Food and Agriculture Organization of the United Nations

International Plant Protection Convention

REPORT

Technical Panel on Phytosanitary Treatments

Virtual meeting
20 February 2019

IPPC Secretariat

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CONTENTS

1. Opening of the Meeting

1.1. Welcome by the IPPC Secretariat and introductions

[1] The International Plant Protection Convention (IPPC) Secretariat (hereafter referred to as "Secretariat") support for Technical Panel on Phytosanitary Treatments (TPPT) chaired the meeting and welcomed the following participants:

1. Mr David OPATOWSKI (TPPT Steward)
2. Mr Toshiyuki DOHINO (Japan)
3. Mr Peter Llewellyn LEACH (Australia)
4. Mr Scott MYERS (USA)
5. Mr Michael ORMSBY (New Zealand)
6. Mr Matthew SMYTH (Australia)
7. Mr Eduardo WILLINK (Argentina)
8. Mr Daojian YU (China)
9. Mr Guy HALLMAN (Invited expert)
10. Ms Adriana G. MOREIRA (IPPC Secretariat, lead)
11. Ms Janka KISS (IPPC Secretariat, support)

[2] The full list of TPPT members and their contact details can be found on the International Phytosanitary Portal (IPP)[1].

[3] Mr Peter LEACH, the new TPPT member was welcomed by the TPPT and the Secretariat.

1.2. Adoption of the agenda and election of the rapporteur

[4] The Secretariat introduced the agenda and it was adopted as presented in Appendix 1 to this report.

[5] Mr Peter LEACH was elected as the Rapporteur.

2. TPPT work programme

2.1. Cold treatment of *Ceratitis capitata* on *Vitis vinifera* (2017-023A)

[6] At their virtual meeting in December 2018, the TPPT discussed whether to include the schedule of 1°C for 14 days into the PT based on the reference De Lima *et al.* (2017)[2] and decided to request the author to supply additional data on how the number of treated insects were calculated and corrected resulting in the estimated number of 398,622 treated immature stages with no survivors.

[7] Mr Toshyuki DOHINO, the Treatment Lead introduced the discussion paper[3] containing the new information and his evaluation. He explained that the new data does not fully correspond with the calculation reported in De Lima *et al.* (2017) and the infestation rate per berry in the control (which is calculated by the number of berry divided by the number of survivors (=pupae)) is more than double compared to the information provided for the other similar cold treatments previously. He also informed the TPPT that the PT is updated to include the reference to the study of De Lima *et al.* (2017).

[8] The TPPT discussed the provided information and agreed that the reason for the high level of pupae in the control fruit should be further clarified before including the schedule of 1°C for 14 days into the PT.

[1] TPPT membership list: https://www.ippc.int/en/publications/81655/

[2] **De Lima C.P.F., Mansfield E.R., Poogoda S.R.** 2017. International market access for Australian table grapes through cold treatment of fruit flies with a review of methods, models and data for fresh fruit disinfestation. *Australian Journal of Grape and Wine Research* 23: 306-317.

[3] 08_TPPT_2019_Feb

[9] As there is no data available that would sufficiently support a schedule of 1°C for 14 days the TPPT decided to keep the schedules of the original submission as they are well supported by the studies supplied along with the submisison and recommend the PT for consultation.

[10] If a contracting party requests, and sufficient data is supplied, the 1°C for 14 days schedule could still be included in the PT.

[11] The TPPT

(1) *recommended* to the Standards Committee (SC) that the "Cold treatment of *Ceratitis capitata* on *Vitis vinifera* (2017-023A)" be submitted for consultation.

2.2. Irradiation treatment for *Drosophila suzukii* (2017-017)

[12] The TPPT finalized this PT at their 2018 June meeting[4], but requested further information to finalize the efficacy of the treatment.

[13] Mr Matthew SMYTH, the Treatment Lead of the draft PT Irradiation treatment for *Drosophila suzukii* (2017-017) introduced the the draft PT[5] and the Treatment Leads summary[6] containing the new information provided by the submitter on how treated insect numbers were estimated.

[14] According to information provided by the submitter, the treated insect numbers reported in Follett *et al*. (2014)[7] were based on absolute counts of the control population replicates and scaled up to estimate pupae numbers in the large scale trials. Noting comments by the panel that the total treated insects estimate should be based on a statistical analysis of the controls, the submitter has also provided a corrected lower estimate using the ratio of the lowest replicate count relative to the overall replicate mean – resulting in a corrected treated population estimate of 21,506.

[15] **Limited information**. The submitter was able to provide the raw data for cherries but not for grapes. The provided information was evaluated by two methods with consistent results.

[16] One member was concerned that the calculation was based only on subset of data. He also highlighted that there may be significant variation in the number of insects developing in the controls in the experiments conducted at different times (e.g. different periods of the year) and that it might be insufficient to estimate the treated numbers based on a control that were not kept under the same conditions as the treated lot.

