



REPORT

Technical Panel on Phytosanitary Treatments September, 2022

Rome, Italy
12-18 September 2022

IPPC Secretariat

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CONTENTS

1.	Opening of the Meeting	4
2.	Meeting Arrangements	4
3.	Administrative Matters	4
4.	Draft Phytosanitary Treatments (PTs) in the Work Programme.....	4
4.1	Cold treatment for <i>Drosophila suzukii</i> on <i>Vitis vinifera</i> (2021-027) – priority 1.....	4
4.2	Vapor heat treatment for <i>Planococcus lilacinus</i> for <i>Selenicereus undatus</i> (2021-028) – priority 1	6
4.3	Irradiation treatment for <i>Aspidiotis destructor</i> (2021-029) – priority 1	8
4.4	Irradiation treatment for all stages <i>Pseudaulacaspis pentagona</i> (2021-030) – priority 1	9
4.5	Generic irradiation treatment against all insects except Lepidoptera larvae and pupae (2017-030) – priority 2	9
4.6	Cold treatment for <i>Thaumatotibia leucotreta</i> on <i>Citrus</i> spp. (2017-029) – priority 2 ...	10
4.7	Heat treatment of wood using dielectric heating (2007-114).....	12
5.	Updates from IPPC bodies: CPM-14 and Standards Committee.....	12
5.1	Strategic discussion on the TPPTs work	12
6.	Liaison	13
6.1	Phytosanitary Measures Research Group (PMRG).....	13
6.2	Ozone Secretariat (Vienna Convention and Montreal Protocol / United Nations Environment Programme (UNEP)).....	14
6.3	International Forestry Quarantine Research Group (IFQRG).....	14
6.4	International Plant Health Conference – input on the presentation by TPPT member	14
7.	Overview of the TPPT Work Programme	14
8.	Recommendations to the SC.....	14
9.	Other Business	15
10.	Close of the Meeting.....	15
	Appendix 1: Agenda.....	16
	Appendix 2: Documents list	19
	Appendix 3: Participants list	21

1. Opening of the Meeting

Opening remarks by the Secretariat

- [1] The International Plant Protection Convention (IPPC) Secretariat (hereafter referred to as the “Secretariat”) welcomed the members of the Technical Panel on Phytosanitary Treatments (TPPT).
- [2] Mr Osama EL-LISSY, IPPC Secretary warmly welcomed the TPPT noting that this is the first face to face meeting of the panel since 2019, and for the first time in Rome since the panel was established in 2004. Mr EL-LISSY expressed appreciation regarding the TPPTs efforts in keeping the panel’s work programme going, via the 14 virtual meetings that took place since the face-to-face meeting. He highlighted specifically the dedication of panel members and expressed gratitude to the NPPOs delegating the members of this panel. He noted the busy agenda and wished fruitful discussions to continue moving the panel’s work programme forward.
- [3] Mr Avetik NERSISYAN, Standard Setting Unit Lead also welcomed the participants.

2. Meeting Arrangements

Election of the Chairperson

- [4] The TPPT elected Mr Scott MYERS as Chairperson.

Election of the Rapporteur

- [5] The TPPT elected Mr Michael ORMSBY as Rapporteur.

Adoption of the agenda

- [6] The TPPT reviewed and adopted the agenda (Appendix 1).

3. Administrative Matters

Documents list

- [7] The TPPT reviewed the documents list (Appendix 2).

Participants list

- [8] The Participants list is presented in Appendix 3.
- [9] The Secretariat was represented by Ms Janka KISS, secretariat lead.

Local information

- [10] Further information was provided regarding the local arrangements and logistics¹.

4. Draft Phytosanitary Treatments (PTs) in the Work Programme

- [11] The Secretariat provided an overview of the standard setting process making particular note of the recent change to enable a single consultation round if no substantive submissions are made.

4.1 Cold treatment for *Drosophila suzukii* on *Vitis vinifera* (2021-027) – priority 1

- [12] The Treatment Lead, Mr Eduardo WILLINK introduced the draft PT, the Treatment Lead’s summary and the additional information provided by the submitter².

¹ Local information on Rome: <https://www.ippc.int/en/publications/1034/>

² 2021-027, 08_TPPT_2022_Sep, 07_TPPT_2022_Sep

- [13] The submission was received in 2021 from China and the proposed schedule is based on the study by Wang *et al.* 2020³. The proposed schedules are:
- Schedule 1: 0°C or below for 11 continuous days. There is 95% confidence that the treatment according to this schedule kills not less than 99.9941% of eggs, larvae and pupae of *Drosophila suzukii*.
 - Schedule 2: 2°C or below for 12 continuous days. There is 95% confidence that the treatment according to this schedule kills not less than 99.9948% of eggs, larvae and pupae of *Drosophila suzukii*.
- [14] The TPPT discussed the submission at the TPPT December 2021 Virtual Meeting and recommended the addition to the TPPT work programme to the Standards Committee (SC) with priority 1, which the SC did in May 2022. In order to further evaluate the treatment the TPPT requested clarification from the submitter on a number of issues. Additional information was received from the submitter in August 2022.
- [15] **Exposure time.** The TPPT reviewed the responses and expressed their appreciation for the submitter for these, however they noted that the TPPT also asked clarification about how the exposure times used in life stage testing were determined, and why longer exposure times weren't considered. Clarification regarding these issues is still necessary.
- [16] The TPPT considered that the dose (the length of the treatment) is relatively high so it might be effective to kill pupae, and that if confirmatory trials will be restarted as a result of life stage testing, the submitter might want to consider the least restrictive treatment and start reviewing shorter treatments to determine the length of treatment absolutely necessary. Consideration should also be given to the fact that temperatures close to 0°C are hard to maintain due to the defrost cycles
- [17] **Most tolerant life stage.** The TPPT also noted that the issue of the determination of the most tolerant life stage was not addressed, and the submitter informed the panel that additional experiment to compare the cold tolerance between eggs and pupae with a series of treatment duration will be conducted and the data will be analyzed statistically and put forward to TPPT as the work is finished. The TPPT noted that another paper suggests that pupae is more tolerant than eggs to heat treatments, and none of the other studies suggest that eggs are more tolerant in the references they were able to find.
- [18] They suggested to bring to the attention of the submitter that they may choose to rely on Kim *at al* 2018⁴, and redo the testing with late stage (pharate) puparia.
- [19] They also considered that the most tolerant life stage testing should be conducted in a similar manner to the resulting treatment schedule, and the initially used 1-2 day tolerance tests should instead be conducted over a longer period of time.
- [20] **Measure of mortality.** They also discussed that the measure of mortality for eggs (color change) might not be conclusive.
- [21] **Diet.** The issue of artificial diet was also discussed, and that Kim *at al* 2018³ conducted the life stage testing on artificial diet (grape slurry), however it was clarified that they have been rearing them in that for 3 years, supplementing with wild colony, and that is unlikely that the difference in cold tolerance is due to this. However the TPPT stressed that the diet closest to the natural conditions is the best, and the closest to representing the real circumstances where the treatments would be applied.

