symptoms.</p> <ul style="list-style-type: none"> - The PWN disease in Lam Dong province is increasing both in disease incidence and in extension to new areas. Tree health status varied in different locations and was of about 44.7%. - The nematode was identified as <i>Bursaphelenchus</i> sp.; but is thought to be neither <i>B. mucronatus</i> nor <i>B. xylophilus</i>. Further molecular diagnostics will be undertaken. - <i>Monochamus alternatus</i> was found in both infected trees and dead trees and identified as the vector of the nematode. - Results of artificial inoculation of the trees with cultured nematodes had shown that the pathogenicity of the nematode was moderate to <i>Pinus kesiya</i>
12.1.10	<p>Plant Quarantine in China – Ying Huang</p> <p>China's two main departments that cover quarantine are (1) Department of Supervision on Animal and Plant Quarantine and (2) Bureau of Import and Export Food Safety.</p> <p>Regulations for both of these departments can be found at www.english.aqsiq.gov.cn. Announcements from AQSIQ can also be found on the website.</p>
13.2	<p>Wood treatments</p>
13.2.1	<p>Pest risks associated with wood pellets – Brenda Callan (presented by Eric Allen)</p> <p>Wood pellets (including the wood chips, the ground chips and finished pellets) from various plants in Canada were tested to assess their phytosanitary pest risk.</p> <p>Some fungi were isolated from the precursor material, but not in the pellets; no fungi of quarantine concern were found in the finished pellets.</p> <p>Since pellets are “products that are a composite of wood constructed using glue, heat and pressure, or any combination thereof” (ISPM 5 glossary definition) they should be considered “Processed wood material” and regulated accordingly.</p>
13.2.3	<p>Efficacy of SF against pathogens under laboratory conditions – Adnan Uzunovic (presentation not posted – contact Uzunovic for further information)</p> <p>Lab tests were carried out to look at the efficacy of SF against range of pathogens (30) and pinewood nematode. New methodology has been developed where 30 fungi grown on grain and put in glass tubes with open ends sealed with fabrics were tested in parallel in 10 L jars. The use of micro-gas chromatography has proven as great method to monitor continuously gas level in 6 jars in parallel. Preliminary results indicated a need to increase exposure from 24 h to 48h to achieve better efficacy.</p>

13.2.4	<p>NAPPO Heat Treatment Review – Shane Sela and Eric Allen (no PowerPoint presentation)</p> <p>Heat treatment is an effective method to kill regulated pests that affect forest trees which may be associated with resulting wood commodities. Internationally heat treatment varies greatly, the paper was written to try and assist with this problem. The paper reviewed the history of heat as a wood treatment, the scientific basis for its effect on wood pests (including insects, fungi, nematodes and bacteria), the industrial processes by which wood is heat treated and how heat treatment can be incorporated into phytosanitary systems approach. The paper is intended to provide guidance to national plant protection organizations in the use of heat treatment in phytosanitary regulations. The paper can be found on the IFQRG website, document '2013 IFQRG-11-18'.</p>
13.2.5	<p>Thermal tolerance of NZ beetles – Steve Pawson</p> <p>Thermal tolerance of <i>Arhopalus ferus</i> (Cerambycidae) and <i>Hylurgus ligniperda</i> (Scolytinae) were tested using temperatures between 42-72 °C at 5,15 and 30 min treatment times.</p> <p>Results:</p> <ul style="list-style-type: none"> • A total of 3,786 individuals were assessed. • No larvae, pupae, or adults of either species survived a treatment of 50°C (or more) applied for 30 minutes • LD₉₉ of all life stages except eggs for a 30 minute treatment were below the ISPM 15 requirement. • More work is needed to confirm thermal tolerance of eggs, which can be difficult. • Assessing the internal temperature that insects were exposed to my reduce LD₉₉ by 2 to 3°C
13.2.7	<p>Vacuum/steam treatment of wood – Chen Zhangjing</p> <p>The project looked at vacuum/steam treatment with the goal of developing a treatment technology that can be used to effectively sanitise forest products including logs, firewood, chip and pallets to achieve 56/30 schedule in shorter time and for large dimensions where classical kiln heating is not feasible. . Brian Zak commented that his may be an interesting technology for many products that currently cannot get easily to markets because of treatment challenges (e.g. log homes, large dimensional timbers).</p>
13.2.8	<p>FEFPEB – wood packaging update – Filipa Pico</p> <p>FEFPEB (European Federation of Wooden Pallet and Packaging Manufacturers) started in 1948 and has 16 country members.</p> <p>Major challenges face by the EU packaging industry include:</p> <ul style="list-style-type: none"> • ISPM 15 phytosanitary standard • Competition from Renewable Energy • Chain of Custody / Certification • Competition from other materials <p>Future developments for ISPM 15 that the industry would like to be addressed include:</p> <ul style="list-style-type: none"> • concerned about lack of harmonization of the individual country regulations • interested in developing future approved measures to meet ISPM 15 • application of dielectric treatment to industrial scale – both HT and KD • need for a field verification test for HT – research project - ESR (electronic spin resonance) • The industry remains highly committed to work with plant health scientists regarding forest protection.

