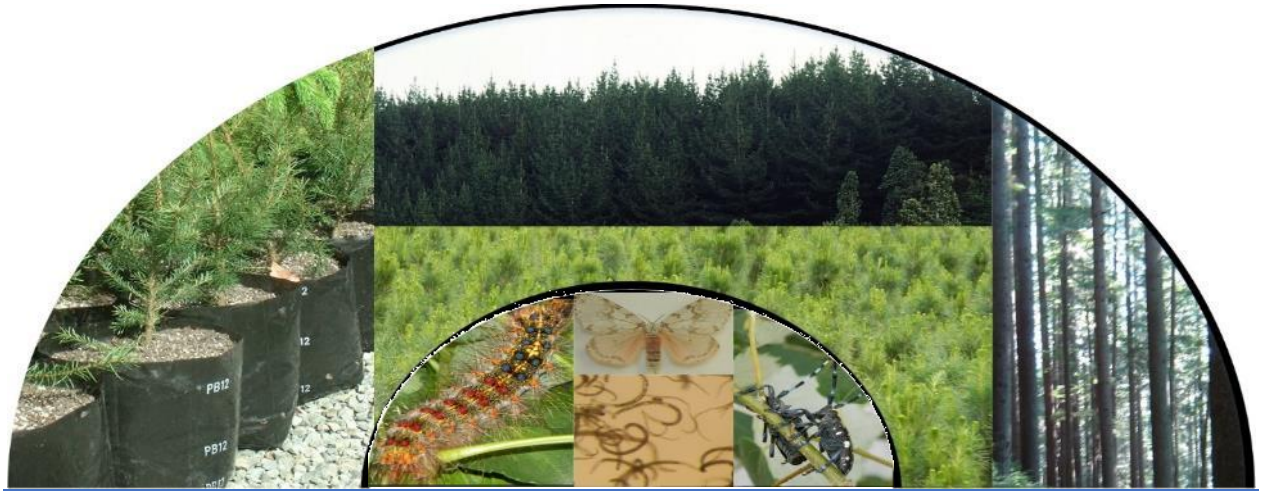

International Forestry Quarantine Research Group

International Meeting # 16

October 7 - 11, 2019, Curitiba, Brazil

Meeting Report

NOVEMBER 20, 2019

INTERNATIONAL FOREST QUARANTINE RESEARCH GROUP
SCIENCE STEERING COMMITTEE
https://www.ippc.int/en/external-cooperation/organizations-page-in-ipp/internationalforestryquarantineresearchgroup/

Disclaimer

The Mission of IFQRG

The mission of the International Forestry Quarantine Research Group (IFQRG) is to support and address critical forestry quarantine issues for the global plant health community through scientific analysis, discussion and collaborative research.

IFQRG is an independent, open international body providing scientific analysis and review of global forestry-related phytosanitary issues. The IFQRG serves as a forum for the discussion and clarification of key issues related to the phytosanitary implications of global trade with forest plants and products.

IFQRG's goal is for membership to include global representation from scientific, industrial and phytosanitary organisations from both developed and developing nations. Membership is open to suitably qualified individuals who have demonstrated expertise in disciplines relevant to plant health. IFQRG endeavors to recruit members from all FAO regions.

To become a member of IFQRG, the individual submits a short biography or curriculum vitae to the Science Steering Committee (SSC) outlining research or other relevant experience. Membership applications will be accepted by the SSC if information on the applicant indicates they would be a suitable member of IFQRG. There is no membership fee.

Meeting Report

This report communicates the discussions and conclusions from the 2019 International meeting number 16 of the International Forestry Quarantine Research Group. The meeting was held at the Victoria Villa Hotel in Curitiba, Brazil, from the 7th to the 11th of October, 2019. International Forestry Quarantine Research Group members and the executive committee thank the Brazilian Agricultural Research Corporation (Embrapa) of the Brazilian Ministry of Agriculture, Livestock, and Food Supply, for their support of the meeting including supplying of the meeting facilities.

Recommended citation:

IFQRG (2019) Report of the 2019 Meeting # 16 of the International Forestry Quarantine Research Group. October 2019, Curitiba, Brazil. International Forestry Quarantine Research Group.

List of Abbreviations

ALSC	American Lumber Standards Committee
APPPC	Asia Pacific Plant Protection Commission
CFIA	Canadian Food Inspection Agency
CLSAB	Canadian Lumber Standards Accreditation Board
CPM	IPPC Commission on Phytosanitary Measures
CRADA	Cooperative research and development agreement
CWPCA	Canadian Wood Pallet and Container Association
DH	Dielectric Heating
EAB	Emerald Ash Borer (*Agrilus planipennis*)
EDN	Ethanedinitrile (C_2N_2)
EPPO	European Plant Protection Organisation
FPSA	Forest Products System Approach
HACCP	Hazard Analysis and Critical Control Points
HT	Heat Treatment
IFC	IPPC Implementation and Facilitation Committee
IFQRG	International Forestry Quarantine Research Group
IFU	Implementation and Facilitation Unit
IPPC	International Plant Protection Convention
IPRRG	International Pest Risk Research Group
IRSS	Implementation Review and Support System
ISPM	International Standards for Phytosanitary Measures
ISPM15	ISPM No. 15 *Regulation of wood packaging material in international trade*
ISPM28	ISPM No. 28 *Phytosanitary treatments for regulated pests*
ISPM42	ISPM No. 42 *Requirements for the use of Temperature Treatment as Phytosanitary Measures*
IUFRO	International Union of Forestry Research Organizations
IYPH	International Year of Plant Health
MBr	Methyl bromide
MW	Microwave
NAPPO	North American Plant Protection Organization
NEPPO	Near East Plant Protection Organization
NGS	Next Generation Sequencing
NPPO	National Plant Protection Organisation
OECD	Organisation for Economic Co-operation and Development
OTUs	Operational taxonomic units
PCE	Phytosanitary Capacity Evaluation
PMRG	Phytosanitary Measures Research Group

PWN	Pine Wood Nematode (*Bursaphelenchus xylophilus*)
RoP	Rules of Procedure
RPPO	Regional Plant Protection Organisation
SC	IPPC Standards Committee
SSC	IFQRG Science Steering Committee
STDF	Standards and Trade Development Facility
ToR	Terms of Reference
TPFQ	IPPC Technical Panel for Forest Quarantine
TPPT	IPPC Technical Panel for Phytosanitary Treatments
USDA-APHIS	United States Department of Agriculture- Animal and Plant Health Inspection

MEETING REPORT

1. Welcome Address

The meeting of IFQRG 16 was hosted by the Brazilian Agricultural Research Corporation (Embrapa). On behalf of Embrapa, Dr. Edson Tadeu Iede welcomed the International Forest Quarantine Research Group (IFQRG) members to Curitiba. Forests and their sustainable management all over the world have presented researchers with many challenges during the past decades. Responses with solutions were and are being only possible because of scientific cooperation among institutions and their dedicated scientists.

2. Opening of the meeting

IFQRG Chair, Dr. Michael Ormsby, opened the meeting and welcomed all participants.

3. Local Information

03_IFQRG-16_2019

4. Meeting logistics and arrangements

02_IFQRG-16_2019

Dr. Ormsby provided meeting logistics and encouraged working groups to factor in time outside the meeting schedule to discuss their specific topics. All presenters were invited to share their abstracts to be included in the Abstracts document and to be used in the meeting report.

5. Introductions

06_IFQRG-16_2019

Introductions were made around the room. The list of participants was updated at the end of the meeting based on actual presence (see Appendix 1).

6. Review and adoption of agenda

01_IFQRG_16_2019

The agenda was adopted without amendment.

6.1 List of Documents

05_IFQRG-16_2019
23_IFQRG-16_2019

A list of documents tabled at or presented to the meeting is provided in Appendix 2 along with a summary of abstracts in document 23_IFQRG-16_2019.

6.2 Selection of secretary and rapporteur

Meeting participants agreed that the Vice Chair and immediate past Chair should act as secretary for the meeting and Dr. Chris Howard as rapporteur.

