2019 FIRST CONSULTATION

1 July – 30 September 2019

Compiled comments for Draft PT: Irradiation treatment for *Bactrocera tau* (2017-025)

Summary of comments

Name	Summary	SC Response
Cuba	Estamos de acuerdo con la propuesta de tratamiento, no hay comentarios al respecto. [We agree with the treatment proposal, there are no comments about it.]	**Noted**
European Union	Comments submitted by the European Commission on behalf of the European Union and its 28 Member States.	**Noted**
Malawi	Malawi supports draft Annex to ISPM 28 Irradiation treatment for Batcrocera tau (2017-025)	**Noted**
South Africa	The National Plant Protection Organisation of South Africa (NPPOZA) has no comments and therefore accepts this standard.	**Noted**

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	**Mexico** I support the document as it is and I have no comments *Category : SUBSTANTIVE*	**Noted**
2	G	(General Comment)	C	**Guyana** We support the document in its entirety and have no objection with it moving forward. *Category : SUBSTANTIVE*	**Noted**
3	G	(General Comment)	C	**European Union** The comments by the European Union and its 28 Member States are provided without prejudice to EU food safety legislation imposing limitations on the acceptance of irradiated goods. *Category : TECHNICAL*	**Noted**
4	G	(General Comment)	C	**Barbados** Barbados has no changes to make to this draft.	**Noted**

				Category : EDITORIAL	
5	G	(General Comment)	C	**Slovenia** Slovenia would like to formally endorse the EPPO comments submitted via the IPPC Online Comment System. *Category : TECHNICAL*	**Noted**
6	G	(General Comment)	C	**Bahrain** We have no comment *Category : TECHNICAL*	**Noted**
7	G	(General Comment)	C	**Thailand** Thailand has no objection on the proposed draft irradiation treatment for Bactrocera tau. However, we would like to seek more clarification on the treatment schedules as follows: Why this standard specifies 2 levels of minimum absorbed dose which provide the same efficacy (to prevent the emergence of adult of Bactrocera tau). These schedules may cause the dispute between exporting and importing countries. Thailand would like to suggest to specify only one minimum absorbed dose or provide more information on how to select a schedule that suitable for certain commodities in this standard. *Category : SUBSTANTIVE*	**Considered but not incorporated**. The two tretament schedules reflects two levels of efficacy. Countries can choose either schedule based on what they considered to be an appropriate level of protection.
8	G	(General Comment)	C	**Australia** Extrapolating from treatment efficacy without the knowledge of the most-tolerant stage (MTS), commodity and pest species tested is a generalised approach which may not work for all commodities. MTS needs to be confirmed even if it is not found frequently in the fruit. Identifying MTS provides complete safety against all of the life-stages. May be MTS in another vegetable or fruit is different (as seen in Medlfy in various commodities) and may require higher dose if not lower, although in the in latter case it would still be within the proposed treatment schedule. *Category : TECHNICAL*	**Considered but not incorporated**. The most tolerant life stage of fruit flies to irradiation is consistently the third instar (Balock *et al.* 1963). Balock, J., Burditt, A.K. and Christianson, L. D. (1963). Effects of gamma radiation on various stages of three fruit fly species. *J. Econ. Entomol*. 56:42-46
9	G	(General Comment)	C	**Uruguay** We have no comments on this draft. We agree with the proposal as it is *Category : TECHNICAL*	**Noted**
10	G	(General Comment)	C	**China** Modify "Bactrocera tau" as "Zeugodacus tau" The genus of this species has been revised and accepted in recent years. The current scientific name should be Zeugodacus tau.	**Incorporated**