13.3	Pest detection techniques
13.3.1	<p data-bbox="320 273 778 297">Gypsy moth surveillance – John Nielsen</p> <p data-bbox="320 333 1182 495">Australia’s use of remote sensing data is intended to allow Australia to identify the highest risk seaports in Asia, and when each seaport presents a risk of AGM contamination (Nielsen 2011). The ultimate aim is to use surveillance data alongside climate models to predict when individual risk seaports in Asia will become a risk for AGM. This approach has led to an increase in the number of gypsy moth egg masses intercepted on maritime vessels.</p> <p data-bbox="320 530 1129 582">Some future work and questions Australia will try address include: Assessing climate data to predict AGM flight times:</p> <ul data-bbox="363 618 1038 730" style="list-style-type: none"> • Use degree-day models to predict risk at individual seaports • Develop Seaport Risk Forecasts based on climate data • <i>Lymantria</i> only affect specific locations for v. limited time • Help industry avoid AGM risk – reduce costs & delays <p data-bbox="320 730 863 754">Can we move away from blanket-style certification?</p> <ul data-bbox="363 759 1099 842" style="list-style-type: none"> • Remote sensing & inspection data may eliminate many ports from inspection • Reduce international quarantine effort & industry expense <p data-bbox="320 871 627 896">Do we need to inspect at all?</p> <ul data-bbox="363 900 1198 1010" style="list-style-type: none"> • AGM have an obligate diapause requirement – min. 60 days of cold chilling • Crossing the equator to Australia prevents eggs from receiving this cold • Will eggs arriving on maritime vessels hatch on arrival in Australia? • What time of year can allow eggs on vessels to hatch?
13.3.2	<p data-bbox="320 1019 1137 1066">Detection of living PWN using RT-LAMP – Isabel Leal (presented by Eric Allen)</p> <p data-bbox="320 1097 1193 1205">A method to differentiate between living and dead <i>Bursaphelenchus xylophilus</i> in wood has been developed using reverse transcription loop-mediated isothermal amplification (RT-LAMP). The colorimetric RT-LAMP method has several advantages over conventional PCR: more cost effective, faster and more sensitive.</p>
13.3.3	<p data-bbox="320 1214 1198 1261">Genome-based detection tools as a part of standardised diagnostic protocols – Adnan Uzunovic</p> <p data-bbox="320 1292 1182 1453">Adnan pointed out increased interest in fungi as potential phytosanitary pests and that knowledge gaps that exist. The development of phytosanitary regulations that include fungi and rapid development of DNA based detection tools are changing how fungal risks are perceived. The TAIGA (Tree Aggressor Identification using Genomics Approaches) project is an example of a new diagnostic tool aimed at detecting fungi based on lists and unknown fungi that contain pathogenicity genes.</p> <p data-bbox="320 1485 644 1509">The TAIGA project objectives:</p> <ul data-bbox="363 1514 1118 1588" style="list-style-type: none"> • Assemble a culture collection and database of pathogens, including stakeholder-identified 50 ‘most unwanted’ pathogens • Develop arrayed qPCR detection assays. <p data-bbox="320 1619 1182 1800">Currently over 580 sequences (deposited in GenBank) have been generated; over 600 more are to be expected to be deposited, 45 / 50 of the assays to be included into the Top 50 array are either culture-validated or in development and the remaining 5 targets have been selected and lab work will be undertaken. Several research groups around the world are generating sequence data for many organisms. Adnan identified potential pitfalls of such powerful technologies and a need for extended dialog and need for standardisation of their use.</p>