[17] As the full dataset is only available on the study conducted with cherries the TPPT agreed to calculate the number of treated insects and consequently the efficacy based on this study – about 15 000 insects reported in the study of Follett *et al.* (2014).

[18] **Efficacy level.** One member suggested that phytosanitary treatments for *D. suzukii* should have similar levels of efficacy then the ones for fruit flies, as similar (high) pest pressure can be anticipated.

[19] **Modified atmosphere restriction**. The submitter requested that further consideration be given to the removal of restrictions to apply the irradiation treatment to commodities stored under modified atmospheric conditions. In support, additional research on the use of modified atmosphere treatments for *D. suzukii* in sweet cherries has been undertaken and provided by the submitter for discussion by the

[4] 2018-06 TPPT Meeting Report: https://www.ippc.int/en/publications/86619/

[5] 2017-017

[6] 05_TPPT_2019_Feb

[7] **Follett, PA., Swedman, A, Price, KD.** 2014. Postharvest irradiation treatment for quarantine control of *Drosphila suzukii* (Diptera: Drosophilidae) in fresh commodities. Journal of Economic Entomology. 107(3): 964-969.

panel (Follett *et al*. 2018)[8]. Some additional supporting papers by Follett *et al*. (2013)[9] and Srimartpirom *et al*. (2018)[10] have also been provided for review.

[20] The TPPT decided to postpone the decision on the sufficiency of the supporting data and the issue of the modified atmosphere restriction at their next meeting to allow time for a thorough evaluation.

2.3. Irradiation treatment for *Frankliniella occidentalis* on all fresh commodities (2017-019)

[21] This treatment was evaluated by TPPT at their virtual meeting in March 2018[11]. The proposed treatment schedule is a minimum absorbed dose of 250 Gy to prevent reproduction in adults of *Frankliniella occidentalis*. The schedule was supported by some unpublished data submitted along with the treatment, but the details of the experiment were not described in it. The tests on which the schedule is based were conducted in Hawaii (dose–response test, large-scale test with adults of *F. occidentalis*) and in Australia (large-scale tests with mixed-age *F. occidentalis* or adults). Further information was requested from the submitter.

[22] The Treatment Lead for the draft PT, Mr Toshiyuki DOHINO, introduced the Treatment Leads summary[12] containing new information provided by the submitter (target regulated article, efficacy of the treatment, investigation period after treatment and unpublished data) and the draft PT[13].

[23] **Target regulated article**. The submitter confirmed in response to the TPPTs query, that the treatment would be equally effective against *F. occidentalis* on floriculture crops – the title of the PT was adjusted accordingly and the scope of the treatment implies that it is applicable to all fresh commodities such as fruits, vegetables and cut flowers.

[24] **Unpublished data and low confidence level**. The submitter supplied the paper of Nicholas and Follett (2018)[14] that was published since the submission and was based on the same data. However the issue of the low level of efficacy is not addressed. The low numbers of tested insects (large-scale test with 3,800 immatures and 5,050 adults, totaled across laboratories in Hawaii and Australia) is reflected in the low efficacy value, as there is 95% confidence that the treatment according to this schedule prevents the reproduction of not less than 99.9407% of adults of *F. occidentalis*.

[25] **Dose.** In one of the studies the highest measured dose was reported as 279 Gy, thus the minimum absorbed dose of 250 Gy proposed by the submitter is replaced in the treatment schedule by the 279 Gy.

[26] **Investigation period after treatment**. Nicholas and Follett (2018) cut off their experiments after 3 weeks, because adults had stopped reproducing at this time. In the study of Nicholas *et al*. (2018)[15] the number of *F. occidentalis* larvae and adults 2, 4 and 6 weeks after irradiation were investigated.

[8] **Follett PA, Swedman A, Mackey B** 2018. Effect of low-oxygen conditions created by Modified Atmosphere Packaging on radiation tolerance in Drosophila suzukii (Diptera: Drosphilidae) in sweet cherries. Journal of Economic Entomology. 111(1): 141-145.

[9] **Follett PA, Wall M, Bailey W** (2013). Influence of Modified Atmosphere Packaging on radiation tolerance in the phytosanitary pest Melon fly (Diptera: Tephritidae). Journal of Economic Entomology. 106(5): 2020-2026.

[10] **Srimartpirom M, Burikam I, Lihohpasmanee W, Kongratarporn T, Thannarin T, Bunsiri A, Follett PA** 2018. Low-dose irradiation with Modified Atmosphere Packaging for mango against the Oriental fruit fly (Diptera: Tephritidae). Journal of Economic Entomology. 111(1): 135-140.