7. Report of the 2017 IFQRG-14 meeting

04_IFQRG-16_2019

7.1 Review of action items

A01. Report on data on wood packaging storage patterns will be posted on IFQRG website.	Ormsby
Action Item 01**:** *Moved to next year's action plan (Ormsby)*	
A02: Establish process for regular intersessional updates on IFQRG actions.	SSC members
Completed: intercessional updates are standing items on the SSC meeting agendas	
A03: IFQRG members are encouraged to check the IPPC web page (IPP) for information on what is available for input and provide comments via their IPPC official contact point	All members
Completed	
A04: Post ToR and Rules of Procedures on the IFQRG webpage	SSC members
Completed	
A05: Develop guides on how to approve facilities and apply standards with a clear simple checklist	All members
As required	
A06: IFQRG to communicate to the CPM that implementation and compliance to standards are key	SSC members
Completed: Communicated in the IFQRG report to the CPM in 2019	
A07: Resend a second reminder about the IFQRG survey to the IPPC list to encourage participation.	SSC members
Completed	
A08: Contact NPPOs directly about the IFQRG survey to encourage them to participate.	Mack to Far East; Howard and Veljkovic to Latin America and Asia-Pacific; Gething to industry groups

Completed: The updated survey results were presented to IFQRG 16 as agenda item 9.1.1	
A09: Develop IFQRG survey results into a paper with a glossary of acronyms, circulate to working group for review and to IFQRG members for comments, then publish it as a short review paper and submit it to CPM in April 2019.	Pawson, SSC
Completed in part: Draft (interim) results presented to IFQRG 16 as agenda item 9.1.1	
A10*:* Discuss how to be involved in programming for IYPH in the IFQRG-16 meeting and what media/promotional material can be put together.	Dawson, Gething, Verdasco, Orlinski, Ormsby, Noseworthy, Zhangjing, Nehme.
Completed: Discussed at IFQRG 16 in agenda item 10.6	
A11: Communicate to industry to see how the wood packaging industry can promote IYPH and IFQRG	Gething, Verdasco
Completed: Discussed at IFQRG 16 in agenda item 10.6	
A12: Develop a list of key research needs on FPSA for IFQRG to consider and share it in the work area.	Noseworthy
Completed: Discussed at IFQRG 16 in agenda item 11.1	
A13: Develop guidance documents for DH	Hoover, Uzunovic, Ormsby, Janowiak, Mack, Gething
Discussed at IFQRG 16 in agenda item 11.2	
A14: Work with China to resolve their objection to DH in ISPM28	Mack, Janowiak, TPPT
Discussed at IFQRG 16 in agenda item 11.2	
A15: Develop HT guidance manual content	Schröeder, Noseworthy, Dentelbeck, Krestchman, Veljkovic, Uzunovic, Gething, Tasciotti
Action Item 02**:** *Moved to next year's action plan to establish a new working group (Ormsby)*	
A16: Continue to work on the paper on pathogens	Uzunovic, Eric Allen/Tanney, Noseworthy, Veljkovic, Howard, Ormsby

***Action Item 03*: *Discussion*: Work is proceeding with CFS (Joey Tanney), Noseworthy, Uzunovic, Howard, Veljkovic, Ormsby to progress (Mike to expand)**	
A17: Submit paper on "Calculating Treatment Efficacy Against Invasive Alien Species in Trade" for publication	Ormsby
Action Item 04*: *Moved to next year's action plan (Ormsby)	

7.2 IFQRG Terms of Reference (ToR) and Rules of Procedure (RoP)

07_IFQRG-16_2019
08_IFQRG-16_2019

The Chair provided an overview of the ToR and RoP for IFQRG. He noted that IFQRG members do not need to come to every meeting, but it is important they stay engaged in the work program and deliver on any actions they have been assigned to complete.

Discussion:

It was noted from past comments that the Secretariat of the IPPC has been concerned that IFQRG participation doesn't represent the 186 contracting parties or 7 regions to the IPPC. Participants noted that part of the problem was funding to support participation of those from developing countries. While some funding can be sourced from the IPPC or the US (for example), consistent funding is more difficult to attain. It was questioned if we know, even with funding, whether people from some regions will ever attend?

Another approach is to move meetings of the IFQRG from FAO in Rome to the different FAO regions (as was done with current meeting organized in Brazil). It was noted, however, that there are challenges to holding meetings in some (less developed) regions. IFQRG meetings could make more use of virtual meeting technology to enable participants from different regions to attend. Regional representation could be boosted by having more workshops on specific IFQRG-related topics.

Participants agreed that IFQRG needs to continue to find ways to make the group more internationally representative. It was also noted that participation with a mindset to be more global citizens is as important as global representation.

8. Update of other bodies

8.1 Update from the Standard Setting Unit of the IPPC Secretariat (including TPPT & TPFQ)

General updates were provided by the Chair on behalf of the IPPC Secretariat, more specifically on the work of the TPPT and the IPPC Technical Panel for Forest Quarantine (TPFQ). Updates started with some background explaining that IFQRG's role is mostly seen as a support for IPPC Commission on Phytosanitary Measures (CPM) priorities in forest quarantine. The IPPC Standards Committee (SC), one of the subsidiary bodies of the CPM, supervises the long process of standard adoption. The drafting stage is where there might be synergies with IFQRG. Drafting the standards is usually done by expert working groups such as the TPPT and TPFQ, composed of experts from contracting parties.

Discussion:

Participants brought up the issue of harmonisation of standards because a lack of harmony causes issues for international companies that want to move goods. For example the lack of harmonisation

associated with the international movement of reused (recycled or remanufactured) WPM is causing some issues for both regulators and commercial WPM producers.

Participants agreed that guidance material is needed for the reuse/recycling/remanufacturing of WPM to help globalised companies, especially for those that have a reuse/recycling agenda. The chair agreed to investigate current information on the reuse/recycling/remanufacturing of WPM and prepare paper for later in the meeting (see agenda item 12.2).

8.2 Update from the Implementation and Facilitation Unit of the IPPC Secretariat (including Guides and Training material)

General updates were provided by the Chair on behalf of the IPPC Secretariat. Information were also provided on the development of the IPPC guides and training materials including the strategy and procedures. All materials are globally available on the IPPC portal in several languages.

Discussion:

The meeting was joined (via a virtual call) by IPPC Secretariat members Brent Larson (lead the IFU), Ketavan Lomsadze (member of IFU), Janka Kiss (member of ISU), and Barbara Peterson (member of ISU); and by Meghan Noseworthy (member of the IFQRG SSC).

Development of an ISPM 15 implementation guidance document

The development of an ISPM 15 guidance document has been under discussion for some time. The IPPC Secretariat has issued a call to NPPOs for experts for a working group to develop the ISPM 15 guidance document, as well as technical and financial resources to support the EWG. To date no financial support has been provided, effectively delaying the formation of the EWG. The IPPC Secretariat received three nominations from IFQRG members. The call for experts and resources has been extended, with the link supplied by the IPPC Secretariat re-circulated to IFQRG members. Once IPPC Secretariat has sufficient nominations and financial resources, a recommendation on EWG membership will be submitted to the IC for endorsement. Ideally the IC will want a range of delegates from developing and developed countries.

The ISPM 15 guide could replace the explanatory document as guidance material is reviewed by the IPPC Secretariat, the SC, and the IC (rather than the single authorship of explanatory documents). Therefore any guide will have more weight from a resource perspective than an explanatory document. The CPM considered that there is a need for guidance material based on the report on ISPM 15 implementation in Africa (presented to IFQRG 15 (2018)).

Participants noted that IFQRG has developed guidance material before that could be submitted as a resource. Further, IFQRG could look to developing further guidance material to address issues identified from within the group. A member noted the knowledge and subject matter expertise at this meeting, and supported the need for more guidance and direction over a greater scope. Another member noted this guidance needed to be considered from a developing country perspective, not from that of a developed country.

The IPPC Secretariat noted that the EWG will identify gaps in available guidance material for ISPM 15. Participants noted that IFQRG has done its own international survey that recorded gaps noted by many contracting parties to the IPPC. A report on this survey could be submitted as a resource for the EWG.

Action item 05: Submit the report on the IFQRG survey to the IPPC EWG on ISPM 15 guidance document (Chair)

Action item 06: All IFQRG members submit ISPM 15 implementation guidance material to the IPPC Secretariat (*All members*)

Development of implementation guidance for Dielectric Heat Facility

The IPPC Secretariat noted that it is still not clear if there are any operating DH facilities existing in the world. Guidance is needed on what needs to be done to approve and monitor DH facilities.

IFQRG members mentioned that several working groups within IFQRG were developing guidance material. The IPPC Secretariat supported the development of this material that could be submitted to any EWG that may be established.

Action item 07: Submit IFQRG DH guidance material to the IPPC Secretariat when a suitable EWG is established (*SSC*).

An IFQRG member noted that researchers and industry in North America hope to approach NAPPO in March 2020 for accreditation of their DH system (RF), and this regional approach can be submitted to the IPPC. The member questioned the utility of a general document on DH implementation, but instead would support a specialized document focused on a particular DH system (RF). Further, it was noted that Canadian and USA IFQRG members are working to develop operating parameters for certification of a commercial DH treating facility.

Regarding the contracting party's objection to the DH schedule proposed for ISPM 28, the IPPC Secretariat noted that this objection can be removed through further data supporting the efficacy of the schedule and if the contracting party do not have scientific data to support their objection and/or suggestion as how to resolve it. The SC would submit this new efficacy data to the TPPT, which would then recommend back to SC that the schedule be recommended to the CPM for a decision on adoption.

The IPPC Secretariat mentioned that the objector had provided all the data that was asked of them by the TPPT. An IFQRG member noted that the TPPT reviewed the objection at their last meeting (July 2019). The TPPT couldn't determine whether there is a dose (efficacy) or delivery (operational) problem. The TPPT could not confirm that the schedule was not effective, and noted that resolving operational issues is outside of the scope of the TPPT.

A member reported that they had communicated with the scientists who were involved in the objection, and reported that access to the DH facility that did the testing is ongoing. The Chair noted that the resolution may need to be facilitated though the CPM.

8.3 Update from FAO Forestry - Forest Health and Protection Activities for 2018

No update was provided to IFQRG 16.