13.3.4	<p>Update on sentinel tree program activities – Marc Kenis</p> <p>An EU-China sentinel tree program following two approaches was described.</p> <p><u>Exotic plantations</u>: To assess infestations by native pests and pathogens on exotic plants (in botanical gardens or specifically established sentinel plantations). The objective is to detect species that are harmless on native plants but could be harmful if introduced elsewhere (e.g. EAB, HWA, Ash dieback, SOD, etc).</p> <p><u>Native plantations</u>: To plant and survey native plants commonly exported to obtain lists of potential pests that can be expected on these commodities. The objective is to provide a tool for commodity risk assessment and test whether the presently used methodology based on literature surveys is adequate; to provide information for NPPOs of importing countries for inspection and surveillance.</p>
13.4	<p>Pest Epidemiology</p>
13.4.2	<p>EAB in Russia (no PowerPoint presentation)</p> <p>The current distribution of <i>Fraxinus pennsylvanica</i> has been planted in large numbers in protective lines (against snow drift) and in shelterbelts along the main motorways and other roads leading away from Moscow. The impact of <i>A. planipennis</i> on these trees is highly visible, with most of those close to the city severely damaged or standing dead, and those further out showing progressively less damage. It is possible therefore, by travelling outward from the city, to track the development of the infestation and locate the approximate edge of the outbreak.</p> <p>The rate of spread of <i>A. planipennis</i> in the Moscow region over the last 4 years has been faster than that previously reported, and the pest is now well established 235 km west and 220 km south of the city. Current rates of spread cannot have been achieved without a significant contribution from human-assisted movements, of which hitchhiking on vehicles seems to be the most likely pathway, assisted by the presence of a highly susceptible host species (<i>F. pennsylvanica</i>) along the main roads. To the south of Moscow, <i>A. planipennis</i> has become established in natural broadleaved woodlands where <i>F. excelsior</i> is abundant. Many of the <i>F. excelsior</i> in these woodlands are suffering severe dieback and are in decline, but <i>F. excelsior</i> appears not to be as immediately susceptible to <i>A. planipennis</i> as <i>F. pennsylvanica</i>, and it may need to suffer a degree of stress before it succumbs rapidly to infestation. The long-term impact of <i>A. planipennis</i> on <i>F. excelsior</i> is expected to be significant however, especially in the future when the pest encounters ash trees that are infected with the fungal pathogen <i>C. fraxinea</i>. The consequences of the spread of <i>A. planipennis</i> for other European ash species (<i>F. ornus</i> and <i>F. angustifolia</i>) remains unknown.</p>
13.4.3	<p>EAB NAPPO biocontrol TAG report - Allen (no PowerPoint presentation)</p> <p>According to the biology and current distribution of the EAB, eradication is not an option and the only alternative is to use Integrated Pest Management tools to slow the spread of this insect.</p> <p>In this context:</p> <ol style="list-style-type: none"> 1. Biological control for EAB is a promising strategy that has minimal environmental costs compared to traditional, chemical management strategies, and can be used in large natural areas where other management strategies are less feasible or economically impossible to implement. 2. EAB biological control agents (including entomopathogens) have shown ability to overwinter and establish in many areas of the US where EAB is present. This bodes well for areas of Canada, for example, that are broadly similar in climate to the northern US. 3. EAB biological Control should be adopted, wherever fiscally and operationally

	<p>feasible, by member countries when and where EAB is detected.</p> <p>4. Biological control must be considered as a long term strategy and we could hope that a natural equilibrium may be reached in several to many years, similar to that already observed in other entomological systems where exotic invasive insects are now “kept at bay” with diseases and parasitoids (ex: NPV and gypsy moth in eastern Canada, virus and European spruce sawfly, parasitoid and mountain ash sawfly).</p> <p>IFQRG members were encouraged to provide feedback to NAPPO TAG.</p>
13.4.4	<p>Four-eyed fir bark beetle (FFBB) and associated fungus – an aggressive tandem in fir forests of Siberia and European part of Russia - Branchikov</p> <p><i>Polygraphus proximus</i>, is a four-eyed fir bark beetle – Far Eastern invasive and aggressive pest of Siberian fir. It’s populations form long lasting outbreaks in the fir stands in Southern Siberia.</p> <p>The beetle’s success in a large extent is connected with lack of Siberian fir resistance to a blue stain fungus <i>Grosmannia aoshimae</i>, associated with the invasive bark beetle.</p> <p>The main problem now is in the possibility of forming of some new insect-fungi associations when introduced invasive fungus will be transported by indigenous wood boring insects. This can be a real disaster for South Siberian fir stands.</p> <p>It has been found that <i>Abies sibirica</i> is a new host for FFBB in Siberia and is more susceptible to <i>Grosmannia aoshimae</i>, than FFBBs’ native host – <i>A.nephrolepis</i>. It was also found that <i>G.aoshimae</i> is more pathogenic to Siberian fir, than local Siberian fungi.</p>
13.4.5	<p>Pine Wilt Disease control in China – Xinrong Wang</p> <p>PWN Research carried out by the Department of Plant Pathology at the South China Agricultural University includes:</p> <ul style="list-style-type: none"> • Nematode detection by molecular technology • Molecular interaction between host and pathogenic nematodes • Plant resistance to its pathogenic nematode • Nematode disease control in the field
13.4.6	<p>Ash Dieback – Michelle Cleary et al. (presented by Eric Allen)</p> <p>Background of Ash Dieback was presented</p> <p>Concerns to Canada (or other countries importing ash products) are that the country has a large amount of native and non-native ash. Canada has existing regulations.</p> <p>Some outstanding questions include:</p> <ul style="list-style-type: none"> • <i>H. pseudoalbidus</i> in seed and wood • The role of conidia • Treatment options for <i>H. pseudoalbidus</i> • Import risk from areas other than Europe (Asia, Russia) • Other pathways