³ Wang, X., G. Zhan, L. Ren, S. Sun, H. Dang, Y. Zhai, H. Yin, Z. Li, and B. Liu. 2020. Cold treatment of 'Red Globe' grape (Rhamnales:Vitaceae) for *Drosophila suzukii* (Diptera:Drosophilidae). *Journal of Insect Science* 20(3): 11; 1–6.

⁴Kim, Min Jee, Kim, Jong Seok, Jeong, Jun Seong Choi, Deuk-Soo, Park, Jinyoung and Kim, Iksoo, 2018, Phytosanitary Cold Treatment of Spotted-Wing *Drosophila*, *Drosophila suzukii* (Diptera: Drosophilidae) in 'Campbell Early' Grape, *Journal of Economic Entomology*, 111(4), 2018, 1638–1643

[22] In summary, the TPPT agreed to suggest to the submitter to redo the most tolerant life stage studies with longer exposure times, reflecting the proposed treatment schedule (PMRG guidelines⁵ recommend at least 5 different durations, for example 12 h, 1 d, 2d, 3d 5d). They noted that if eggs are found to be the most tolerant, the rest of the study is well done, and would be sufficient to develop a PT.

[23] The TPPT:

- (1) *agreed to wait with the further development of the Cold treatment for *Drosophila suzukii* on *Vitis vinifera* (2021-027) until the submitter conducted the required life stage testing.*

4.2 Vapor heat treatment for *Planococcus lilacinus* for *Selenicereus undatus* (2021-028) – priority 1

[24] The Treatment Lead, Mr Michael ORMSBY introduced the draft PT, the additional information provided by the submitter and the treatment leads summary⁶.

[25] The submission for a Vapor heat treatment (VHT) of dragon fruit (*Selenicereus undatus* (Haworth) D.R. Hunt) for *Planococcus lilacinus* (Cockerell) was received in 2021 from China and first evaluated by the TPPT at a virtual meeting in December 2021.

[26] The proposal is based on the study by Ren *et al.* 2021⁷. The proposed treatment differs from previous vapor heat treatment schedules in that the fruit is placed into an already heated chamber. This is because the target pest (*Planococcus lilacinus*) is a surface pest only, so the treatment need not necessarily heat the flesh of the fruit.

[27] The proposed schedule is as follows:

[28] Exposure in a vapour heat chamber:

- at a minimum of 95% relative humidity
- with air temperature at 50°C or above
- for 70 minutes once the fruit surface temperature has reached 49°C.

[29] Once the treatment is complete, fruits may be air-cooled to reach ambient temperature.

[30] The TPPT requested clarification from the submitter on a number of issues related to the study. The submitter provided the information in 2022.

[31] **Estimation of the number of treated insects.** The TPPT agreed that more information is needed how the number of treated insects were estimated. The submitter explained that the individual *Planococcus lilacinus* used in large-scale confirmatory test were counted directly since it is a surface pest. The TPPT concluded that that the “estimated” numbers were direct counts adjusted for natural mortality (Abotts formula).

[32] **Infestation.** The TPPT requested more information on the method of the artificial infestation. The submitter explained that *Planococcus lilacinus* colony was reared on potato and kept in a laboratory at 25 ± 1 °C, 60–80% RH, and a photoperiod of 14 h:10 h, light: dark. They transferred the adult females to fresh dragon fruits by soft brush and reared them there 4-6 hours before large-scale confirmatory test. They determined mortality of pest by a brush. Survival rates of mealybugs were checked within 48 hours after treatment. The TPPT felt this clarified their concerns sufficiently regarding the infestation methods.

⁵ PMRG Research Guidelines: Cold Treatments:

<https://www.ippc.int/en/partners/phytosanitarymeasuresresearchgroup/publications/2019/03/pmrg-research-guidelines-cold-treatments/>

⁶ 2021-028, 06_TPPT_2022_Sep, 12_TPPT_2022_Sep

⁷ Lili Ren, Qian Lu, Meiling Xue, Caiyun Peng, Naizhong Chen, Guoping Zhan and Bo Liu. 2021. Vapor heat treatment against *Planococcus lilacinus* Cockerell (Hemiptera: Pseudococcidae) on dragon fruit. Pest Management Science. Doi: 10.1002/ps.6616.

