2021 SECOND CONSULTATION

1 July – 30 September 2021

Compiled comments for Draft PT: Irradiation treatment for *Zeugodacus tau* (2017-025) with Treatment lead's response

Summary

Name	**Summary**
EPPO Σ	Comments from the EPPO countries
European Union	The comments on this draft standard have been entered into the OCS by the European Commission on behalf of the EU and its member States.
Singapore	Singapore is supportive of this draft.
South Africa	The NPPOZA is in agreement with this draft and has no further comments
Venezuela	sin observacion

T (Type) - B = Bullet, C = Comment, P = Proposed Change, R = Rating

FAO sequential number	Para	Text	T	Comment	SC response
1	G	(General Comment)	C	**Guyana** Guyana has no objection at this time. *Category : SUBSTANTIVE*	Noted
2	G	(General Comment)	C	**Costa Rica** No comment *Category : SUBSTANTIVE*	Noted
3	G	(General Comment)	C	**Nepal** Nepal has no comments on Draft ANNEX TO ISPM◦28: Irradiation treatment for Zeugodacus tau *Category : TECHNICAL*	Noted
4	G	(General Comment)	C	**Mexico** I support the document as it is and I have no comments *Category : SUBSTANTIVE*	Noted
5	G	(General Comment)	C	**Canada** Canada supports the draft Annex to ISPM 28 *Category : SUBSTANTIVE*	Noted
6	G	(General Comment)	C	**European Union** The comments by the EU and its Member States are provided without prejudice to the European Union food safety legislation imposing limitations on the acceptance of irradiated goods. *Category : SUBSTANTIVE*	Noted
7	G	(General Comment)	C	**Malawi** We support the draft Annex to ISPM 28:Irradiation trt for Zeugodacus tau(2017-025) *Category : SUBSTANTIVE*	Noted

8	G	(General Comment)	C	**Barbados** Barbados agrees with the proposal. *Category : SUBSTANTIVE*	Noted
9	G	(General Comment)	C	**United States of America** 1. The paper by Zhan et al. 2015 often lacked details in methodology that were important to understanding the study and verifying the results. • There is no mention of whether the life stages of the test insects were verified prior to irradiation for the dose-response studies. The authors indicated that the life history studies performed by Singh et al. 2010 were used to estimate the time period in which the insects were in each particular life stage. They used the same host and rearing conditions. It is unknown whether they performed tests to see whether the development rates were true for their unique colony as well. • It is unclear whether there is any time differentiation for the replicates in the dose response studies. It was mentioned that there were three cups tested for each dose/life stage but it appears that they were all irradiated at the same time. • There is no mention of dose mapping exercises used to determine the Dmax and Dmin for the configurations used in the irradiations for the dose response and the confirmatory tests. Were the dosimeters placed in the min/max areas for these tests? If dosimeters were not placed at the area of maximum dose during the confirmatory trials, it is possible that the recommended dose should be increased above 85 Gy to account for the fact that the maximum dose was not determined? The raw dosimetry data, including the spatial arrangement of each data point, would allow for a more thorough review of the treatment application. • In the methods section, the researchers report that they calculated the uncertainty of the dosimetry system, so it would have been good to include this information in the results. 2. We are concerned with the diversity of the colony of Z. tau used in the experiments. It was based on 2 collections from one pumpkin field at one geographic location. We feel that experimental colonies are more robust when they include insects from a wide range of geographical regions. This will result in a colony that is more diverse genetically and more representative of a wider range of tolerances and adaptations. 3. The doses of 72 Gy and 85 Gy are rather low compared to other Bactrocera spp. Follett et al. 2011 states that Bactrocera (>100 Gy) seem to be more	Considered but not incorporated. **1.** The TPPT did request additional information from the applicant who did provide more information on life history studies, dose mapping and the timing of experiments. The authors stated that the development rates of larval stages in these trials were similar to that of Singh et al. 2010 ~~except that third instars were treated at 7 days rather than 8 days.~~ The applicant did not undertake examinations of each life stage but did provide pictorial evidence that shows late third instars were present when the samples were irradiated 8 days after being infested. The authors have confirmed that the cups used in the dose response trials were all treated at the same time in the same chamber. While this is not standard practice the results obtained concluded correctly that the most tolerant life stage was third instars which is the lifestage used in the confirmatory trials. It is generally accepted that the 3rd instar is the most radiotolerant life stage of fruit flies (excluding puparia and adults) (Hallman *et al.* 2010). Dose mapping is important and provides information that researchers can use to calculate a treatment time that will be very close or slightly lower than the target dose depending on the distance from the source and the height that treatment fruit are placed. The irradiator at the National Institute of Metrology Research in Beijing undertakes dose mapping at different distances and heights from the source every six months. Dose mapping records provided by the applicant show that the dose rates at ten locations 100 cm from the source ranged from 5.0 Gy/min to 6.3 Gy/min. Providing a dose uniformity ration of 1.26. For the large-scale confirmatory trials conducted using gamma sources it is simply not possible to place all the fruit in the location