				Reference: A global checklist of the 932 fruit fly species in the tribe Dacini (Diptera, Tephritidae) ZooKeys 730: 19–56 (2018) doi: 10.3897/zookeys.730.21786 http://zookeys.pensoft.net) *Category : SUBSTANTIVE*	
11	G	(General Comment)	C	**Malawi** Malawi supports the Draft Annex to ISPM 28 : Irradiation treatment for Bactrocera tau(2017-025) *Category : SUBSTANTIVE*	**Noted**
12	G	(General Comment)	C	**Botswana** The dosage is in line with the recommended one therefore we agree with the proposed annex *Category : TECHNICAL*	**Noted**
13	G	(General Comment)	C	**New Zealand** New Zealand supports the standard. Given the efficacy information was extrapolated to cover all hosts we encourage the panel to review the standard should evidence become available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect. *Category : SUBSTANTIVE*	**Noted.**
14	G	(General Comment)	C	**Congo** j'approuve le projet d'annexe à la NIMP 28 *Category : SUBSTANTIVE*	**Noted**
15	G	(General Comment)	C	**Cuba** Estamos de acuerdo con la propuesta de tratamiento. *Category : TECHNICAL*	**Noted**
Draft ANNEX TO ISPM 28: Irradiation treatment for Bactrocera tau (2017-025)					
16	1	**DRAFT ANNEX TO ISPM 28: Irradiation treatment for ~~*Bactrocera*~~ *Zeugodacus tau* (2017-025)**	P	**Australia** Updated to reflect taxonomy at the time of drafting. The species is now known as Zeugodacus (Zeugodacus) tau (Walker, 1849). *Category : SUBSTANTIVE*	**Incorporated**
17	1	**DRAFT ANNEX TO ISPM 28: Irradiation treatment for *Bactrocera tau* (2017-025)**	C	**Viet Nam** Propose to delete one of Schedule, because this phytosanitary measure is irradiation *Category : TECHNICAL*	**Considered but not incorporated**. The two tretament schedules reflects two levels of efficacy. Countries can choose either schedule based on what they considered to be an appropriate level of protection

18	23	This treatment describes the irradiation of fruits and vegetables to prevent the emergence of adults of *Bactrocera tau* at the stated efficacy~~.~~[1].	P	**European Union** Typo. *Category : EDITORIAL*	**Incorporated**
19	23	This treatment describes the irradiation of fruits and vegetables at 72 Gy or 85 Gy minimum absorbed dose to prevent the emergence of adults of *Bactrocera tau* at the stated efficacy.[1].	P	**Japan** Add minimum absorbed dose as well as other PTs. *Category : EDITORIAL*	**Considered but not incorporated.** The IPPC editor will adress consitency issues.
20	23	This treatment describes the irradiation of fruits and vegetables to prevent the emergence of adults of *Zeugodacus tau* at the stated efficacy.~~This treatment describes the irradiation of fruits and vegetables to prevent the emergence of adults of *Bactrocera tau* at the stated efficacy.[1].~~	P	**Australia** An international standard should reflect updated taxonomy at the time of drafting. The species is now known as Zeugodacus (Zeugodacus) tau (Walker, 1849). The annex should be renamed accordingly. The taxonomy could become more critical in the future as we gain more understanding of the potential species complex within the Zeugodacus tau group. It may yet be split into different species, which would need to be reflected in this standard. *Category : TECHNICAL*	**Incorporated** Additionally the PT has been corrected to include (Walker, 1849), Not Walker (1848).
21	23	This treatment describes the irradiation of fruits and vegetables to prevent the emergence of adults of *Bactrocera tau* at the stated efficacy~~.~~[1].	P	**EPPO** Typo. *Category : EDITORIAL*	**Incoprorated**
Treatment description					
22	26	**Name of treatment** Irradiation treatment for *Zeugodacus tau*~~*Bactrocera tau*~~	P	**Australia** Taxonomic accuracy. *Category : EDITORIAL*	**Incorporated**
23	29	**Target pest** ~~*Bactrocera*~~ *Zeugodacus (Zeugodacus) tau (Walker, 1849)*~~(~~ (Diptera: Tephritidae)~~*Zeugodacus) tau* (Walker, 1848) (Diptera: Tephritidae)~~	P	**Australia** Taxonomic accuracy (note the correct date). *Category : EDITORIAL*	**Incorporated**