- [33] **Probe placement.** The TPPT queried to know where the temperature probes were placed, considering that the calyx area at the top of a dragon fruit forms a protected chamber and the coldest spot is likely to be in there (pest survival after heat treatment has been observed there in the past). The submitter clarified that the temperature mapping of dragon fruit were conducted before heat tolerance and large-scale confirmatory test. Temperature was monitored at the coolest region of the commodity, namely by inserting a temperature sensor probe (Pt100, Chong Qing Well Co., Chongqing, China) into the surface of peel and core of fruit. They constantly monitored the surface (calyx, stem and equator of fruit) and core of dragon fruit and ambient temperature, making sure that the air temperature in heat treatment chamber was uniform. They noted that the temperature of fruit calyx was lower than the other surface temperatures at the beginning of the treatment, but there was no difference in temperature among fruit surface as treatment time increased. They didn't find a significant difference between the surface temperature when heat treating at 49°C, therefore, they did not distinguish probe placement of the fruit calyx and other surface area in the study. The TPPT noted the reply.
- [34] **Most tolerant life stage.** The reference provided by the submitter indicated that 20–26-day old adult female (rearing under 25±1°C) were the most tolerant stages, and used for testing, however another paper (Follett 2006b)⁸ for a similar treatment tested the eggs to be the most tolerant. The TPPT wanted to clarify why eggs and late-aged adult females were excluded from testing for tolerance to heat.
- [35] The response from the submitter did not resolve the issue of the most tolerant life stage testing however the TPPT noted that in this species the eggs hatch inside the females and eggs are rarely produced. The TPPT discussed weather treating the colony, including adults and the eggs inside them would be sufficient. One member queried weather the females were gravid, and the TPPT concluded that if the colony reproduced and was treated as a whole, that is sufficient, as it reflects the natural conditions.
- [36] **Less stringent treatment.** One member noted that the treatment was different to the one used in Australia and Vietnam, 46°C for 40 minutes, which is less stringent then the recommended 49°C for 70 minutes. However the TPPT still felt that this treatemnt could offer a viable alternative.
- [37] **Males.** The TPPT noted that males weren't tested, but they can't reproduce on their own, and they are smaller and mobile, not attached to the fruit.
- [38] **Application.** The TPPT discussed how much explanation to include regarding the treatment application, noting that the fruit should be placed in the preheated chambers, and whether to specify what to do when the temperature and humidity drops when the fruit is placed inside, and some time would be needed until the required parameters are reached again. The TPPT also discussed that cooling should only be allowed the same was as in the supporting study, which is via air-cooling, but not via cold water dipping, or placing in the fridge. The TPPT discussed, how to include this in the PT, whether to restrict other accelerated cooling. They agreed that the treatment schedule should include the minimum requirements to be met, and not to include any explicit restriction, just the statement of what kind of cooing is allowed (implicitly excluding everything else).
- [39] **Host commodity.** The TPPT considered that the treatment is likely efficacious on any hosts of this pest, as it lives on the surface. They noted that not all commodities would be able to withstand the heat treatment, but the product quality issues would not be part of the TPPT considerations, as they are not concerning the phytosanitation. The TPPT considered that finding the coldest spot on the surface of any commodity used is essential, but as long as that is done correctly, the treatment would be applicable to any commodity, that is host of the target pest. A generic statement of the extrapolation was drafted, modelled after the statement on the generic irradiation treatment (extrapolating to all commodities). It includes a statement “if new information becomes available...” and includes references on the physiology on how heat treatments work.

⁸ Follett, Peter. 2006b Irradiation as a Phytosanitary Treatment for White Peach Scale (Homoptera: Diaspididae) J. Econ. Entomol. 99(6): 1974-1978.

[40] **Draft PT.** The TPPT reviewed the draft treatment and modified it according to the discussion reported above, and recommended it for approval for consultation to the Standards Committee.

[41] The TPPT

(2) *recommended* to the Standards Committee (SC) to approve the draft PT Vapor heat treatment for *Planococcus lilacinus* (2021-028) for consultation

4.3 Irradiation treatment for *Aspidiotis destructor* (2021-029) – priority 1

[42] The Treatment Lead, Mr Daojian YU introduced the draft PT⁹.

[43] The proposal was submitted by the USA in 2021, and the treatment was discussed in December 2021, where the TPPT agreed to recommend to add the topic to their work programme. The treatment schedule is proposed as a minimum absorbed dose of 150 Gy to prevent F₁ reproduction of *Aspidiotus destructor*, based on Follett 2006¹⁰ with a 95% confidence that the treatment according to this schedule kills not less than 99.9897% of the target pest.

[44] The TPPT discussed the supporting data and raised some issues for clarification by the submitter: one regarding how the most tolerant life stage was established (females with eggs), and the need to clarify how the estimated number of treated insects was calculated, and whether it includes the whole population, including all life stages, or only the most tolerant one. The TPPT requested to see the raw data used to establish the treated numbers.

[45] One TPPT member noted, that the efficacy of this treatment is relatively low, but the TPPT considered that the treatment may still be adopted by countries if it meets their ALOP or may use it as part of a systems approach.

[46] They also decided to review another paper (Khan et al. 2016)¹¹ to potentially establish another treatment within this topic. Both treatments used estimates of treated numbers (by using grids and only counting 2 or 3 squares and extrapolating to the whole grid). Follet (2006) was not clear on numbers of most tolerant life stage versus other life stages (explanation/numbers not clear).

- End point of Follet (2006) 150 Gy treatment was prevention of gravid F1 females;
- End point of Khan et al (2016) 220 Gy treatment was prevention of F1 1st instars;
- Long tail of survivors in Follet (2006) paper suggests potential for post treatment infestation.

[47] The TPPT thanked Mr Daojian YU, and agreed to assign Mr Guoping Zhan to the Irradiation treatment for all stages *Aspidiotis destructor* (2021-029).

[48] The TPPT:

- (3) *requested* further information from the submitter to possibly clarify the issues mentioned here and
- (4) *assigned* new treatment lead, Mr Guoping Zhan to the topic on the Irradiation treatment for all stages *Aspidiotis destructor* (2021-029)

⁹ 2021-029

¹⁰ Follett, P. A. 2006. Irradiation as a phytosanitary treatment for *Aspidiotis destructor* (Homoptera: Diaspididae). *Journal of Economic Entomology* 99 (1): 1138-1142.

¹¹ Inamullah Khan, Muhammad Zahid, Fazal Mahmood, and Alam Zeb, 2016. Mortality and growth inhibition of γ -irradiated red scale *Aonidiella aurantii* (Hemiptera: Diaspididae) on 'Kinnow' citrus (Sapindales: Rutaceae) fruits. *Florida Entomologist* - Volume 99, Special Issue 2