8.3 Update from the QUADS Collaborative Working Group on Methyl Bromide Alternatives (*Uzunovic, Mack*)

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The Quadrilateral group (colloquially known as 'Quads') is an international forum of the National Plant Protection Organizations (NPPOs) of Australia, Canada, New Zealand and the United States. Its purpose is to: discuss; explore; and progress issues arising from biosecurity & trade that affect the four

nations and to internationally influence best practice in biosecurity, pest and disease management. Its strategic goal is to strengthen plant health and biosecurity programs of countries to protect resources and markets, maximize efficiencies and avoid duplication in efforts. A similar arrangement also covers Animal Health (AH Quads). The Plant Health Quads is comprised of Senior plant health officials of each NPPO. Meetings and conference calls happen throughout each year and an annual meeting is held where achievements are discussed, new projects proposed and collaborative science projects are presented. Collaborative research projects that are prioritized and approved by the Plant Health Quads members are coordinated by the Quads Collaboration Working Group (QCWG), which gathers together experts relevant to the project needs and coordinates activity and outcomes for the projects. Currently there are several subgroups/projects that have QCWG oversight. These cover: Methyl Bromide alternatives; Emerging risk intelligence gathering; Regulatory research repository; Diagnostic collaborations tools; Digital identification tools; Lures protocols and surveillance; Reducing the risk from contaminant pests in entry pathways; and, Managing regulatory issues arising from new diagnostic technologies.

It was noted that there is a significant shared focus and goals of the projects coordinated by the QCWG and that of IFQRG. In particular: Methyl bromide alternatives; Contaminant pests; and, Regulatory issues arising from new molecular-based diagnostic technologies. It may be mutually beneficial and useful to further promote sharing and discussion of scientific information that is of interest to both bodies. Increased collaboration and interaction between QCWG and IFQRG would improve focus of scientific efforts contributing to safe trade of goods while promoting biosecurity, health of natural environments and forests.

Discussion:

Members discussed the potential for IFQRG to collaborate with the QUADS working subgroups/projects. It was noted that much of IFQRG's work already aligns and we should look for opportunities to collaborate and work together. The IFQRG priorities can be fed into the Quads discussion.

Action item 08: Quads working group members to seek guidance from Plant Health Quads members about what level of Quads-specific information they can share outside of the Quads arrangement and under what conditions (*Mack*, Howard, Veljkovic).

9. Highlights of other meetings and surveys

9.1 IFQRG Strategic Research Survey (*Pawson, Chair*) 09_IFQRG-16_2019

The preliminary results of the survey conducted on IFQRG strategic research areas were presented. The survey was developed to identify areas of focus in forest quarantine for future collaborative research projects for IFQRG members.

The preliminary results of the survey are available in 09_IFQRG-16_2019.

The meeting looked to produce a short summary of high priority things that seem like they might give the best value for effort in terms of the research done meets the needs of the greatest. For example some obvious winners are:

- International database of interception information – we have the beginnings of that already with all of the data Rebecca has from SESYNC perhaps we can convince the parties to allow anonymous data to make its way into the public sphere?
- International collaboration on a forest product/forests specific DNA barcoding library with reference specimens etc.
- Climate suitability tools, e.g., what Craig Phillips has been working on;
- Treatment verification for ISPM 15;
- Surveillance protocols, e.g., active space of traps and how many are needed and what that results in.

Discussion:

It was noted that the results on the perception of risk from the various pathways indicated that WPM was perceived to have a similar risk profile to round wood, rather than the lower perceived risk of lumber. The perception of risk may still be high because of ALB and EAB are still problematic and being managed, and their spread is associated with the movement of WPM. Through the literature, the casual use of words like 'WPM is a pathway for pests', continues this perception. Interchangeability of wood pallets and dunnage confuses the issue. Dunnage is on a higher risk scale than pallets and crates.

Is there a need to publish a commentary-type article that tries to rationalize the perceived risk of WPM to the actual risk? ISPM 15 is still perceived to be ineffective.

When considering future IFQRG research needs that need prioritization; it would be good to have a guide for data collectors, to make sure that they are collecting the right data. Industry finds it particularly difficult to access interception data. If you are going to take interception data for wood packaging, it makes a difference to record whether it's certified, or non-certified wood packaging. It would be good to remove the ambiguity around the non-compliance records.

Guidance and protocol may be needed to make sure that data is collected in a meaningful way - i.e., to ensure that if a pest is found, then ensure that data about the WPM is recorded - i.e. stamps present, stamps not present etc.

Action item 09: An analysis of available interception data on forest products will be provided to IFQRG 17 in 2020 (*Ormsby*).

A member suggested that the IFQRG survey be finessed and reported to the CPM then archived for historical reference.

Action item 10: Working group will continue to develop survey results into a paper with a glossary of acronyms, circulate to working group for review and to IFQRG members for comments, then publish it as a short review paper and submit it to CPM in April 2020 (*Pawson, SSC*).

10. Current phytosanitary issues

10.1 APPPC

A summary of the IFQRG-related activities of the APPPC was contributed to by a number of participants.

APPPC met in Thailand in August, 2019. Not much was discussed in relation to phytosanitary issues in forestry. The APPPC is starting to look at commodity-specific RSPMs beginning with Mango fruit. Other commodities such as those that are pathways for South American Leaf Blight (SALB) are also

being considered. A challenge in developing pest-related commodity standards as that not all APPPC countries grow rubber and therefore are concerned by the particular pest (SALB).

10.2 COSAVE

No comments were provided on the COSAVE work programme.

10.3 NAPPO (*Allen, Noseworthy, Mack*)

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NAPPO's work on forest quarantine is mainly accomplished by the forestry expert working group. In 2018 the group produced a two-page summary on RSPM 41 – *The use of systems approaches to manage pest risks associated with forest products*, for communication with stakeholders on accessibility of RSPM 41. In 2019 a new forestry expert working group was established to create a Science and Technology document on Contaminating pests of wood commodities. The objective of this document is to provide scientific background on live contaminating organisms on wood commodities and wood packaging and provide guidance regarding actions appropriate for addressing associated phytosanitary risks.

Discussion:

It was noted that NAPPO early on did the heavy lifting on ISPM 15, started with RSPM 11. Easier to get stuff done within these regional groups than dealing with 183 countries. Regional standards are not just useful for trade between the regional countries, but can be used for international trade and possibly used as market access tools. It was pointed out again that a new expert group has been established: Contaminant pests of wood commodities and IFQRG can be useful to generate ideas for these standards.

10.4 IPPC Contaminants Workshop (*Howard*)

10_IFQRG-16_2019

Recent experience in Australia indicates an increase in the number and type of phytosanitary and other risks associated with containers, conveyances and pathways, and with goods that are not regulated plants or plant products.

It is logical to assume that the same pests are moving between all countries by the same means, and that the global spread of pests, including contaminating pests, will continue. This poses a significant risk to production and natural ecosystems. The rapid inter- and trans-continental spread of the brown marmorated stink bug (BMSB) and the red imported fire ant (RIFA) highlight this risk and the significant impacts that can result from the establishment of serious pests in an area.

The proposed CPM recommendation initially focuses on raising awareness and then on working collaboratively with exporting and importing industries to prevent infestation of containers, conveyances and exported goods. The CPM might consider the value of establishing an industry advisory group to address the risks posed by conveyances and other regulated articles, including the benefit of addressing these risks before export. Clarification of contaminating pests in forestry context by IFQRG would be useful to this group.

Commercial solutions that are integrated into commercial trading operations and reduce or stop infestation or contamination would offer a benefit to importers and exporters by facilitating clearance processes, preventing transported goods being compromised and reducing regulatory burden and costs. A commercial solution would increase compliance and be more efficient than regulation, which is resource intensive, expensive and may impact the flow of trade.

The Australian Environmental Biosecurity Office is organising the IPPC Symposium on *Limiting the Global Spread of Contaminant Pests* 3-5 March 2020, to be held in Sydney, Australia.

Action item 11: Howard to send information to members about the workshop, to inform members of the scope and for them to decide whether they need to be nominated by their NPPO to attend (*Howard*).

10.5 IFQRG's role and activities for the International Year of Plant Health (2020) (*Marcel, Noseworthy*)

21_IFQRG-16_2019
22_IFQRG-16_2019
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The United Nations declared the year 2020, the International Year of Plant Health (IYPH) in order to raise global awareness around how protecting plant health can help end hunger, reduce poverty, protect the environment and boost economic development. IYPH 2020 will provide opportunities to highlight the important role of national and regional plant health organizations in protecting plants from pests. In 2018, IFQRG formed an IYPH 2020 working group to develop a strategy to participate in the IYPH 2020 and communicate how IFQRG supports IYPH initiatives.

Discussion:

Participants discussed the potential initiatives available to IFQRG. A member noted that the IYPH logo is available for use with conditions:

"*The FAO Office for Corporate Communications report that anyone can use the IYPH logo* ***without need to request a formal authorization****, provided that guidelines are met, that the visual identity is used for non-commercial purposes, and that it is not associated with the FAO logo (in which case, applicants should submit the relevant form to the IYPH Secretariat). We encourage NPPOs to collect information on the use of the logo at the national level, and refer to the IYPH Secretariat in case of doubt.*"

Group came up with 7 initiatives, one of which is to continue to create slides for media release. A sub-plenneal working group was formed to come up with further ideas for slides. The group agreed that the slides should be for IFQRG only (e.g. no other organizations mentioned in the slides except perhaps IPPC), and should be focused on specific things rather than being general.

Action item 12: The IFQRG IYPH working group will continually update the availability of the slides to the IPPC secretariat for release (*Marcel, Noseworthy*).

Action item 13: All members are encouraged to submit further slides to the working group (*Marcel/Meghan*).