				radiotolerant than other genera (Anastrepha, Ceratitis, and Rhagoletis- 50-100 Gy) • Bactrocera dorsalis 116 Gy (Zhao et al. 2017) • Bactrocera dorsalis 125 Gy (Follett & Armstrong 2004) • Bactrocera dorsalis 150 Gy (USDA APHIS Treatment Manual) • Bactrocera tryoni 100 Gy (USDA APHIS Treatment Manual) • Bactrocera tryoni 100 Gy (ISPM 28 Annex 5) • Bactrocera cucurbitae 150 Gy (USDA APHIS Treatment Manual) • Bactrocera cucurbitae 150 Gy (Follett & Armstrong 2004) • Bactrocera jarvisi 100 Gy (USDA APHIS Treatment Manual) • Bactrocera jarvisi 100 Gy (ISPM 28 Annex 4) • Bactrocera latifrons 150 Gy (Follet et al. 2011) *Category : SUBSTANTIVE*	receiving the maximum dose, nor is it necessary. The absorbed dose in the trial fruit was measured and the maximum dose measured is the minimum dose that can be recommend in the treatment schedule. In trial 2 the Dmin was 65.3 Gy and the Dmax was 85Gy with a dose uniformity ratio of 1.3. The fact that no adult emergence was recorded at doses as low as 65.3 Gy provides confidence that the recommended treatment schedule of 85 Gy is robust. 2. There are currently no prescriptive guidelines for the establishment of fruit fly colonies. General agreement is that colonies are more robust when they include insects from a wide range of geographical regions. But the TPPT is unaware of any scientific publications that clearly identifies that the size of the founding population or the number of locations flies are collected from prevents/reduces the impact of maintaining flies in laboratory cultures and if this does influence the radiotolerance of the flies. In the first reference provided below (Follet *et al*. 2011) the comparison of the tolerance of wild and laboratory strains of fruit fly was made using collections from 1 farm. This refence has been used to justify the use of laboratory reared flies in phytosanitary irradiation research in the United States and Internationally. 3. The TPPT concurs with the comment *Bactrocera* seems to be more tolerant than other genera. The aim of this current research was to determine the lowest dose that would control *Z. tau*. Many historical irradiation studies have not tried to determine the lowest doses that will control a pest but have aimed to demonstrate that generic treatments (e.g. 150 Gy) will control a particular pest species. A good example is the three references for *B. dorsalis* in the comments section with three different recommended doses.
10	G	(General Comment)	C	**Thailand** Thailand has no objection on the Draft PT: Irradiation treatment for Zeugodacus tau. *Category : SUBSTANTIVE*	Noted

11	G	(General Comment)	C	**New Zealand** General comment about a species treatments. Zeugodacus tau and Zeugodacus cucurbitae can share the same hosts and similar geographical locations. If live larvae was found and the it turned out to be the latter species would the treatment be acceptable? Larvae would need to be sequenced to determine whether it is Z. tau or something else. There is a case for batching species from a similar host and geographical area with a generic treatment rate. **New Zealand** implementation issue *Category : SUBSTANTIVE*	Noted As part of a pest risk analysis, NPPO's will determine the dose required to control each particular pest and then apply the minimum dose required to control the most tolerant pest species. If efficacy data is not available for all Tephritid pest species, then then the generic dose of 150 Gy would be recommended (Annex 7 to ISPM 28).
Draft ANNEX TO ISPM 28: Irradiation treatment for Zeugodacus tau (2017-025)					
12	1	**DRAFT ANNEX TO ISPM 28: Irradiation treatment for *Zeugodacus tau* (2017-025)**	C	**Viet Nam** VN agrees with this draft annex to ISPM 28 *Category : SUBSTANTIVE*	Noted
13	1	**DRAFT ANNEX TO ISPM 28: IRRADIATION TREATMENT FOR *ZEUGODACUS TAU* (2017-025)**	C	**Uruguay** We agree with the document as it is, no comments *Category : TECHNICAL*	Noted
14	11	2017-06 Treatment submitted in response to 2017-02 call for treatments (*Irradiation treatment for* Bactrocera tau).	C	**Kenya** keep the name as Zeugodacus tau *Category : TECHNICAL*	Considered but not incorporated. The original title of the submission is referenced here.
15	14	2018-05 SC added the topic *Irradiation treatment for* Bactrocera tau (2017-025) to the TPPT work programme with priority 3.	C	**Kenya** keep the name as Zeugodacus tau *Category : TECHNICAL*	Considered but not incorporated (refer to response to comment 14)
16	24	2017-07 ~~SC~~ Andrew PARKER (IAEA)	P	**European Union** Typo. *Category : EDITORIAL*	Incorporated
17	24	2017-07 ~~SC~~ Andrew PARKER (IAEA)	P	**EPPO** Typo. *Category : EDITORIAL*	Incorporated
18	30	This treatment describes the irradiation of fruits and vegetables at 72Gy or 85Gy minimum absorbed dose to prevent the emergence of adults of *Zeugodacus tau*[1] at the stated efficacy.[2]	P	**Japan** In all adopted irradiation treatment schedules as annexes to ISPM28, "minimum absorbed dose" is described in the "Scope of the treatment" section. Need to be consistent with other annexes. *Category : EDITORIAL*	Incorporated
19	31	Species names is in accordance with Doorenweerd *et al.* (2018), following the elevation of the subgenus *Bactrocera (Zeugodacus)* to genus level (Virgilio ~~et al.~~ *et al.*, 2015).	P	**European Union** Typos (missing italics and comma). *Category : EDITORIAL*	Noted. The PT will be reviewed by the IPPC scientific editor