4.4 Irradiation treatment for all stages *Pseudaulacaspis pentagona* (2021-030) – priority 1

- [49] The Treatment Lead, Mr Toshiyuki DOHINO introduced the draft PT, the additional information provided by the submitter and the treatment leads summary¹².
- [50] The “Irradiation treatment for all stages of *Pseudaulacaspis pentagona* (2021-030)” was submitted by the USA in November 2021 and the TPPT evaluated the submission at their virtual meeting in December 2021¹³. The proposed treatment schedule for *Pseudaulacaspis pentagona* is a minimum absorbed dose of 150 Gy to prevent production of F1 females with eggs. The schedule is supported by Follett (2006)¹⁴.
- [51] The TPPT’s requested further information from the submitter, which was received in August 2022.
- [52] **Lack of raw data.** The TPPT noted that although the submitter responded to one of the TPPT’s question on species identification, the other question regarding the calculation of the number of treated insects was not answered, as the raw data of controls for the large-scale studies could not be located. The TPPT discussed how to proceed with the treatment. They noted the high mortality in the controls (>40 %) and considered that the lack of data on the controls makes it difficult to complete the evaluation of this treatment.
- [53] **Most tolerant life stage.** The most tolerant life stage is the females with eggs. One member noted that the most tolerant is the egg stage, not females with eggs. The gravid females are not surviving better than the ones without eggs.
- [54] **Endpoint.** The paper indicates that the endpoint is prevention of F2. The irradiated adults survive, lay eggs, the F1 adults develop but cannot reproduce anymore. That is an unusual endpoint, allowing for the development of the pest further than any other irradiation treatment adopted. The TPPT discussed that the endpoint of the treatment might raise some questions, since there is no clarity on what happened to the irradiated females after the 4 weeks observation period. The data establishes that some females without eggs survived the irradiation, and it is not possible to tell if the eggs hatching were the ones irradiated originally, or the ones the irradiated females laid afterwards.
- [55] The TPPT noted that according to the response of the submitter, the data for the controls is lost and consequently the number of treated insects cannot be established. Adding up the uncertainty of the removed endpoint, the TPPT felt that it is not possible to develop this treatment further, and recommended its removal from the work programme.
- [56] **Generic treatment for scale insects.** The TPPT noted that there is a generic treatment for scales on their work programme that will cover this pest and might address the issue of lowering the generic dose for insects, however it will likely be a higher dose than proposed in this treatment.
- [57] The TPPT:
- (5) *recommended* to the Standards Committee to remove the Irradiation treatment for all stages *Pseudaulacaspis pentagona* (2021-030) from the work programme

4.5 Generic irradiation treatment against all insects except Lepidoptera larvae and pupae (2017-030) – priority 2

- [58] The “Generic irradiation treatment against all insects except Lepidoptera larvae and pupae (2017-030)” was submitted by the Mexico in 2017. The generic irradiation treatment is proposed at 300 Gy.

¹² 04_TPPT_2022_Sep, 05_TPPT_2022_Sep, 2021-030

¹³ 2021-12 TPPT Meeting report: <https://www.ippc.int/en/publications/91131/>

¹⁴ Follett, P.A. 2006. Irradiation as a phytosanitary treatment for white peach scale (Homoptera: Diaspididae). Journal of Economic Entomology, 99(6): 1974–1978.

- [59] The Treatment Lead, Mr Scott MYERS explained that there is a need to collect a large number of studies to form the basis of this treatment, and suggested the TPPT to consider again how to move forward with this.
- [60] One member noted that irradiation is used as a phytosanitary treatment since 2016, and IAEA has a database of all irradiation related publications. The TPPT discussed if the approach to establishing a generic treatment should be searching for any paper that contradicts the proposed dose. The generic treatment for insects is used by USDA at 400 Gy that includes Lepidoptera, but reducing the generic dose would be beneficial to avoid commodity damage. One TPPT member highlighted that there are publications that require more the 300 Gy to some insects, and although they maybe overdosing, there needs to be consideration given to these, as they may be raised through consultation. The issue of research conducted at higher dose then necessary was noted by the TPPT.
- [61] One member proposed to also exclude other insect groups, that there is no data on, and don't have economic importance in trade (for example crickets). A TPPT members also noted that some Lepidoptera species that pupate in fruit have the ability to recover DNA, which is counteracting the effects of irradiation which works by destroying DNA. One member suggested to develop generic doses for insect families instead rather than at the order level. Another member suggested to first see if it possible to establish a generic dose. It was mentioned that the IAEA has a Coordinated Research Project (CRP) working on research substantiating generic doses for insect groups. One member suggested to explore further the biological basis for radio tolerance, to substantiate the claim that all insects will be susceptible. One member suggested to consider what the endpoint of such treatment could be. Another member suggested to have "prevention of reproduction" as an endpoint, as treated insects maybe adults.
- [62] The TPPT concluded that more information needs to be gathered and they agreed to work with the IAEA and wait for the result of the CRP.

4.6 Cold treatment for *Thaumatotibia leucotreta* on *Citrus* spp. (2017-029) – priority 2

- [63] The Treatment Lead, Mr Peter LEACH, introduced the draft PT, the Treatment Leads summary, the responses to consultation comment and the additional comments made by a contracting party after the consultation¹⁵.
- [64] The TPPT noted that the submission was made in 2017 by South Africa, and the TPPT reviewed and requested further information from Submitter in 2017, which was provided in 2018. The TPPT at their 2019 July meeting revised the draft, restricting the scope to *Citrus sinensis*, and recommended it to the SC for approval for consultation. The SC approved and the draft PT was submitted to first consultation in 2020, received some critical feedback and also some additional comments afterwards, submitted straight to the TPPT by China. The TPPT discussed these comments in 2021 and agreed that the treatments lead request clarification from the submitter, in order to better address the comments. The resulting responses to the comments are presented at this meeting.
- [65] **Efficacy and artificial diet.** One of the comments noted that a more stringent treatment is being used commercially and survivals are found. They suggested that possibly the artificial diet used in the trial supporting the draft PT may cause a difference in the cold tolerance of the target pest, and suggested that the treatment should be used only as a part of a systems approach. The TPPT noted the concerns of the contracting party but considered that the TPPT has evaluated the proposed treatment schedules based on published papers provided by the applicant that support the efficacy of this treatment, while it is difficult to determine the reason why there might be complications in a commercial setting. They also noted that the decision to use this treatment schedule as a standalone treatment or as part of a systems approach is a decision for NPPOs involved in bilateral negotiations. In the response to this comment

¹⁵ 2017-029, 15_TPPT_2022_Sep, 14_TPPT_2022_Sep, 13_TPPT_2022_Sep

they also quoted a study¹⁶ that establish that even if there are survivors, they are not able to produce further generations of moths.