24	30	**Target regulated articles** All fruits and vegetables that are hosts of *Zeugodacus tau*. ~~*Bactrocera tau*~~	P	**Australia** Taxonomic accuracy. *Category : EDITORIAL*	**Incorporated**
Treatment schedule					
25	31	**Treatment schedule**	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 B. 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	**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 of fruit flies to irradiation is consistently the third instar The treatment facility does undertake dose mapping at six monthly intervals and the raw data from the last dose mapping was provided by the applicant. The does mapping at various locations 100 cm form the source (the same distance the trials were undertaken at). 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

				and adaptations. 3. The doses of 72Gy and 85 Gy are rather low compared to other Bactrocera spp. Follett et al. 2011 states that Bactrocera (>100 Gy) seem to be more 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) Literature Cited: Follett, P. A., and J. W. Armstrong. 2004. Revised irradiation doses to control melon fly, Mediterranean fruit fly, and Oriental fruit fly (Diptera: Tephritidae) and a generic dose for Tephritid fruit flies. J. Econ. Entomol. 97(4): 1254-1262. Follett, P. A., T. W. Phillips, J. W. Armstrong, and J. H. Moy. 2011. Generic phytosanitary radiation treatment for Tephritid fruit flies provides quarantine security for Bactrocera latifrons (Diptera: Tephritidae). J. Econ. Entomol. 104(5): 1509-1513. (IPPC) International Plant Protection Convention. 2016. ISPM #28, Annex 4. Irradiation treatment for Bactrocera jarvisi. Food and Agricultural Organization, Rome, Italy. (IPPC) International Plant Protection Convention. 2016. ISPM #28, Annex 5. Irradiation treatment for Bactrocera tryoni. Food and Agricultural Organization, Rome, Italy. [USDA–APHIS–PPQ]. 2019. United States Department of Agriculture, Plant and Animal Health Inspection Service, Plant Protection and Quarantine. Treatment manual. (https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf). Zhan, G., L. Ren, Y. Shao, Q. Wang, D. Yu, Y. Wang, and	laboratory reared flies in phytosanitary irradiation research in the United States and Internationally. 3. 3. The name of the target pest *Bactrocera tau* was changed to *Zeugodacus tau* when the subgenus *Bactrocera* (*Zeugodacus*) was elevated to genus level (Virgilio *et al.* 2015). The name change is now widely recognised (Doorenweerd *et al*. 2018). Doorenweerd, C., Leblanc, L., Norrbom, A.L., San Jose, M. & Rubinoff, D. 2018. A global checklist of the 932 fruit fly species in the tribe Dacini (Diptera, Tephritidae). ZooKeys, 730, 17-54. Virgilio, M., Jordaens, K., Verwimp, C., White, I.M. and De Meyer, M. 2015. Higher phylogeny of frugivorous flies (Diptera, Tephritidae, Dacini): Localised partition conflicts and a novel generic classification. Molecular Phylogenetics and Evolution, 85:171-179. The TPPT conquers with the comment Bactriocera seems to be more tolerant than other genera.