Action item 14: Investigate the possibility of making IFQRG 17 an IYPH affiliated meeting (*Chair*).

11. Development and implementation of standards

11.1 Systems Approaches in Forestry - Research and Implementation (*Noseworthy, Allen*)

12_IFQRG-16_2019
13_IFQRG-16_2019
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The North American Plant Protection Organization (NAPPO) Regional Standard for Phytosanitary Measures (RSPM) 41: *The use of systems approaches to mitigate pest risks associated with the movement of forest products* and appended explanatory document as well as the new draft Specification for an ISPM on the use of systems approaches for wood commodities are creating more environmentally sound options for the phytosanitary trade of wood products internationally. Next steps require scientific expertise on how to logistically verify and quantify realistic systems approaches.

On October 26, 2018 the new regional standard RSPM 41 *The use of systems approaches to mitigate pest risks associated with the movement of forest products* was adopted by the North American Plant Protection Organization. In August 2018 a new ISPM specification for a forest products systems approach underwent country consultation. The use of systems approaches in forestry are increasing internationally. In 2018 at IFQRG -15, members identified an action to develop a list of key research needs for consideration. Examples of systems approaches in effect currently and outstanding needs are presented.

Presentation notes:

Need for scientific expertise on how to logistically verify and quantify realistic systems approaches. Also a need to identify key knowledge gaps e.g. What types of data are needed to develop systems approaches?

Is there a generic step-wise model to follow in the development of a systems approach:

Pest:	Biology, where they are in the wood?
	Group by guild? Pathway?
Commodity:	Species
	Associate risk
Production pathway:	Pest Risk reduction steps
	Scientific proof of concept

Next steps:

- Verify and assess treatments
- Develop strategies and measures for pest risk reduction
- Document forest product systems approaches

Discussion:

Participants discussed various examples of PHSAs that are currently in use e.g. oak wilt and timing of log harvest.

A member noted that there are two main areas holding up development of PHSA:

- Very little documentation on known and accepted PHSAs as examples;
- Little work done on how to effectively validate a PHSA.

PHSAs can be qualitative or quantitative or a mix of both. Validation of qualitative systems is particularly important and difficult. Guidance on how to develop and validate a PHSA would be particularly valuable.

Action Item 15: Form a working group to provide some guidance to the NAPPO expert group and the IPPC secretariat about PHSAs (*Noseworthy/Dawson/Ivan V/Chen*)

Action Item 16: Have a session on how to quantify the steps in each PHSAs at IFQRG next year. Meghan to deliver paper from Chris Macquarie at IFQRG next year (*Megan*).

Action Item 17: Pull together examples for IFQRG 17 and type of data collected and some key knowledge gaps to further support existing or developing system approach (*Marcel, Ivan and Megan*).

11.2 Dielectric Heating and Implementation (Cooperative Research and Development Agreement (CRADA) for Tech Transfer of Vacuum Steam/Logs and Radiofrequency/SWPM in North America) (*Mack* ++)

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The cooperative effort to develop commercial radiofrequency (RF) for solid wood packing material (SWPM) began in 2010 as a result of discussion between interested parties at the International Forest Quarantine Research Group (IFQRG) annual meeting. Shortly thereafter, a working group composed of USDA-APHIS-PPQ, Penn State University, Innovations (Canada) and PSC, Inc. (United States) designed and purchased an RF testing machine for treatment efficacy testing of several high profile pests (ALB, EAB, PWN) on individual pieces of wood. This data aligned with previously collected microwave (MW) data in support of the Dielectric standard of 60°C for 1 minute hold that was adopted by CPM in 2013. More recently (2017), USDA-APHIS-PPQ and Penn State University have partnered with RF Kiln Tech Ltd., a commercial RF equipment manufacturer based in Ontario, Canada to design and place a commercial RF treatment system on the Penn State campus. The research team is currently working through a complex test matrix of consisting of varying wood species, pallet components, moisture content, etc. in an effort to optimize RF heating in bulk SWPM. A pending bi-lateral testing arrangement between the United States and Canada in fall 2019, under the guidance of US and Canadian certification groups, will effectively sanction RF technology for phytosanitary use at the regional level in North America. This recognition would then advance the opportunity for placing this RF application in other locations around the world.

The Cooperative Research and Development Agreement (CRADA) is a joint research effort with at least one non-Federal partner that has some degree of research capacity and which commits funds and/or in-kind resources to a collaborative effort with a USDA scientist. The CRADA project is generally intended to create or optimize a commercial product, and it usually specifies creating, securing, and licensing intellectual property related to the research effort. A CRADA partner may be an individual company, a group of companies, an association, a university, or any combination of the preceding. It may also include another Federal agency, but only if there is an additional partner which is not a federal agency. In this review, we highlight and discuss CRADA relationships leading to tech transfer for commercial radiofrequency (RF) development for SWPM and vacuum steam development for logs, tile, bamboo among other durable commodities.

Discussion

A member noted that industry has formed a draft US/Canada bilateral agreement for certification and testing of DH heating. Researchers and industry directly approached NAPPO. Both Canada and USA agreed that more work needed to be done.

Researchers and industry are hoping to develop ISPM 15 guidance document as a result of this. Chinese objection to the Dielectric heating in ISPM 28 based on survival of PWN at 60/1 min.

What could have been done differently?

- After ISPM 15 2013 adoption, NPPOs should have been messaged that DH required additional commercial proving, and that this was now to be accomplished regionally under approved certification program
- Developmental groups are responsible for assembling the proper expertise in order to achieve the standard successfully
- Important distinction between placing new treatment/technology and established treatments with regard to "implementation"

Participants generally agreed that a guidance document is needed. It was noted that not all NPPOs are created equal. The IC could assist by bridging the gulf between NPPOs that work with industry and those that do not.

It was noted that because DH has been adopted into ISPM 15, we have the remit to create the guidance material under ISPM 15 (currently not ISPM 28) and move forward. While we can hope that the objection will be resolved, it is up to the country to remove the objection (see also relevant discussion under 8.2).

11.3 ISPM 15 Heat Treatment Facility Guidance

The working group will be reconfigured and report back on the outline of the HT manual at IFQRG -17 in 2020.

11.4 Guide on using molecular diagnostic tools in forestry (*Uzunovic*)

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31_IFQRG-16_2019

Increase in trade of large variety of forest commodities and climate change also increases pest transfers and likelihood of pathogens establishment. Detection of pathogens, when needed, has traditionally been based on visual inspection, quarantine methods, serology and to an extent using molecular tools in limited applications. However, there have been major developments of molecular based tools especially since discovery of Polymerase Chain Reaction (PCR method). Huge amount of genomic data have been generated about pests in last two decades. Identification has mostly relied on amplification of very small fraction of genome, often ITS region that is easily accessible even in partly degraded or diluted DNA, and few other target regions/genes, and comparing data with same sequences deposited in databases of characterized organisms. Whole genome sequencing is now more common since cost of only around 50 dollars to sequence whole genome of a fungus allowing comparisons between organisms and finding markers for different pathogen traits like its virulence, adaptability , potential host range, resistance to fungicides, etc.

LAMP method (Loop Mediated isothermal amplification)is competitor [an alternative] to PCR that does not need complex equipment in a laboratory setting and can easily be used in field, and used by developing countries. Other significant advances include Quantitative (real time) PCR which is highly sensitive and fast processing method used in pathology, and different assays have been developed based on it. Detection using RNA focuses on distinguishing live from dead organisms and offer opportunity to validate phytosanitary treatments. New Generation Sequencing (NGS) or High Output Sequencing (HTS) now obtain large number of information fast to find candidate genes for key traits. Metabarcoding and environmental DNA use HTS and target desired gene or multiple genes, and studies

can and are already performed directly on bulk samples (soil, sludge, water, air, seeds, chips…) to get info or all organisms present there. Field portable devices will generate even more information.

This has a potential to provide regulators a powerful toolbox for pathogen detection and monitoring and regulation however also create potential great challenges. Scores of species may be reported, some that were not reported before in that country, many may be unknown and there are no internationally agreed protocols for NPPOs to utilize. IPPC deals with only regulated pests but question arise how to deal with info based on identified sequence that indicate possibly problematic pathogens where no biological characterization or pest status exists. There are also many knowledge gaps as reference DNA libraries have problems with poor data or insufficient data and protocols and methodologies are not standardized bringing challenges to the interpretation of data.

IFQRG has been a forum where scientist regulators and industry discuss emerging issues and could potentially address this issue by linking with other similar initiatives that may exist around IPPC, RPPOs QUADS, etc. IFQRG may consider the formation of an advisory/working group on the issue where possible actions may include identification of major concerns, roles of different organizations in addressing it, identifying if the issue can cause problems among trading partners, connect with other similar initiatives, identify key questions and knowledge gaps, share current projects and knowledge and approach, identify areas of coordinated work and collaborations, investigate a need for a guideline. A guideline could identify identification/diagnostic needs for different commodities/uses and suggest when molecular tools will be appropriate.

Discussion:

There is a large body of scientists conducting work on genomics related to forestry quarantine. There is a need to recruit them to focus on critical questions we have in forestry quarantine.

Members noted that there are significant regulatory issues with the use of the most advanced genomic methods such as NGS. Before you report that a pest is present based on NGS, need to prove that it is living in a host past the border and that it is alive, and other biological traits, such as ability to establish and survive, pathway etc. It was recognized that identifications that do not have a confirmed biological viability/validity and other key biological characteristics, can have significant financial and social impacts on industry.