- [66] **Monitoring temperature.** Some comments suggested to include information on where to place temperature probes to monitor the treatment temperature, however the TPPT agreed that the PT referencing ISPM 42 (*Requirements for the application of heat treatment as a phytosanitary measure*) addresses these concerns.
- [67] **Artificial diet.** Another contracting party was concerned that the cold tolerance of larvae in fruit is higher than in artificial diet, used in the trials supporting this treatment. It was suggested that the difference of cold-tolerant should be re-evaluated between the larvae in fruits and the larvae in diet. The TPPT noted that the results (Table 2) in Moore et al. (2016)⁹ show that at the survival of the last instar larvae in fruits at LD50 is higher than that of the larvae in diet, the use of LD50 is no longer recommend as the area of interest is in the upper range of efficacy (Heather and Hallman 2008¹⁷). They also noted that it is not unusual to find that regression lines cross, so that a stage which is less tolerant than another at LD50 is more tolerant at the LD99 or higher (dose response lines are not parallel). This is exactly the case presented by Moore et al. (2016) for new and historical data sets. As such the evaluation that is most important in this data set is the LD99.9 estimate. While the LD99.9 estimate in fruit is arithmetically higher it is not significantly different from the estimate in diet based on overlap of the fiducial limits (Hallman 1994¹⁸, Waddell et al. 1997¹⁹). Additionally this finding is supported by research from Myburgh (1965)²⁰ that found no significant difference between larval tolerance on fruit or diet.
- [68] The TPPT also noted that the controls showed very low mortality, and the colony has been raised on artificial diet and supplemented regularly.
- [69] The TPPT agreed that additional to the responses to the consultation comments, that are publicly available on the IPP²¹ after the SC approves them, the TPPT report will be available to address the responses to comments submitted outside of the formal consultation.
- [70] The TPPT reviewed the draft PT, and agreed to add a sentence referencing another study by Myburgh 1965 substantiating that the artificial diet didn't result in a more cold tolerance additional to the one by Moore at all 2016.
- [71] The TPPT agreed to submit the responses to the comments and the draft PT as revised at this meeting to the SC for approval for second consultation.
- [72] The TPPT:
- (6) *recommended* the approval of the responses to the consultation comments and the draft PT Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis* (2017-029) to the Standards Committee (SC) for approval for second consultation.

¹⁶ Moore S.D., Kirkman, W., Alibertyn, S. & Hattingh, V. 2016. Comparing the use of laboratory-reared and field-collected *Thaumatotibia leucotreta* (Lepidoptera: Tortricidae) larvae for demonstrating efficacy of postharvest cold treatments in citrus fruit. *Journal of Economic Entomology*, 109(4) 1571–1577. Erratum (2016), *Journal of Economic Entomology* 110(2): 793, doi:10.1093/jee/tow270.

¹⁷ Heather, N.W. and Hallman, G.J (2008). *Pest management and phytosanitary trade barriers*. Neil Heather and CAB International, ISBN: 978184593 3432.

¹⁸ Hallman, G.J. 1994. Mortality of third-instar Caribbean fruit fly (Diptera: Tephritidae) reared at three temperatures and exposed to hot water immersion or cold storage. *Journal of Economic Entomology* 87: 405-408.

¹⁹ Waddell, B.C. Clare, C.K. and Maindonald, J.H. 1997. Comparative mortality responses of two Cook Island fruit fly (Diptera: Tephritidae) species to hot water immersion. *Journal of Economic Entomology* 90: 1351-1356.

²⁰ Myburgh, A. C. 1965. Low temperature sterilization of false codling moth, *Argyroplote leucotreta* Meyr., in export citrus. *Journal Ent. Soc. S. Africa* 28(5): 277-285.

²¹ Previous consultations for draft ISPMs: <https://www.ippc.int/en/core-activities/standards-setting/member-consultation-draft-ispms/substantial-concerns-commenting-period-sccp-draft-ispms/>

4.7 Heat treatment of wood using dielectric heating (2007-114)

- [73] The Treatment Lead, Michael ORMSBY, introduced the draft PT and the objection received when this treatment was submitted for adoption²².
- [74] The TPPT was updated on the progress of the ISPM 15 guide, and noted that the attachments to the guide on treatment application will be finalized in 2023. The TPPT considered that there is still no large-scale commercial application of this treatment and the guidance for its application should be available before progressing with this treatment.

5. Updates from IPPC bodies: CPM-14 and Standards Committee

- [75] The Steward of the TPPT and the Secretariat updated the TPPT on the recent issues discussed the Standards Committee meetings and at the CPM-16 (2022).

5.1 Strategic discussion on the TPPTs work

- [76] The Steward of the TPPT and the Secretariat Lead presented the discussion paper²³ on the outcomes of recent meetings of the Commission on Phytosanitary Measures (CPM-14), the Standards Committee (SC) and the Standards Committee Working Group (SC-7).
- [77] **Facilitating submissions.** The TPPT recognized that in order to provide more available treatments and cover a larger portion of pests for which treatments could be needed, a more proactive way to facilitate submissions is needed, and it was suggested that TPPT members are well positioned to find publications and propose them as topics for approval by the SC, just as the Technical Panel on Diagnostic Protocols (TPDP) does. This would facilitate submissions that benefit smaller countries that don't have the capacity to research and write submissions.
- [78] This approach may also help developing commodity standards, by gathering treatments around particular commodities. As previously stated, the TPPT is ready to support the development of commodity standards in coordination with the Technical Panel on Commodity Standards (TPCS).
- [79] Another proposed solution to covering more pests would be to consider more generic treatments where a treatment covers a larger pest group rather than one species on one commodity (e.g. a family of pests, like PT 40: Irradiation treatment for Tortricidae on fruits). It was recognized that this might require a more flexible approach to establish the efficacy of the treatment.
- [80] The TPPT also discussed the challenges of the appropriate set up of the studies supporting submissions and how often crucial steps are missing and thus the research data is not able to address all the criteria in ISPM 28. They highlighted the benefit of using the research guidelines that the Phytosanitary Research Group (PMRG) developed and the need to develop further guidelines concerning other treatment types.
- [81] They also considered to hold a webinar to discuss the challenges around setting up treatment research and thus the barriers to developing submissions. The webinar can be recorded and made available at the Calls for treatments website.
- [82] **Adjustments to the standard setting process to facilitate the development of phytosanitary treatments.** The TPPT discussed the comments of contracting parties at the CPM during the adoption of the modified standard setting procedure to allow for only one consultation for PTs in case no substantive comment is submitted.
- [83] The TPPT agreed that once a situation arises where a PT is proposed for approval for adoption after only one consultation, they will provide detailed reasoning for the SC to allow to make the decision on

²² 2007-114, 11_TPPT_2022_Sep, 10_TPPT_2022_Sep

²³ 21_TPPT_2019_Jun

whether to send it to adoption, noting that the responses to consultation comments for all draft PTs will be posted on the IPP.

[84] The TPPT

(7) *invited* the Standard Committee (SC) to approve that TPPT members can actively seek out appropriate treatments and submit them as topics for approval by the SC (either directly or through an NPPO).