20	31	Species names is in accordance with Doorenweerd *et al.* (2018), following the elevation of the subgenus *Bactrocera (Zeugodacus)* to genus level (Virgilio ~~et al.~~ *et al.*, 2015).	P	**EPPO** Typos (missing italics and comma). *Category : EDITORIAL*	Noted. The PT will be reviewed by the IPPC scientific editor
Treatment schedules					
21	44	This treatment should be applied in accordance with the requirements of ISPM 18 (*Guidelines for the use of irradiation as a phytosanitary measure*).This treatment should not be applied to fruit stored in a modified atmosphere because the modified atmosphere may affect the treatment efficacy.	P	**Australia** Additional text to be included to ensure modified atmosphere is not included within treatment schedule and make the text consistent with the other irradiation treatment for consultation - Irradiation treatment for Tortricidae on fruits (2017-011) *Category : SUBSTANTIVE*	Considered but not incorporated. The CPM-15 (2021) agreed to remove the restriction to use modified atmosphere before irradiation of Tephritide fruit flies.
22	44	This treatment should be applied in accordance with the requirements of ISPM 18 (*Guidelines for the use of irradiation as a phytosanitary measure*).This treatment should not be applied to fruits and vegetables stored in a modified atmosphere because the modified atmosphere may affect the treatment efficacy	P	**China** Hypoxia is known to abate the effects of radiation on organisms because less oxidative radicals are produced. *Category : SUBSTANTIVE*	Considered but not incorporated. (see response to comment 21).
Other relevant information					
23	46	Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Zeugodacus tau* (larvae or puparia) during the inspection process. This does not imply a failure of the treatment.	C	**Colombia** In the text: "Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable Zeugodacus tau (larvae or puparia) during the inspection process. This does not imply a failure of the treatment", the alternatives to follow should be included to clearly define when the treatment was or was not effective. Live insects of Zeugodacus tau are assumed to be non-viable, but this condition would have to be assessed to confirm or disprove it. If live pests are found, the NPPO should consider taking emergency treatment and initiate viability assessment of the pests that are found alive. Situation that should be defined within ISPM 18	**Considered but not incorporated** The possibility of encountering live but not viable insects during the inspection process in fruits that were treated with irradiation is true for all insects not just for Z. tau. This is a treatment schedule, aimed at recommending an effective quarantine dose. Giving alternatives to follow when live insects are found is out of the scope of the schedule. ISPM 18 refers to the situation when live insects are found. Actions to be taken when live insects are found should be negotiated between the involved NPPOs