Action item 18: For SSC to reach out to known researchers in the field through invitation to key members, particularly from Europe to attend the meeting in Rome next year to discuss issue in a targeted session (*SSC*).

Action item 19: Form a working group to identify key players and specific forest quarantine issues related to emerging molecular technologies and report back to the group next year (e.g. Baldissera Giovani (Euphresco)) (*Uzunovic, Veljkovic, Dawson, Chen, Ormsby, Howard*).

11.5 Resolving issues with the reuse or recycling of ISPM 15 WPM

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A summary of the ISPM 15 text on the definitions of reused, repaired and remanufactured WPM was provided to the meeting.

Discussion:

A member asked after 15 years of implementing ISPM 15, how much WPM is being retreated? It was noted that NPPOs seem to administer the rules different in each country.

In Europe, there is incentive to reuse pallets. For pooled industry systems, each time the pools need to fix a pallet, they need to repaint. NPPOs want traceability of the product. To guarantee that the job is done properly, need to remark. Traceability is the issue as NPPOs want traceability as they need to know the origin of the product.

Two views, one for closed pools, one for open markets. For open market systems, any the new boards must have an IPPC mark for the new provider. NPPOs interpret the rules differently. Everyone errs on the side of caution. In US, if any repair is done, in most cases the whole pallet is retreated.

Members also noted that it is our responsibility to ensure that energy use is kept to a minimum.

A member noted that for a 6 months old pallet, nothing is alive in the pallet. But, we need to keep an open mind to every possibility relating to life cycle analysis of pests associated with packaging.

Two different pest risks for new versus already used pallet. From a risk perspective, new pallets are the most risky. Pallets repaired with treated material do not suddenly have the same risk profile as new. The old parts of the pallet have a reduced risk profile due to time. It would be useful for more work to be done on the area of age of wood packaging in regards to its risk profile. This would assist NPPOs understand that not all wood packaging has the same risk profile.

Remanufactured: more than one third, is replaced, the whole pallet is retreated and recertified.

The group considered that retreatment is from a litigation point of view rather than any particular pest risk. The problem needs to be rationalized. The group needs to think about changing the forcing of retreatment currently specified in ISPM 15.

A member considered that it may be better to work outside of IFQRG to try and get a harmonized position from NPPOs to then pass back through the group to rationalize the problem and provide some guidance. To find a starting point is hard. The standard has been well intentioned and has served well, but there are some issues to work though.

Action item 20: Members encouraged to work with their NPPOs to develop a solution and to bring that back to IFQRG 17 for further discussion (*members*).

12. Research reports

12.1 Treatment Development

12.1.1 Heat Treatment dose-response research update (*Humble, Noseworthy, Allen*)

There is broad international acceptance of heat treatment protocols for reducing pest risk associated with wood products. The time/ temperature schedule of fifty-six degrees Celsius for thirty minutes (56/30) is globally recognized as a treatment for wood packaging in ISPM 15. There is a surprising lack of data that define the precise temperature schedules that result in insect mortality. Quantification of species-specific lethal time-temperature regimes will provide the data required to define treatment schedules for a range of pests associated with wood products. We have been working to acquire this data using a programmable hot water bath and platinum resistance thermometers with an accuracy of ±0.03°C. Preliminary results of positive-control test subjects were presented (presentation not available).

Discussion:

It has been pointed out the importance of separating the *dose* required to kill pest from schedule required for the *delivery of the dose*, that in past has often confused our understanding of efficacy of a treatment. This research will confirm what temperature (dose) is required to kill a variety of pests. Issues associate with the delivery of that dose will need to be addressed separately and at the operational level.

12.1.2 Thermally modified wood – heat treatment or "processed wood" (Allen)

32_IFQRG-16_2019
41_IFQRG-16_2019

A presentation was made that outlined the process for producing thermally modified wood (TMW) and a review of globally accepted standards for thermal treatment of wood and sterilization of medical supplies. Thermally modified wood undergoes a treatment process in an oxygen-free environment at temperatures between 180 to 230°C. This will kill all wood pests including insects, fungi and nematodes. Countries trading thermally modified wood could describe the phytosanitary status of the commodity by: certification of treatment to specified parameters or, in accordance with ISPM 32, certifying that the commodity has been processed to the point whereby it is not capable of being infested with quarantine pests and therefore requires no phytosanitary certification.

Discussion:

The group agreed that the process used to produce TMW (minimal exposure of temperature higher than 160°C and conditions of reduced oxygen) will kill all pests associated with wood at the time of treatment. The group discussed the appropriateness of considering TMW as a category 1 commodity under ISPM 32, recognizing that the commodity was "*processed to the point where they do not remain capable of being infested with quarantine pests. Hence, no phytosanitary measures should be required and such a commodity should not be deemed to require phytosanitary certification with respect to pests that may have been present in the commodity before the process*." The group proposed that a contracting party or RPPO present this recommendation to the IPPC for their consideration.

Further discussion considered some thought would be required to determine how TMW could be easily differentiated from normal unmodified wood. Testing of TMW resistance to insect infestation should also be required to verify the category 1 status.

Action item 21: Members request NAPPO present this recommendation to the IPPC for their consideration (*Allen, Members*).

A member pointed out that there are few other similar processes that may result in similar characteristics found in TMW and could perhaps also be considered category 1, such as Furfurylated wood. Similar to TMW it has notable resistance to microbial decay and insect attack, and relatively high dimensional stability (increased hardness). Furfurylation is accomplished by impregnating wood with a mixture of furfuryl alcohol and catalyst and then heating to cause polymerization.

12.1.3 Radiofrequency Heat Treatment for Recycled Pallet Components in Compliance With ISPM-15 (*Szymona, Janowiak*)

15_IFQRG-16_2019
27_IFQRG-16_2019

Experimentation was conducted to examine the potential effectiveness of dielectric heating to treat recycled pallet component materials in compliance with the ISPM-15 standard. The study focused on the disassembled type of materials salvaged from discarded or spent shipping pallets. This research was conducted in cooperation with a local (Pennsylvania) pallet manufacturer who regularly collects and deconstructs wooden pallets for recycling purposes to repair other still servable but damaged

commercial Grocery Manufacturer's Association (GMA) pallets. This remanufacture process results in an extremely diversified wood species and variable moisture states as the decking board or stringers collections. The study served to better understand whether applied radio-frequency (RF @ 6.86 MHz frequency) can properly interact with this type of extreme set of compositional material conditions from very low (12-18%) moisture content to well above a wood saturation level (+80% MC). An additional objective included within the trial testing include the examination to determine whether pallet construction fasteners (residual metal contents) would be problematic in terms of differential wood fibre heating (risks of fire) or other negative impacts in electromagnetic field collapse e.g. arching problems that might cause harm and costly damages to the RF treating equipment system. The completed trial(s) on the supplied material with significant patterns of residual nailing fastener shanks tested showed very promising results it is possible to apply dielectric heating without fire risk and consequential equipment damage.

Discussion:

Participants discussed various aspects of the RF treating system and how promising DH technology is in some areas of use. The group considered the work presented was thorough and provided supporting evidence for the use of DH in WPM recycling.

12.1.4 Commercial viability findings from select manufacturer engagement advanced commercial scale radio frequency (RF) dielectric system in the U.S. pallet industry (*Gagnon*)

25_IFQRG-16_2019

The team has developed and tested an advanced commercial scale radio frequency (RF) dielectric system specifically engineered to rapidly heat wood materials that must be treated to comply with international regulatory standards. Commercial viability findings from select manufacturer engagement in the U.S. pallet industry will be presented and discussed. In addition, Follow-on market applications for RF dielectric heat treatment of wood chips, dunnage at shipping ports, and agricultural commodities will be explored.

Discussion:

The group considered the analysis was comprehensive and clearly demonstrated the relative value proposition compared to conventional heating and methyl bromide fumigation. Members noted that the RF technology was currently more viable for larger pallet manufacturing operations with company revenues >$USD 20 million, >6 nailing lines, and significant HT volumes. The analysis identified a potential market of an estimated 2300 pallet firms with a ~$USD 80 million market opportunity.

12.1.5 Preserving Ohia Trees using Vacuum Steam Technology to Kill Ceratocystis Wilt Fungus in Hawaii (*Zhangjing*)

35_IFQRG-16_2019

Ohia wood in Hawaii is highly valued for a number of applications. In recent years, there has been increasing commercial interest in use of the wood for flooring, house posts, fencing posts, decoration, and firewood. However, two fungal pathogens, *Ceratocystis huliohia* and *Ceratocystis lukuohia*, detected on the big Island of Hawaii, have resulted in extensive rapid Ohia death (ROD) since 2014. A custom built vacuum chamber (1.5 x 1.5 x 3.0 m capacity) consisting of 80 Kw electric boiler and 5 hp dry screw vacuum pump was shipped to the island in 2018 to initiate a study on Ohia log sterilization at the request of local officials. The objectives of this study were to: determine the effectiveness of vacuum steam in eradicating the *Ceratocystis* wilt fungus in large naturally infected Ohia logs;

determine the pathogen isolation rates following treatment at either 56°C for 30 min or 60°C for 60 min to a variable depth of 3.5 - 5.5 inches into the wood depending on diameter; evaluate potential log damage due to treatment; document temperatures achieved at selected log depths and total time required for each treatment regime. Utilizing a carrot-baiting technique, ROD fungi were consistently isolated from an average of 16 and 9 percent of Ohia wood samples taken at outer and inner wood samples, respectively. Post treatment results indicated that fungi were eradicated from greater than 99.99 percent of the sampled locations based after assay was completed. Overall log quality with regard to checking and discoloration was not negatively impacted by the vacuum steam treatment. A proposed treatment schedule at 56°C for 30 minutes at a depth of 0.7% of log radius would take approximately 10 hours and satisfy any regulatory concern with log movement in trade.