6. Liaison

6.1 Phytosanitary Measures Research Group (PMRG) ²⁴

[85] The chairperson of the PMRG, Mr Peter LEACH is a member of the TPPT and other members are also participating in PMRG meetings. Mr Scott MYERS, the research coordinator of the PMRG reminded the TPPT that the research group was created to support the work of the TPPT, and that it submits a report²⁵ to the CPM each year summarizing their activities.

[86] He updated the TPPT, that the PMRG is working on research guidelines for different treatment types. The fumigation guidelines are almost ready, and they are proposing to revise and include all guidelines in one document. The TPPT members were invited to give feedback on the guidelines.

[87] It was also highlighted that the revised formula for the estimation of the number of treated insects (according to the section below) will need to be incorporated into the research guidance documents as well.

[88] **Review of the method for the estimation of the number of treated insects.** Some PMRG members reviewed the way efficacy was calculated, and recommended using standard error and a t-test instead of standard deviation when estimating the number of treated insects from non-aggregated control data, as the standard deviation is quite high in natural infestation. For example fruit flies are attracted to light, and fruit closer to the light gets more infestation. This provides a conservative estimate, and the results match better reflect the real conditions (sample sizes and the variation in infestation numbers), and suggested to replace the currently used formula in the Procedure Manual for Standard Setting, to the suggested new one.

[89] The TPPT considered this approach to efficacy calculation for aggregated control data, and they noted that natural conditions result in big variability across controls and this change in the calculation would address this variability. One TPPT member suggested that a publication or reference would be good to cite when revising this efficacy calculation method in the TPPT procedures before adapting this new efficacy calculation method. The use of a t-test in the current formula or the use of the same (new) formula for non-aggregated means would be investigated further by members.

[90] The TPPT considered whether this would mean that the efficacy of the already adopted PTs would need to be recalculated. One member proposed that as long as the adopted PTs are successfully used, they may be kept the same, and the new treatments would reference the new treatment manual and the new calculation method. They suggested that likely when compared with the previous method, the efficacy would either stay the same or slightly increase.

[91] Some members felt that revising the efficacy might affect whether countries use a treatment depending how it changes compared to their ALOP. They suggested not to revise all PTs (requiring consultation etc) but only revise if there is a particular issue identified.

²⁴ Phytosanitary Measures Research Group: <https://www.ippc.int/en/external-cooperation/organizations-page-in-ipp/phytosanitarymeasuresresearchgroup/>

²⁵ CPM 2019/INF/17: Written reports from relevant international organizations - Phytosanitary Measures Research Group (PMRG): <https://www.ippc.int/en/publications/87042/>

[92] The TPPT agreed that they would discuss the issue again at a later meeting in order to finalize the proposal to the SC and review how the efficacy of the adopted treatments would change.

[93] The TPPT:

- (8) *noted* the update of the PMRG activities and acknowledged the importance of this group to the work of the TPPT
- (9) *welcomed* that the PMRG will develop guidelines on irradiation
- (10) *agreed* to consider again the revised formula, and discuss it at a later meeting

6.2 Ozone Secretariat (Vienna Convention and Montreal Protocol / United Nations Environment Programme (UNEP))

[94] The Co-chair of the Methyl Bromide Technical Options Committee (MBTOC) joined the meeting virtually and introduced the brief update²⁶ of the activities.

[95] **Methyl bromide treatment alternatives.** According to the update, quarantine and pre-shipment uses of methyl bromide (approx. 11000 tons) are presently exempted of phase-out measures under the Montreal Protocol. Quarantine and pre-shipment use has become, by far, the main use of methyl bromide.

[96] The Co-chair extended again the invitation for any TPPT member to join the MBTOC. He explained that the group has 24 members, and that their goal is to further reduce the use of methyl bromide. They meet twice a year, and search for alternative uses. It is required that members attend at least one of the two in-person meetings per year.

[97] The TPPT:

- (11) *noted* the update of the recent meeting of the Methyl Bromide Technical Options Committee (MBTOC)

6.3 International Forestry Quarantine Research Group (IFQRG)

[98] The chairperson of the IFQRG, Mr Michael ORMSBY is a member of the TPPT and other members are also participating in IFQRG meetings. The IFQRG also submits a report to the CPM each year summarizing their activities.

6.4 International Plant Health Conference – input on the presentation by TPPT member

[99] The TPPT provided input on the presentation that was later given by one of the TPPT members at the IPHC, introducing the work of the TPPT and promoting the need for IPPC members to develop and submit phytosanitary treatments for standards development.

7. Overview of the TPPT Work Programme

[100] The Secretariat provided an overview of the Standard setting process and introduced the summary of the TPPT work programme (see also *List of topics for IPPC standards*²⁷).

8. Recommendations to the SC

[101] The following summarizes the TPPT recommendations to the SC from this meeting.

[102] The TPPT invited the Standard Committee (SC) to:

- (12) *remove* the following phytosanitary treatments from the work programme:

²⁶ 22_TPPT_2019_Jun

²⁷ *List of topics for IPPC standards*: <https://www.ippc.int/en/core-activities/standards-setting/list-topics-ippc-standards/list>

- Irradiation treatment for all stages *Pseudaulacaspis pentagona* (2021-030) – noting that the submission has merit, but that the supporting information is not suitable
 - Irradiation treatment for *Lobesia botrana* eggs and larvae on all fresh commodities (2017-021) - as this pest is controlled with a less restrictive generic treatment that was adopted recently: PT 40: Irradiation treatment for Tortricidae on fruits
- (13) *note* that the TPPT assigned new treatment lead, Mr Guoping Zhan to the Irradiation treatment for all stages *Aspidiotis destructor* (2021-029).
- (14) *approve* the responses to the consultation comments and the following draft PT for second consultation:
- Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis*. (2017-029) – priority 2
- (15) *approve* the draft PT Irradiation treatment for Vapor heat treatment for *Planococcus lilacinus* (2021-028) for first consultation
- (16) *approve* that TPPT members can actively seek out appropriate treatments and submit them as topics for approval by the SC (either directly or through an NPPO).

9. Other Business

[103] There was no other business

10. Close of the Meeting

[104] The Secretariat thanked the TPPT for their work and asked to the members to provide feedback on the meeting process via an online survey.

[105] The Chairperson thanked the Secretariat for hosting the meeting and the TPPT members for the good discussion.

[106] The meeting was closed.