				It is not clear what would be the reference to evaluate the effectiveness or not of the treatment by the inspectors. What could be lent for misinterpretations in the result of the treatment. *Category : TECHNICAL*	Live target pests may be found after treatment, but this should not result in the refusal to issue a phytosanitary certificate Where mortality is not the required response, it is more likely that live target pests may persist in the treated consignment; in such cases, phytosanitary certification should be based on confirmation from the normal validation programme that the required response is achieved for the specific commodity and treatment conditions concerned.
24	46	Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Zeugodacus tau* (larvae or puparia) during the inspection process. This does not <u>neccessarily </u>imply a failure of the treatment.	P	**New Zealand** Live larvae may survive from a treatment failure or other unknown circumstances. *Category : SUBSTANTIVE*	Considered but not incorporated It is a standard statement
25	49	Extrapolation of treatment efficacy to all fruits and vegetables was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research studies on a variety of pests and commodities. These include studies on the following pests and hosts: *Anastrepha fraterculus* (*Eugenia pyriformis*, *Malus pumila* and *Mangifera indica*), *Anastrepha ludens* (*Citrus paradisi*, *Citrus sinensis*, ~~*Mangifera*~~ <u>*M.*</u> *indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, *C. sinensis* and *Psidium guajava*), *Anastrepha suspensa* (~~*Averrhoa*~~ <u>*A.*</u> *carambola*, *C. paradisi* and ~~*Mangifera*~~ <u>*M.*</u> *indica*), *Bactrocera tryoni* (*C. sinensis*, *Solanum lycopersicum*, ~~*Malus*~~ <u>*M.*</u> *pumila*, ~~*Mangifera*~~ <u>*M.*</u> *indica*, *Persea americana* and *Prunus avium*), *Cydia pomonella*	P	**European Union** Full scientific name already given above in the same paragraph. *Category : EDITORIAL*	Considered but not incorporated. Full text was provided in response to previous comments that the abbreviated genus name was confusing because there were multiple genera starting with the same letter. The TPPT made a decision to provide the full name rather than use two letter abbreviations.

		(~~*Malus*~~ *M.* *pumila* and artificial diet), *Grapholita molesta* (~~*Malus*~~ *M.* *pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*) and *Tribolium confusum* (*Triticum aestivum, Hordeum vulgare* and *Zea mays*) (Bustos *et al.*, 2004; Gould and von Windeguth, 1991; Hallman, 2004a, 2004b, 2013; Hallman and Martinez, 2001; Hallman *et al*., 2010; Jessup *et al.*, 1992; Mansour, 2003; Tunçbilek and Kansu, 1966; von Windeguth, 1986; von Windeguth and Ismail, 1987; Zhan *et al*., 2016). It is recognized, however, that treatment efficacy has not been tested for all potential fruit and vegetable hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect, the treatment will be reviewed.			
26	49	Extrapolation of treatment efficacy to all fruits and vegetables was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research studies on a variety of pests and commodities. These include studies on the following pests and hosts: *Anastrepha fraterculus* (*Eugenia pyriformis*, *Malus pumila* and *Mangifera indica*), *Anastrepha ludens* (*Citrus paradisi*, *Citrus sinensis*, ~~*Mangifera*~~ *M.* *indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, *C. sinensis* and *Psidium guajava*), *Anastrepha suspensa* (~~*Averrhoa*~~ *A.* *carambola*,	P	**EPPO** Full scientific name already given above in the same paragraph. *Category : EDITORIAL*	Considered but not incorporated. (Refer to response to comment 25)

		C. paradisi and ~~*Mangifera*~~ *M.* *indica*), *Bactrocera tryoni* (*C. sinensis*, *Solanum lycopersicum*, ~~*Malus*~~ *M.* *pumila*, ~~*Mangifera*~~ *M.* *indica*, *Persea americana* and *Prunus avium*), *Cydia pomonella* (~~*Malus*~~ *M.* *pumila* and artificial diet), *Grapholita molesta* (~~*Malus*~~ *M.* *pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*) and *Tribolium confusum* (*Triticum aestivum*, *Hordeum vulgare* and *Zea mays*) (Bustos *et al.*, 2004; Gould and von Windeguth, 1991; Hallman, 2004a, 2004b, 2013; Hallman and Martinez, 2001; Hallman *et al*., 2010; Jessup *et al.*, 1992; Mansour, 2003; Tunçbilek and Kansu, 1966; von Windeguth, 1986; von Windeguth and Ismail, 1987; Zhan *et al*., 2016). It is recognized, however, that treatment efficacy has not been tested for all potential fruit and vegetable hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect, the treatment will be reviewed.			
References					
27	51	The present annex ~~may refer~~ refers to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at .	P	**European Union** The present annex refers to ISPMs 28 and 18. There is no reason to write "may refer". We understand that this is a general statement for all PTs and this comment may apply to other already adopted PTs. *Category : EDITORIAL*	**CONSIDERED BUT NOT INCORPORATED** Keep standard language.
28	51	The present annex ~~may refer~~ refers to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at .	P	**EPPO** The present annex refers to ISPMs 28 and 18. There is no reason to write "may refer". We understand that this is a general statement for all PTs	**CONSIDERED BUT NOT INCORPORATED** Keep standard language.

				and this comment may apply to other already adopted PTs. *Category : EDITORIAL*	