Discussion:

IFQRG members agreed that the comprehensive research programme demonstrated the effectiveness of the ISPM 15 conventional heat treatment schedule (56°C for 30 minutes) against *Ceratocystis huliohia* and *Ceratocystis lukuohia*. The research also demonstrated the ability of a vacuum steam treatment system to achieve the required temperature dose to the required depth I the wood while not compromising wood quality.

12.1.6 NZ's current efforts to find suitable alternatives to MB for exported logs (*Veljkovic*)

28_IFQRG-16_2019

Pinus radiata (radiata pine) logs exported from New Zealand are often required to undergo methyl bromide (MB) treatment before export. MB treatment is likely to be trade-prohibitive in future given national and international moves to restrict and/or prohibit MB use. Although the Montreal Protocol allows quarantine and pre-shipment (QPS) use, it also strongly encourages countries to seek alternatives. New Zealand's environment regulator has decided that by October 2020 MB must either be replaced with an acceptable alternative, or to be fully recaptured after fumigation.

New Zealand is free of serious high-risk pest species of P. radiata that are of global importance. Based on key trading partners' quarantine pest lists, New Zealand has performed a risk assessment for all organisms that could be potentially associated with pine logs from New Zealand. The study identified three risk organisms associated with the export pathway that may warrant phytosanitary measures, which became the focus of further fumigation treatment research.

New Zealand's laboratory and operational trials have proven the efficacy of ethanedinitrile (EDN) and reduced MB rates as a phytosanitary treatment for common pests of concern associated with New Zealand pine logs. New Zealand's National Plant Protection Organization (NPPO), Ministry for Primary Industries (MPI), therefore proposed to key trading partners' NPPOs to add to the list of available treatments EDN at 100 g/m^3 for 20 hours at or above 5.0°C and below 20.0°C and EDN at 80 g/m^3 for 24 hours at or above 20.0°C. MPI also proposed that currently used MB treatment rates are replaced with reduced rates of 40 g/m^3 MB for 16 hours at or above 10°C and below 20°C and 30 g/m^3 MB for 16 hours at or above 20°C.

Discussion:

A member noted that the environmental registration process for NZ has not as yet been completed for EDN. The initial focus is on exported logs from New Zealand given the possible loss of MB. Once approved for bilateral trade, approval will then be sought at the regional and /or international level.

Initially an EDN schedule was submitted to TPPT to enable the gaps in science to be recognized and are now being worked on internationally. It was noted that all MB alternatives have limitations e.g. SF has limitations on eggs. Current limitations for EDN are that data doesn't exist for all life stages of all potential pests of concern for the world e.g. ALB. For New Zealand, the pests and life stages covered by the research should be sufficient for EDN use in trade. A member commented that additional experimental data on EDN against pathogens have shown EDN to be very promising and efficacious against pathogens as well as pine wood nematodes inside the wood.

12.1.7 Efficacy of ethanedinitrile for the quarantine treatment of New Zealand pine export logs (*Najar-Rodriguez*)

30_IFQRG-16_2019

Over the last 5 years, we have prepared comprehensive data to support the registration of ethanedinitrile (EDN) in New Zealand and for trading partner acceptance of EDN as a phytosanitary treatment for New Zealand export pine (*Pinus radiata*) logs. In previous years, we;

(a) identified the most tolerant species/life stage to EDN, of three species associated with New Zealand export log species;
(b) determined the sorption/desorption characteristics of EDN when used to treat pine logs;
(c) measured concentrations of EDN during and after a commercial scale fumigation of pine logs with EDN; and
(d) identified and quantified the gases which remained in the treated space at the end of EDN fumigation.

In the last stage of our research we conducted a series of confirmatory fumigations to demonstrate the efficacy of EDN at a commercial scale using export logs and commercial fumigation practices. Confirmatory fumigations were carried out in a recently harvested commercial plantation area near a pulp and paper mill in Tokoroa, central North Island, New Zealand. Our results demonstrated the efficacy of EDN as a potential phytosanitary fumigant for logs exported from New Zealand and indicated that a dose of 100 g/m^3 delivered to the logs kept under tarps for 20 h is sufficient to provide phytosanitary security. The main highlights of our research will be presented here.

Discussion:

A member questioned what a final commercial schedule for EDN fumigation would look like? Further testing may allow for even lower doses to be acceptable.

It was noted that it may be difficult to set a CT value for the fumigant given that the concentration is close to zero towards the end of the treatment. A member raised that any schedule may need to show minimum concentration values at points in time based on current practices with existing fumigants. Further discussion covered that as EDN rapidly changes to secondary compounds that are the toxic compounds, any measurements of secondary compounds may be complex. The schedule for EDN is likely to be unique due to the mode of action and metabolism for EDN being unique. Further work may be required to develop an adequate measurable schedule for EDN fumigation.

It was noted that the recorded survivor of one of the treatment replicates highlights that things can happen in the application of a treatment. These things are important to note when guidance documents are written e.g. if tarping isn't perfect, treatment won't deliver the target dose. See also discussion under 12.1.9.

A member noted that the benchmark for confirmatory trials is set by fruit fly research, which may not be suitable for forest pests. Although this study shows that some forest insects can be lab reared in a

manner that achieves the same standard, it may not be possible to replicate for all forest pests. This continues to pose a challenge for developing new treatments for forest pests to the standards set for confirmatory field trials set by fruit fly research (e.g. Probit 9).

A member questioned if EDN is effective against fungi. Initial research indicates that EDN is particularly efficacious against fungi and PWN inside tested wood.

12.1.8 Vacuum pressure impregnation with wood preservatives: potential use for pinewood nematode elimination from wood (*Fonseca, Abrantes*)

33_IFQRG-16_2019

A study on an industrial scale demonstrated the efficacy of the vacuum pressure impregnation with commercial wood preservative products, used for outdoor wood protection against fungi and insects, to eliminate the quarantine organism, the pinewood nematode (*Bursaphelenchus xylophilus*), from *Pinus pinaster* wood, avoiding the need for subsequent heat treatment to phytosanitize the wood.

Discussion:

It was noted that in Europe, European legislation forces Portuguese manufacturers to HT regardless of any chemical (VPI) treatment. The HT requirement is that which must also be applied in order to be treated wood to be used for WPM. VPI with wood preservatives should be recognized as eliminating the need for further treatment of wood.

A member questioned the potential risk from insects deeper in the wood that can escape wood treated only at the surface (sap wood) layers. For wider use VPI would need to show that those deeper insects are adequately mitigated.

A member considered there may be value in testing different treatment processes (full cell vs partial cell) to see if it is the vacuum/pressurization application is crucial. There may also be value in delivering this paper to the International Research Group on Wood Protection (IRG) conference next year in Bled, Slovenia, June 7-11, 2020 to elicit additional input by this forum of wood treaters and check if there are other chemical treatment processes that could be considered as potential phytosanitary treatment or part of system approaches to significantly reduce pest. The IRG is planning to have working party session on chemical treatments as potential phytosanitary treatments.

The TPPT is developing a series of IPSMs on guidelines for the different treatment types. Temperature (ISPM 41) and fumigation (ISPM 42) have already been adopted, with a draft ISPM for controlled atmospheres currently under contracting party consultation. The next ISPM being drafted is for chemical treatments, and would benefit from input from this and other research currently underway.

Action item 22: IFQRG to form small working group to inform NPPOs of the efficacy of chemically impregnated wood (*Uzunovic, Fonseca*).

Action item 23: Deliver paper to and connect with the International Research Group on Wood Protection conference next year in Bled, Slovenia, June 7-11, 2020 (*Fonseca, Uzunovic*).

12.1.9 The efficacy of reduced concentrations of methyl bromide (MB) for the quarantine treatment of New Zealand-grown pine export logs (*Najar-Rodriguez*)

29_IFQRG-16_2019

Here we will present the main results of our multi-year research program, which started in 2012 with the aim of producing comprehensive data to support the development of revised methyl bromide

fumigation schedules for New Zealand export logs. The program has used scientifically rationalized doses and three forest insects associated with pine (*Pinus radiata*) logs in New Zealand: golden-haired bark beetle, *Hylurgus ligniperda* (Coleoptera: Curculionidae); black pine bark beetle, *Hylastes ater* (Coleoptera: Curculionidae); and burnt pine longhorn beetle, *Arhopalus ferus* (Coleoptera: Cerambycidae) as target species. Following a stepwise approach we:

a) Developed a laboratory-based rearing program for each target insect;
b) Identified the most tolerant species and life stage in laboratory trials;
c) Measured the sorption characteristics of methyl bromide by pine logs;
d) Optimized new fumigation schedules (combinations of dose and duration for different temperatures) using the most tolerant life stage; and
e) Confirmed the efficacy of the proposed schedules in commercial situations.