Appendix 1: Agenda

**2022 MEETING OF THE TECHNICAL PANEL ON
PHYTOSANITARY TREATMENTS**

11-16 September 2022

AGENDA

AGENDA ITEM	DOCUMENT NO.	PRESENTER
1. Opening of the meeting		KISS
<ul style="list-style-type: none"> - Opening remarks by the IPPC Secretariat <ul style="list-style-type: none"> o Mr Osama El-Lissy, IPPC Secretary o Mr Avetik Nersisyan, Standard Setting Unit Lead 		EL-LISSY NERSISYAN
2. Meeting Arrangements		
<ul style="list-style-type: none"> - Election of the Chairperson - Election of the Rapporteur - Adoption of the Agenda 	01_TPPT_2022_Sep	KISS CHAIRPERSON CHAIRPERSON
3. Administrative Matters		
<ul style="list-style-type: none"> - Documents List - Participants List - Local Information 	02_TPPT_2022_Sep 03_TPPT_2022_Sep https://www.ippc.int/en/publications/1034/	KISS KISS KISS
4. Draft phytosanitary treatments (PTs) in the work program²⁸	Link to Call for treatments page Link to all TPPT reports	KISS
<ul style="list-style-type: none"> - Overview of the standard setting procedure 		
4.1 Cold treatment for <i>Drosophila suzukii</i> on <i>Vitis vinifera</i> (2021-027) – priority 1		WILLINK
<ul style="list-style-type: none"> - Submission and references - Treatment lead summary - Additional information from the submitter - Draft PT 	Link to the submission 2021-027 08_TPPT_2022_Sep 07_TPPT_2022_Sep 2021-027	
4.2 Vapor heat treatment for <i>Planococcus lilacinus</i> <i>Selenicereus undatus</i> (2021-028) – priority 1		ORMSBY
<ul style="list-style-type: none"> - Submission and references - Additional information from the submitter - Treatment lead summary - Draft PT 	Link to the submission 2021-028 06_TPPT_2022_Sep 12_TPPT_2022_Sep 2021-028	

²⁸ Additional resources: IPPC procedure manual for standard setting: <https://www.ippc.int/en/core-activities/ippc-standard-setting-procedure-manual/>; IPPC style guide: <https://www.ippc.int/en/publications/81329/>; TPPT Specification TP3: <https://www.ippc.int/en/publications/1308/>

AGENDA ITEM		DOCUMENT NO.	PRESENTER
4.3	Irradiation treatment for <i>Aspidiotis destructor</i> (2021-029) – priority 1 <ul style="list-style-type: none"> - Submission - Draft PT 	Link to the submission 2021-029 2021-029	YU
4.4	Irradiation treatment for all stages <i>Pseudaulacaspis pentagona</i> (2021-030) – priority 1 <ul style="list-style-type: none"> - Submission - Additional information from the submitter - Treatment lead summary - Draft PT 	Link to the submission 2021-030 04_TPPT_2022_Sep 05_TPPT_2022_Sep 2021-030	DOHINO
4.5	Generic irradiation treatment against all insects except Lepidoptera larvae and pupae (2017-030) – priority 2 <ul style="list-style-type: none"> - Draft PT: 2017-030 - Treatment lead summary 	Link to the submission 2017-030 2017-030 XX_TPPT_2022_Sep	MYERS
4.6	Cold treatment for <i>Thaumatotibia leucotreta</i> on <i>Citrus</i> spp. (2017-029) – priority 2 <ul style="list-style-type: none"> - Draft PT: 2017-029 - Treatment lead summary - Compiled comments from the first consultation - Additional comments 	Link to the submission 2017-029 2017-029 15_TPPT_2022_Sep 14_TPPT_2022_Sep 13_TPPT_2022_Sep	LEACH
4.7	Heat treatment of wood using dielectric heating (2007-114) <ul style="list-style-type: none"> - Draft PT: 2007-114 - Evaluation of the objection - Implementation guide (draft) - Dielectric heating as a treatment for wood material (IPPC Fact sheet, 2018) 	2007-114 11_TPPT_2022_Sep 10_TPPT_2022_Sep Link to the factsheet	ORMSBY
5.	Updates from IPPC bodies <ul style="list-style-type: none"> - SC July2022 - CPM-16 (2022) 	SC July 2022 report CPM- 16 report	
5.1	Strategic discussion on the TPPTs work <ul style="list-style-type: none"> - Comments on the SSP for PTs at CPM - Feedback on TPPT work to the SC 	16_TPPT_2022_Sep	OPATOWSKI / KISS
6.	Liaison		
6.1	Phytosanitary Measures Research Group (PMRG) <ul style="list-style-type: none"> - PMRG Research Guidelines: Cold Treatments and Vapour heat treatments 	Link to PMRG page Link to PMRG update to the CPM	LEACH

	AGENDA ITEM	DOCUMENT NO.	PRESENTER
6.2	Ozone Secretariat (Vienna Convention and Montreal Protocol / United Nations Environment Programme (UNEP)) <ul style="list-style-type: none"> - Update from the Methyl Bromide Technical Options Committee - Invitation of TPPT members to join the MBTOC 	Link to Ozone Secretariat website Link to the Ozone Secretariat update to CPM	KISS
6.3	International Forestry Quarantine Research Group (IFQRG)	Link to IFQRG page Link to IFQRG update to the CPM	ORMSBY
6.4	International Plant Health Conference – input on the presentation by TPPT member	09_TPPT_2022_Sep	ORMSBY/ MYERS
7.	Overview of the TPPT work programme <ul style="list-style-type: none"> - TPPT 2022-2023 work plan 	Link to List of topics for IPPC standards	KISS
8.	Recommendations to the SC		CHAIRPERSON
9.	Other business		CHAIRPERSON
10.	Close of the meeting		CHAIRPERSON
	<ul style="list-style-type: none"> - Evaluation of the meeting process - Close 		KISS / CHAIRPERSON

Appendix 2: Documents list**MEETING OF THE TECHNICAL PANEL ON PHYTOSANITARY TREATMENTS****12-19 September 2022****Rome, Italy****DOCUMENTS LIST***(Updated 2022-09-09)*