[11] 2018-03 TPPT Meeting report: https://www.ippc.int/en/publications/85772/

[12] 03_TPPT_2019_Feb

[13] 2017-019

[14] **Nicholas, A.H. & Follett, P.** 2018. Postharvest irradiation treatment for quarantine control of Western flower trips (Thysanoptera: Thripidae). *Journal of Economic Entomology*, 111: 1185−1189.

[15] **Nicholas, A., Lidbetter, F., Eagleton, F., Spohr, L., Harris, A., and Barchia, I.,** 2018. Effects of gamma radiation on the survival of four species of thrips (Thysanoptera: Thripidae) *Austral Entomology.*

Deligeorgidis *et al*. (2006)[16] reported that at 25°C, females took 2.41 days before they became fertile. Females were able to lay eggs for 30.01 days, and were not fertile for the last 3.33 days of their life. In total, the average adult life span was 35.75 days.

[27] The TPPT considered the submitted information and were concerned about the low level of efficacy. They recognized that there are few studies available on the irradiation of thrips, and the TPPT members confirmed that they don't know of any additional research in progress either.

[28] Recognising the importance to have a PT for this pest, the TPPT suggested that the PMRG discuss at their upcoming meeting in September if there are any possibility of conducting further research on of *F. occidentalis*. The TPPT will reconsider the PT after the PMRG meeting.

2.4. Irradiation treatment for *Hypothenemus hampei* (2018-041)

[29] A similar treatment (Irradiation treatment for *Hypothenemus hampei* on coffee berries (2017-020) was submitted and considered by the TPPT at their virtual meeting in March 2018[17]. The TPPT acknowledged the usefulness of the treatment, but did not recommend it for the work programme. The TPPT strongly encouraged the submitter to resubmit this treatment at a later stage once the test results are published, more results are obtained at other irradiation doses, the tests to determine the most resistant life stage are conducted, and information on dosimetry is provided. The resubmitted treatment is presented to the TPPT.

[30] The Lead for the submission, Mr Eduardo WILLINK, introduced the Checklist for evaluating treatment submissions and Prioritization score sheet[18] for the Irradiation treatment for *Hypothenemus hampei* (2018-041).

[31] The proposed treatment schedule is a minimum absorbed dose of 100 gy to prevent the development of adults of *Hypothenemus hampei*. The schedule is supported by the study of Follet (2018)[19]. There is 48% confidence that the treatment according to this schedule prevents emergence in not less than 99.99% of adults of *Hypothenemus hampei*. This was calculated from 6598 treated adults which laid a total of 39 eggs, none of which hatched (100% sterility).

[32] The Treatment Lead noted that not all concerns of the TPPT were addressed in the new submission. Even though the test results are now published in the paper of Follet (2018), there are no studies done at other irradiation doses, the most resistant life stage is not determined, and information on dosimetry is not provided.

[33] **Low efficacy**. The confidence level reported in the submission is quite low, and the data available to support the proposed treatment is very limited.

[34] **Most tolerant life stage**. The trials were conducted using adult specimens, and the most tolerant life stage of the pest was not determined.

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[16] **Deligeorgidis, P.N., Giakalis, L., Sidiropoulos, G., Vaiopoulou, M., Kaltsoudas, G. & Ipsilandis, C.G.** (2006) Longevity and reproduction of *Frankliniella occidentalis* and *Thrips tabaci* on cucumber under controlled conditions. Journal of Entomology. 3(1): 61-69.

[17] 2018-03 TPPT Meeting report: https://www.ippc.int/en/publications/85772/

[18] 06_TPPT_2019_Feb

[19] **Follett, P. A**. 2018. Irradiation for quarantine control of coffee berry borer, Hypothenemus hampei (Coleoptera: Curculionidae: Scolytinae) in coffee and a proposed generic dose for snout beetles (Coleoptera: Curculionoidea). Journal of Economic Entomology (advance access) doi: 10.1093/jee/toy123.

Wall, M. M. 2005. Storage quality and composition of sweetpotato roots after quarantine treatment using low doses of x-ray irradiation. HortScience 40: 424-427.

Barkai-Golan, R. and P. A Follett. 2017. Irradiation for Quality Improvement, Microbial Safety and Phytosanitation of Fresh Produce. Academic Press, Elsevier: Amsterdam.Unpublished data

[35] **Investigation period after treatment.** According to the submission, after the treatment a "fresh diet" was fed to the adult *Hypothenemus hampei* but no further information is provided on what the diet was. There is concern whether three weeks would be enough to see if the treated adults reproduce.

[36] **Control population**. The control population did not seem to reproduce well either. *Hypothenemus hampei* female adults can lay between 20 and 40 eggs and obtain a similar number of adults, and in the supporting information, 1,033 control adults laid only 327 eggs that produced 58 pupae.

[37] The TPPT discussed the submission and decided to not to recommend this submission for the work program for the above reasons.