Artificially infested logs were placed within log stacks and fumigated under the tarpaulin at the Port of Tauranga in New Zealand. This is the first time that such a detailed research approach has been used to develop fumigation schedules for forest exports.

Discussion:

A member requested clarification on why the one living outlier was referred to as "moribund". The speaker informed the group that the larvae failed to pupate. Participants considered that this was suitable evidence that all the insects were ultimately rendered non-viable.

A member considered there would be value in IFQRG looking at the issue of data outliers in the final large scale confirmatory tests, such as the surviving larva (that failed to pupate indicating non-viable pest) or survivors that are clearly due to failure to deliver targeted dose (e.g. not achieving targeted temperature or fumigant concentration in the area where survivors occurred). Questions to consider would be what a researcher should do in terms of reporting survivors? Instead of publishing data of survivors that may have delayed mortality or survived because the dose is not delivered due to issues that can be scientifically explained, suggest that the IFQRG think about how statements could be made that explain the reason for survivors or outliers. These data outliers, if reported as part of the results and the efficacy, will wrongly suggest that treatment is not fully efficacious. This can considerably and unnecessarily slow the adoption of new phytosanitary measures. In principle, if one can explain the outliers with plausible evidence or reasoning, then one should report it and explain it in the discussion section, and not necessarily mention the outlier in the abstract of the paper nor include outliers as a part of the efficacy data. One needs to have a credible and justified explanation for any anomaly that researcher think should not be reported in the abstract or in the results since it does not indicate failure of the dose but rather failure to deliver that dose.

One member noted that a comprehensive study such as this NZ research is unlikely to be repeated so the issue of outliers that can be explained, and how to handle them becomes even more important. Another member also commented that while you can set a high bar for experimental design such as done in NZ research, there are sometimes credible alternatives to labor intensive methods of assessing number of insects in each log prior to treatment and isolating them after the treatment. For example, methods used in fruit fly research or some efficacy data with pine wood nematode where prior assessment of pest load is done destructively on a portion of the test material and will represent (estimate) pest load in the treated material. Alternatively you can measure control survival (emergence) as an estimate of treatment mortality.

Action item 24: IFQRG look at the reporting of data outliers in more detail (*Uzunovic, Najar-Rodriguez, Noseworthy, Hoover*)

12.2 ISPM 15/Wood implementation

12.2.1 ISPM 15 – compliance science (*Allen*)

42_IFQRG-16_2019

The effectiveness of ISPM 15 in preventing the global movement of forest pests has been critically assessed since its adoption in 2002. Major concerns are based on the prevalence of pests found in association with WPM in spite of apparent compliance. The science underlying ISPM 15 treatments is reviewed, reasons for non-compliance proposed and opportunities for improvement considered.

Discussion:

The speaker noted that approximately 80 of the 183 contracting parties have implemented ISPM 15. However, many of the contracting parties may only export compliant imported ISPM 15 WPM (e.g. reuse ISPM 15 WPM). The speaker noted that live insect detections have gone up in some cases, but questioned if this was due to more inspections being undertaken. The speaker postulated that we have to live with the fact that 100% implementation is unlikely ever to occur.

One participant considered that to move the needle about non-compliance versus establishment, would a seminal paper that sums up these issues help to reduce the perception that non-compliance is an issue?

Action item 25: WG produce a paper to help reduce the perception that non-compliance is an issue (*Geffros, Gething, Ormsby, Clara Serra*).

12.2.2 Overview of the CFIA's WPM programs over time and provide lessons learned and practical tips for more effective application of ISPM 15 (*Dawson, Geffros*)

36_IFQRG-16_2019

Implementation of ISPM 15 – A Canadian Perspective: The Canadian Food Inspection Agency (CFIA) is the responsible authority for developing and implementing plant protection programs for Canada. An overview of the CFIA's wood packaging related programs and their efforts to implement them since the adoption of ISPM 15 in 2003 is provided. Lessons learned and practical tips for more effective implementation of ISPM 15 are also included. Canada is a world leader in sustainable forest resource management, including the development of sustainable and environmentally responsible solutions. ISPM 15 is widely recognized as being an effective approach in reducing the spread of invasive forest pests. Examples are provided to illustrate the importance and contribution of Canada's forest industry in the development, implementation and promotion of ISPM 15.

Discussion:

The speaker noted the following challenges with the ISPM 15 system:

- limited resources for inspections
- Fraudulent marks
- Gaps in inspections of transiting shipments
- Lack of timely or informative notices of noncompliance from NPPOs
- Inconsistent global implementation

A member question if there is any incentive to join the environmental certification to plant health certification. Participants considered that these two systems only partially overlap, and as such do not fit well together.

Participants noted the important role the CIFA had played in the global adoption and implementation of ISPM, and agreed with the global issues the speakers had identified with the current implementation os ISPM 15.

12.2.3 International Movement of Fungi on Wood – update (*Allen, Tanney, Uzunovic*)

Discussion: IFQRG members considered this work remains an important priority for the IFQRG work programme.

Action Item 03: Work to proceed (CFS (*Joey Tanney*), *Uzunovic*, *Howard*, *Ormsby*, *Veljkovic*, *Noseworthy*)

12.2.4 Contaminating pests on wood products (*Allen*) 40_IFQRG-16_2019

Contaminating pests are of increasing concern to plant health officials worldwide. In this presentation, definitions of contaminating pests are reviewed and considered in a forest commodity context. The outline of a draft North American Plant Protection Organization (NAPPO) Science and Technology document is presented including types of contaminating pests, commodities affected, why pests contaminate commodities, mitigation opportunities and guidance to inspectors.

Discussion:

The group discussed the general benefits and problems of contaminating pests on wood products. A participant noted the potential benefits of having a document to help with inspection guidance. The focus of teams that collect contamination data can be risk-based, however implementation can be less than consistent. There may be value in IFQRG coming up with a common or standardized sampling regime for contaminants.

A participant noted that in some regions the border inspectors are not interested in collecting data on contaminants. This provides further support for a document for inspectors to determine what they can overlook. An alternative approach would be to direct the document at the PRA authors to determine what contaminants need to be regulated. Inspectors will find it hard to overlook pests if they find them.

A participant noted that in many cases system's approaches are the key for controlling these contaminant pests.

Action item 26: The IFQRG members participating in the NAPPO expert group will interact other IFQRG members to tap into other sources of data (*Mack, Noseworthy, Ormsby, Gething, Dawson*)

12.2.5 Analysis of historical inspection data to inform hitchhiker pest risk patterns on sawn wood (*Howard*) Not available.

Changes in biosecurity risk has resulted in an increase in regulation for generalist hitchhiker pests in Australia, which has affected some sawn wood commodities. An attempt was made to interrogate inspection and interception data for hitchhiker pests from the past 11 years to determine whether any

specific temporal, geographical, or taxonomic patterns exist that may prompt further changes to regulation or management for hitchhiker pests specific to the sawn wood pathway. The data indicated that changes in exporting country can influence overall interception rates, but no statistically significant patterns were evident. Limitations of the data and the premise on why it was collected are discussed.

Discussion:

Participants discussed the problems and limitations of using interception records that were not collected consistently and/or for the purpose of phytosanitary analysis. There was considered some benefit in the larger IPPC group to do the same thing to make it a global study. Participants noted that border interception data is messy, changing priorities can drive reasons for changes in inspection effort. There may be more benefit from looking at trends in much larger international data sets. For many contaminants, associations with imported products is not random. Examples provided included Burnt Pine Longhorn beetle (*Arhopalus tristis*), Spotted Lanternfly (*Lycorma delicatula*), and Gypsy moth (*Lymantria dispar*). However for some contaminants the associations are random and as such cannot be easily predicted (e.g. BMSB (*Halyomorpha halys*)).

Action item 27: Provide analysis on big data collections for IFQRG discussion in 2020 (*Howard, Ormsby, Noseworthy*)

13. Review of IFQRG-16 report

The draft text of the meeting report was reviewed on the last day of the meeting. Members noted that greater clarity on the role of the report to reflect the discussions of the participants at the meeting was needed.