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14	Review and adoption of IFQRG-11 report																																						
	The group was unable to review the meeting report in Qingdao. A draft report was sent to all participants for their comments and corrections.																																						
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14.2	Date and location for IFQRG-12 Possible locations: India, New Zealand, Rome Eric will advise as soon as possible via a posting on the IFQRG website.
15	Close of meeting

Participant List

	First name	Last name	Country	email address
1	Ai	Akama	Japan	aaai09a@nenv.k.u-tokyo.ac.jp
2	Julie	Aliaga	USA	Julie.E.Aliaga@aphis.usda.gov
3	Eric	Allen	Canada	eallen@nrca.gc.ca
4	Kerry	Britton	USA	kbritton001@comcast.net
5	Eckie	Brockerhoff	New Zealand	Eckehard.Brockerhoff@scionresearch.com
6	Kate	De Groot	Australia	Katherine.DeGroot@daff.gov.au
7	Chuck	Dentelbeck	Canada	cdentelbeck@clsab.ca
8	Rene	Eschen	Switzerland	R.Eschen@cabi.org
9	Hugh	Evans	UK	hugh.evans@forestry.gsi.gov.uk
10	Ian	Gear	New Zealand	ian@ingearglobal.com
11	Kavita	Gupta	India	kavita@nbpgr.ernet.in
12	John	Janowiak	USA	jjj2@psu.edu
13	Marc	Kenis	Switzerland	m.kenis@cabi.org
14	Keiko	Kuroda	Japan	kurodak@garnet.kobe-u.ac.jp
15	Hongmei	Li	China	h.li@cabi.org
16	Sandy	Liebold	USA	aliebold@gmail.com
17	Ron	Mack	USA	ron.mack@aphis.usda.gov
18	Rory	MacLellan	New Zealand	rory.maclellan@mpi.govt.nz
19	John	McDaniel	USA	jmcdaniel@alsc.org
20	John	Neilsen	Australia	John.Nielsen@daff.gov.au
21	Kimiko	Okabe	Japan	kimikook@ffpri.affrc.go.jp
22	Andrei	Orlinski	EPPO	orlinski@epo.int
23	Steve	Pawson	New Zealand	Steve.Pawson@scionresearch.com
24	Pham Quang	Thu	Vietnam	phamquangthu@fpt.vn
25	Filipa	Pico	Portugal	filipa.pico@embar.pt
26	TV	Sanjeev	India	tvsaajeev@gmail.com
27	KV	Sankaran	India	sankarankv@gmail.com
28	Shane	Sela	Canada	shane.sela@inspection.gc.ca
29	Artur	Shamilov	IPPC	Artur.Shamilov@fao.org
30	Mike	Springborn	USA	mspringborn@ucdavis.edu
31	Adnan	Uzunovic	Canada	adnan.uzunovic@fpinnovations.ca
32	Xingrong	Wang	China	xingrongw@scau.edu.cn
33	Wyatt	Williams	USA	wyatt.williams@state.or.us
34	Piotr	Wlodarczyk	Poland	p.wlodarczyk@piorin.gov.pl
35	Huang	Ying	China	huanhling@caiq.gov.cn
36	Jennifer	Yu	Canada	yu@canadawood.cn
37	Brian	Zak	Canada	zak@allforestsolutions.com
38	Zhangjing	Chen	USA	chengo@vt.edu