DOCUMENT NO.	AGE NDA ITEM	DOCUMENT TITLE	DATE POSTED / DISTRIBUTED
Draft PTs			
2021-027	4.1	Cold treatment for <i>Drosophila suzukii</i> on <i>Vitis vinifera</i> (2021-027) – priority 1	2022-09-02
2021-028	4.2	Vapor heat treatment for <i>Planococcus lilacinus</i> <i>Selenicereus undatus</i> (2021-028) – priority 1	2022-09-07
2021-029	4.3	Irradiation treatment for <i>Aspidiotis destructor</i> (2021-029) – priority 1	2022-09-09
2021-030	4.4	Irradiation treatment for all stages <i>Pseudaulacaspis pentagona</i> (2021-030) – priority 1	2022-09-02
2017-029	4.6	Cold treatment for <i>Thaumatotibia leucotreta</i> on <i>Citrus</i> spp. (2017-029) – priority 2	2022-09-02
2007-114	4.7	Heat treatment of wood using dielectric heating (2007-114)	2022-09-05
Other Documents			
01_TPPT_2022_Sep	02	Provisional agenda	02 Sep 2022 09 Sep 2022
02_TPPT_2022_Sep	03	Document List	09 Sep 2022
03_TPPT_2022_Sep	03	Participants list	02 Sep 2022
04_TPPT_2022_Sep	4.4	Additional information from submitter: 2021-030	02 Sep 2022
05_TPPT_2022_Sep	4.4	Treatment Lead summary: 2021-030	02 Sep 2022
06_TPPT_2022_Sep	4.2	Additional information from the submitter: 2021-028	02 Sep 2022
07_TPPT_2022_Sep	4.1	Additional information from the submitter: 2021-027	02 Sep 2022
08_TPPT_2022_Sep	4.1	Treatment Lead summary: 2021-027	02 Sep 2022
09_TPPT_2022_Sep	6.4	Presentation for the IPHC	02 Sep 2022
10_TPPT_2022_Sep	4.7	Implementation guide (draft)	02 Sep 2022
11_TPPT_2022_Sep	4.7	Responses to the Objection	07 Sep 2022
12_TPPT_2022_Sep	4.2	Treatment lead summary: 2021-028	07 Sep 2022

DOCUMENT NO.	AGE NDA ITEM	DOCUMENT TITLE	DATE POSTED / DISTRIBUTED
13_TPPT_2022_Sep	4.6	Additional comments: 2017-029	09 Sep 2022
14_TPPT_2022_Sep	4.6	Compiled comments from the first consultation: 2017-029	09 Sep 2022
15_TPPT_2022_Sep	4.6	Treatment lead summary: 2017-029	09 Sep 2022
16_TPPT_2022_Sep	5.1	Strategic discussion on TPPT work	09 Sep 2022

IPP LINKS:	Agenda item
Local information document	3
Link to Call for treatments page	4
TPPT meeting reports	4
Link to the submission 2021-027	4.1
Link to the submission 2021-028	4.2
Link to the submission 2021-029	4.3
Link to the submission 2021-030	4.4
Link to the submission 2017-030	4.5
Link to the submission 2017-029	4.6
Link to the factsheet	4.7
Link to PMRG page	6.1
Link to PMRG update to the CPM	6.1
Link to Ozone Secretariat website	6.2
Link to the Ozone Secretariat update to CPM	6.2
Link to IFQRG page	6.3
Link to IFQRG update to the CPM	6.3
Link to List of topics for IPPC standards	7

Appendix 3: Participants list**2022 MEETING FOR THE TECHNICAL PANEL ON
PHYTOSANITARY TREATMENTS****Rome, Italy****PARTICIPANTS LIST**

Participant role & Expertise	Name, mailing, address, telephone	Email address	Term ends
Steward	Mr David OPATOWSKI Head, Plant Biosecurity, Plant Protection and Inspection Services (PPIS), P.O.Box 78, Bet Dagan, 50250 ISRAEL Tel: 972-(0)3-9681518 Mob.: 972-(0)506-241885	dopatowski@yahoo.com ; davido@moag.gov.il ;	
Member	Mr Michael ORMSBY Manager– Plants & Pathways Biosecurity Science & Risk Analysis Ministry for Primary Industries P.O Box 2526, Wellington, 6011 NEW ZEALAND Tel: +64 4 894 0486	michael.ormsby@mpi.govt.nz ;	2025
Member	Mr Eduardo WILLINK Estación Experimental Agroindustrial Obispo Colombres, P.O.Box 9, Las Talitas (4101) Tucumán ARGENTINA Tel: +54 381-4521010 +54-381 154692512	ewillink@arnet.com.ar ; eduwillink@gmail.com	2025
Member	Mr Scott MYERS USDA APHIS 1398 W Truck Rd., Buzzards Bay, MA, USA Tel: 508-563-0959	scott.w.myers@aphis.usda.gov ;	2023
Member	Mr Daojian YU Shenzhen Customs District, P. R. China, GACC 1011, Fuqiang Road, Shenzhen, 518045, Guangdong, CHINA Tel: +86-755-82117990	yudj_2002@aliyun.com	2024

Participant role & Expertise	Name, mailing, address, telephone	Email address	Term ends
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Member	<p>Mr Walther ENKERLIN HOEFLICH Entomologist Insect Pest Control Section Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture International Atomic Energy Agency Vienna International Centre, PO Box 100, 1400 Vienna AUSTRIA Tel: +43 1 2600 26062</p>	W.R.Enkerlin@iaea.org ;	2024
Member	<p>Mr Peter Llewellyn LEACH Senior Principle Entomologist and Market Access Focus Team Leader, Agri-Science Queensland, Department of Agriculture Fisheries (DAF) 21 Redden St. Portsmith, Queensland 4870 AUSTRALIA Tel: +61 408077752</p>	peter.leach@daf.qld.gov.au	2024
Member	<p>Ms Meghan NOSEWORTHY Research Manager – Entomology and Phytosanitary Research Canada/ Natural Resources Canada – Canadian Forest Service Address: 506 West Burnside Road, Victoria, BC, V8Z 1M5 CANADA Telephone number: 250 298 2354</p>	Meghan.noseworthy@nrca-nrcan.gc.ca ;	2027
Member	<p>Mr Guoping ZHAN Professor Chinese Academy of Inspection and Quarantine (CAIQ), P. R. China Address: No. A3, Gaobeidian Bei Lu, Chaoyang District, Beijing, 100123, CHINA Telephone number: +86 136 1119 2153</p>	zhangp@caiq.org.cn ; zhgp136@126.com ;	2027

Participant role & Expertise	Name, mailing, address, telephone	Email address	Term ends
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Invited Expert	Mr Guy HALLMAN Research Entomologist	N5551212@yahoo.com ;	
IPPC Secretariat Lead	Ms Janka KISS International Plant Protection Convention Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla 00153 Rome ITALY Tel: +39 06 570 52454	janka.kiss@fao.org	