13.3. Work program for 2019-20

A01. Report on data on wood packaging storage patterns will be posted on IFQRG website.	Ormsby
A02: Develop HT guidance manual content – re-establish working group	Ormsby
A03: Continue to work on the paper on pathogens	CFS (Joey Tanney), Noseworthy, Uzunovic, Howard, Veljkovic, Ormsby.
A04: Submit paper on "Calculating Treatment Efficacy Against Invasive Alien Species in Trade" for publication	Ormsby
A05: Submit the report on the IFQRG survey to the IPPC EWG on ISPM 15 guidance document	Ormsby
A06: All IFQRG members submit ISPM 15 implementation guidance material to the IPPC Secretariat	All members
A07: Submit IFQRG DH guidance material to the IPPC Secretariat when a suitable EWG is established.	SSC
A08: Quads working group members to seek guidance from Plant Health Quads members about what level of Quads-specific information they can share outside of the Quads arrangement and under what conditions	Mack, Howard, Veljkovic

A09: An analysis of available interception data on forest products will be provided to IFQRG 17 in 2020.	Ormsby
A10: Working group will continue to develop survey results into a paper with a glossary of acronyms, circulate to working group for review and to IFQRG members for comments, then publish it as a short review paper and submit it to CPM in April 2020.	Pawson, SSC
A11: Howard to send information to members about the workshop, to inform members of the scope and for them to decide whether they need to be nominated by their NPPO to attend	Howard
A12: The IFQRG IYPH working group will continually update the availability of the slides to the IPPC secretariat for release.	Marcel, Noseworthy
A13: All members are encouraged to submit further slides to the working group.	Noseworthy, Marcel
A14: Investigate the possibility of making IFQRG 17 an IYPH affiliated meeting	Ormsby
A15: Form a working group to provide some guidance to the NAPPO expert group and the IPPC secretariat about PHSAs	Noseworthy, Dawson, Veljkovic, Chen
A16: Have a session on how to quantify the steps in each PHSAs at IFQRG next year. Meghan to deliver paper from Chris Macquarie at IFQRG next year.	Noseworthy
A17: Pull together examples for IFQRG 17 and type of data collected and some key knowledge gaps to further support existing or developing system approach.	Noseworthy, Dawson, Veljkovic
A18: For SSC to reach out to known researchers in the field through invitation to key members, particularly from Europe to attend the meeting in Rome next year to discuss issue in a targeted session.	SSC
A19: Form a working group to identify key players and specific forest quarantine issues related to emerging molecular technologies and report back to the group next year	Uzunovic, Veljkovic, Dawson, Chen, Ormsby, Howard
A20: Members encouraged to work with their NPPOs to develop a solution (to the recycle/reuse of WPM) and to bring that back to IFQRG 17 for further discussion.	All members
A21: Members request NAPPO present the recommendation on the categorization of TMW as non-risk to the IPPC for their consideration.	Allen, All members
A22: IFQRG to form small working group to inform NPPOs of the efficacy of chemically impregnated wood.	Uzunovic, Fonseca
A23: Deliver paper to and connect with the International Research Group on Wood Protection conference next year in Bled, Slovenia, June 7-11, 2020.	Fonseca, Uzunovic
A24: IFQRG look at the reporting of data outliers in more detail.	Uzunovic, Najar-Rodriguez, Noseworthy, Hoover
A25: WG produce a paper to help reduce the perception that non-compliance is an issue in ISPM 15 WPM.	Geffros, Gething, Ormsby, Clara Serra

A26: The IFQRG members participating in the NAPPO expert group on contaminating pests will interact other IFQRG members to tap into other sources of data.	Mack, Noseworthy, Ormsby, Gething, Dawson
A27: Provide analysis of hitchhikers from big data collections for IFQRG discussion in 2020	Howard, Ormsby, Noseworthy

13.5 Date and location IFQRG-17 (2020)

The next meeting (IFQRG-17) has been set for the week of 28 Sept -2 Oct 2020 in the Philippines Room at the FAO in Rome, Italy.

The IFQRG-18 2021 meeting arrangements will be organized before IFQRG-17.

14. Close of Meeting

IFQRG thanked the Brazilian Agricultural Research Corporation (Embrapa) for hosting the meeting and for organizing the lovely dinner on Thursday night.

The Chair thanked the participants for their commitment and participation and encouraged them to follow up on their action items before the next meeting.

Appendix 1: List of Participants at IFQRG 16

Photo' Nº	Member's name	Country	Email address
6	Adnan Uzunovic	Canada	adnan.uzunovic@fpinnovations.ca
Not in Photo	Adriana Najar-Rodriguez	New Zealand	Adriana.najar-rodriguez@plantandfood.co.nz
12	Barry Ford	Canada	ford@canadawood.org
23	Bart De Laender	Canada	bart.delaender@chep.com
25	Brad Getting	USA	bgething@palletcentral.com
4	Celso Garcia Auer	Brazil	celso.auer@embrapa.br
17	Chen Zhangjing	USA	chengo@vt.edu
2	Christopher Howard	Australia	Chris.Howard@agriculture.gov.au; chrishoward@y7mail.com
1	Chuck Dentelbeck	Canada	cdentelbeck@clsab.ca
Not in Photo	Claudia Maria Garbuio	Brazil	claudia.garbuio@embrapa.br
9	Denis Rousseau	Canada	denis.rousseau@cifq.qc.ca
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13	Eric Allen	Canada	eric.allen@canada.ca
Not in Photo	Erich Schaitza	Brazil	erich.schaitza@embrapa.br
3	Guilherme Schnell E Schuhli*	Brazil	guilherme.schuhli@embrapa.br

Photo' Nº	Member's name	Country	Email address
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14	Karolina Szymona	USA	kss29@psu.edu
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20	Luís Fonseca	Portugal	luis.fonseca@uc.pt
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21	Mark Hamelin	Canada	mark@aquatimber.com
18	Michael Ormsby	New Zealand	Michael.Ormsby@mpi.govt.nz
10	Paul Conway	USA	pconway@alsc.org
19	Paulo Verdasca	Portugal	paulo.verdasca@madeca.pt; paulo.verdasca@gmail.com
15	Ron Mack	USA	ron.mack@aphis.usda.gov
26	Scott Geffros	Canada	scott.geffros@canadianpallets.com

*Observer

Appendix 2: List of Documents Tabled or Presented at IFQRG 16

Document Number	Agenda Item	Document Title
01_IFQRG-16_2018	6	Agenda (Draft)
02_IFQRG-16_2018	4	2nd Meeting Announcement
03_IFQRG-16_2018	3	Local Information Document
04_IFQRG-16_2018	7.1	Report of the IFQRG 15 (2018)
05_IFQRG-16_2018	6.1	List of Documents
06_IFQRG-16_2018	5	List of Meeting Participants
07_IFQRG-16_2018	7.2	IFQRG Rules of Procedure
08_IFQRG-16_2018	7.2	IFQRG Terms of Reference
09_IFQRG-16_2018	9.1.1	Summary of Responses of IFQRG Survey
10_IFQRG-16_2018	10.4	CPM Contaminants Recommendation
11_IFQRG-16_2018	10.3	NAPPO Contaminants Project Proposal
12_IFQRG-16_2018	11.1	RSPM 41 The use of systems approaches to manage pest risks associated with forest products. NAPPO.
13_IFQRG-16_2018	10.3, 11.1	RSPM 41 Information Sheet. NAPPO.
14_IFQRG-16_2018	12.2	ISPM 15 Explanatory Document
15_IFQRG-16_2018	11.5, 12.1, 12.2	ISPM 15 Regulation of wood packaging material in international trade. IPPC, FAO.
16_IFQRG-16_2018	11.3	HT Verification Working Group Guide
17_IFQRG-16_2018	12.1.2	ISPM 32 Categorization of commodities according to their pest risk. IPPC, FAO.
18_IFQRG-16_2018	12.2	ISPM 5 Glossary of Phytosanitary Terms. IPPC, FAO.
19_IFQRG-16_2018	11.4	Roe et al 2018 Biosurveillance Part I
20_IFQRG-16_2018	11.4	Bilodeau 2018 Biosurveillance Part II
21_IFQRG-16_2018	10.5	IYPH 2020 Getting Started Package
22_IFQRG-16_2018	10.5	IYPH 2020 Presentation 2018
23_IFQRG-16_2018	6.1	Abstracts
25_IFQRG-16_2018	12.1.4	Presentation: Gagon-etal_RF-Economic-Review
26_IFQRG-16_2018	11.2	Presentation: Mack_DH-Path-to-Adoption
27_IFQRG-16_2018	12.1.3	Presentation: Szymona-etal_RF-HT-Recycled-WPM
28_IFQRG-16_2018	12.1.6	Presentation: Veljkovic_NZ-MB-reduction-replacement-for-NZ-log-exports
29_IFQRG-16_2018	12.1.9	Presentation: Najar-Rodriguez_MB-Efficacy-Research
30_IFQRG-16_2018	12.1.7	Presentation: Najar-Rodriguez_EDN-Efficacy-Research

Document Number	Agenda Item	Document Title
31_IFQRG-16_2018	11.4	Presentation: Uzunovic_Molecular-diagnostic-tools-in-Forestry
32_IFQRG-16_2018	10.5	Presentation: Noseworthy & Dawson_IYPH
33_IFQRG-16_2018	12.1.8	Presentation: Fonseca_Vacuum-pressure-wood-preservatives
34_IFQRG-16_2018	11.2	Presentation: Mack_CRADA
35_IFQRG-16_2018	12.1.5	Presentation: Chen-etal_Vacuum-Steam-Technology-To-Kill-Ceratocystis-Wilt-Fungus
36_IFQRG-16_2018	12.2.2	Presentation: Dawson & Geffros-etal_CFIA-implementation-of-ISPM15
37_IFQRG-16_2018	11.1	Presentation: Allen & Noseworthy_Systems-Approaches-in-Forestry
38_IFQRG-16_2018	10.3	Presentation: Allen & Noseworthy_NAPPO-Update
39_IFQRG-16_2018	8.3	Presentation: Uzunovic & Mack_QUADS-information
40_IFQRG-16_2018	12.2.4	Presentation: Allen_Contaminating-pests
41_IFQRG-16_2018	12.1.2	Presentation: Allen_Thermally-Modified-Wood
42_IFQRG-16_2018	12.2.1	Presentation: Allen_ISPM15-Science-and-Compliance
43_IFQRG-16_2018	11.5	Presentation: Ormsby_Summary-of-ISPM15-Reuse-Text