[38] The TPPT:

(2) *recommended* to the Standards Committee (SC) that the "Irradiation treatment for *Hypothenemus hampei* (2018-041)" not be included in the *List of topics for IPPC standards* (i.e. not be included in the TPPT work programme) due to the insufficient supporting information.

3. Other Business

Expertise needed for the TPPT (additional member).

[39] The Steward of the TPPT explained that during the review of the candidates for new TPPT members, some SC members suggested to that the TPPT provide suggestions on what specific expertise is lacking, and would be most beneficial. One SC member proposed to request the TPPT to also consider their terms of reference (Specification TP 3[20]).

[40] The TPPT members discussed the issue shortly. They felt that new members should have detailed expertise in treatment development. Experience in treatment evaluation for regulatory purposes is also considered valuable.

[41] The TPPT members agreed to provide further suggestions via email to the TPPT Steward.

Technical queries from first consultation on the draft ISPM on the Requirements for the use of modified atmosphere treatments as phytosanitary measures (2014-006).

[42] The ISPM on the Requirements for the use of modified atmosphere treatments as phytosanitary measures (2014-006) completed first consultation in 2018. Some of the consultation comments were technical, the Steward of the ISPM requested the Assistant Steward's input.

[43] Assistant Steward introduced the technical questions of the Steward and his proposed responses[21]. He highlighted one remaining concern: to better explain how pressure and moisture content is important in modified atmosphere treatments.

[44] It was discussed that pressure is an important consideration in modified atmosphere treatments only when positive pressures are needed to maintain modified atmosphere conditions (e.g. to push out oxygen). The ISPM on modified atmosphere treatments do not cover vacuum or reduced pressure treatments, so it's not a parameter of the treatment that directly impacts efficacy. It was considered that humidity may influence insect respiration.

[45] The TPPT discussed the issue and agreed to elaborate further the significance of these factors in the draft ISPM, and specify that these parameters are not essential to monitor, but "may" be considered.

[46] The Assistant Steward of the ISPM will provide responses to comments and text proposals to the Steward of the ISPM based on the TPPT input.

[20] Specification TP3: https://www.ippc.int/en/publications/1308/
[21] 07_TPPT_2019_Feb

4. Close of the Meeting

[47] The Secretariat thanked the TPPT members for their participation and closed the meeting.

Appendix 1: Agenda

2019 FEBRUARY VIRTUAL MEETING OF THE TECHNICAL PANEL ON PHYTOSANITARY TREATMENTS (TPPT)

AGENDA

	AGENDA ITEM	DOCUMENT NO.	PRESENTER
1.	Opening of the meeting		
1.1	Welcome by the IPPC Secretariat and introductions ❖ New TPPT member	02_TPPT_2019_Feb	MOREIRA KISS / ALL
1.2	Adoption of the agenda and election of the rapporteur	01_TPPT_2019_Feb	KISS / ALL
2.	TPPT work programme		
2.1	Cold treatment of *Ceratitis capitata* on *Vitis vinifera* (2017-023A) ❖ Draft PT ❖ Discussion paper ❖ Reference: De Lima *et al.* (2017)	Link to submission 2017-023A Link to the TPPT e-forum 2017-023A 08_TPPT_2019_Feb	DOHINO/ SMYTH
2.2	Irradiation treatment for *Drosophila suzukii* (2017-017) ❖ Draft PT: 2017-017 ❖ Treatment Leads notes ❖ MA and efficacy of irradiation: Follett *et al.* (2018)	Link to submission 2017-017 2018-06 TPPT meeting report 2017-017 05_TPPT_2019_Feb 04_TPPT_2019_Feb	SMYTH
2.3	Irradiation treatment for *Frankliniella occidentalis* on all fresh commodities (2017-019) ❖ Draft PT: 2017-019 ❖ Treatment Lead's notes ❖ New reference: Nichols *et al*. (2018)	Link to submission 2017-019 Link to 2018-03 TPPT meeting report 2017-019 03_TPPT_2019_Feb	DOHINO
2.4	Irradiation treatment for *Hypothenemus hampei* (2018-041) ❖ Checklist for evaluating treatment submissions and Prioritization score sheet	Link to submission 2018-041 06_TPPT_2019_Feb	WILLINK
3.	Other business		
	❖ Expertise needed for the TPPT (additional member)	Link to Specification TP3 Link to TPPT membership list (incl. expertise of members)	OPATOWSKI/ MOREIRA

	AGENDA ITEM	DOCUMENT NO.	PRESENTER
	❖ Technical queries from first consultation on the draft ISPM on the Requirements for the use of modified atmosphere treatments as phytosanitary measures (2014-006)	Link to the compiled comments from consultation Link to the draft ISPM 07_TPPT_2019_Feb	MYERS
4.	Close of the meeting	-	KISS