				T. Li. 2015. Gamma Irradiation as a phytosanitary treatment of Bactrocera tau (Diptera: Tephritidae) in pumpkin fruits. J. Econ. Entomol. 108(1): 88–94. Zhao, J., J. Ma, M. Wu, X. Jiao, Z. Wang, F. Liang, G. Zhan. 2017. Gamma radiation as a phytosanitary treatment against larvae and pupae of Bactrocera dorsalis (Diptera: Tephritidae) in guava fruits. Food Control 72:360-366. *Category : TECHNICAL*	
26	31	**Treatment schedule**	C	**Iran** When we say minimum absorbed dose , is it possible only schedule 1 is mentioned? *Category : TECHNICAL*	**Considered but not incorporated.**
27	32	~~**Schedule 1:**~~	P	**China** 1. The efficacy in schedule 1 is 99.9933% (95% CL), which is less than probity 9 as required for the phytosanitary treatment of fruits flies. 2. Reducing the treatment dose from 85 to 72 makes little practical sense as these two doses are relatively low for commercial phytosanitary irradiation treatment. *Category : SUBSTANTIVE*	**Considered but not incorporated**. The two tretament schedules reflects two levels of efficacy. Countries can choose either schedule based on what they considered to be an ALOP
28	33	Minimum absorbed dose of 72 Gy to prevent the emergence of adults of *Zeugodacus tau*~~*Bactrocera tau*~~.	P	**Australia** Taxonomic accuracy. *Category : EDITORIAL*	**Incoprorated**
29	34	There is 95% confidence that the treatment according to this schedule prevents development to the adult stage of not less than 99.~~9933%~~ 99.339938% of eggs and larvae of *Bactrocera tau.*	P	**Australia** As quoted from Zhan et al., 2015 'The mortality proportion of Z. tau late third instars in the first confirmatory test calculated by equation (2) was 99.9938% at the 95% confidence level, where the highest dose of 71.7 Gy was measured (Table 4).' *Category : TECHNICAL*	**Considered but not incorporated** The TPPT recalculated the efficacy at their 2018 June meeting. The efficacy of the 85 Gy schedule was calculated combining the number of treated insects of both experiments (72 Gy and 85 Gy), and the efficacy of the 72 Gy schedule was calculated from the number of insects treated with 72 Gy. The number of treated insects was corrected based on Abbott's formula. The number of treated third instar insects was calculated as 44 994 and the 99 005, for 72 Gy and 85 Gy respectively (also taking into account the control mortality). Appendix 10 of the meeting report provides the calculation: https://www.ippc.int/en/publications/86619/ Based on the recalculation of efficacy in the 2018 report this figure is correct. Mortality was 99.9933
30	34	There is 95% confidence of *Zeugodacus tau* when tested in	P	**Australia** Consistency with other ISPMs that mention the commodity tested.	**Considered but not incorporated.**

		pumpkin that the treatment according to this schedule prevents development to the adult stage of not less than 99.9933% of eggs and larvae of *Bactrocera tau.*		*Category : EDITORIAL*	
31	34	There is 95% confidence that the treatment according to this schedule prevents development to the adult stage of not less than 99.9933% of eggs and larvae of *Zeugodacus tau*~~*Bactrocera tau*~~.	P	**Australia** Taxonomic accuracy. *Category : EDITORIAL*	**Incorporated**
32	36	Minimum absorbed dose of 85 Gy to prevent the emergence of adults of *Zeugodacus tau*~~*Bactrocera tau*~~.	P	**Australia** Taxonomic accuracy. *Category : EDITORIAL*	**Incorporated**
33	37	There is 95% confidence that the treatment according to this schedule prevents development to the adult stage of not less than 99.~~9970%~~ 9970% of eggs and larvae of *Bactrocera tau.*	P	**Australia** As quoted from Zhan et al., 2015 'Therefore, a minimum dose of 85 Gy, that could acquire the controlling (preventing adult emergence) efficacy of 99.9972% at the 95% confidence level, can be recommended for the phytosanitary treatment of Z. tau on all shipped fruits and vegetables.' *Category : TECHNICAL*	**Considered but not incorporated**. (Refer to response to comment 29)
34	37	There is 95% confidence of *Zeugodacus tau* when tested in pumpkin that the treatment according to this schedule prevents development to the adult stage of not less than 99.9970% of eggs and larvae of *Zeugodacus tau*~~*Bactrocera tau*~~.	P	**Australia** Consistency with other ISPMs that mention the commodity tested. and Taxonomic accuracy. *Category : EDITORIAL*	**Considered but not incorporated**. Information on the host used in the confirmatory trials is presented in the "Other relevant information" section of the PT consistently across PTs. It is stated in paragraph 42 that the host was pumpkin, and justification for the extrapolation to all fruits and vegetables is provided in paragraph 44.
35	39	This treatment should not be applied to fruits and vegetables stored in modified atmospheres because modified atmospheres may affect the treatment efficacy.	C	**China** These sentence needs to check or add the related reference. Modified atmospheres may or may not affect irradiation treatment efficacy. The related reference should be noted. *Category : SUBSTANTIVE*	**Considered but not incorporated**. This issue is currently under review and changes to the current wording are expected.
Other relevant information					
36	43	The efficacy of schedules 1 and 2 was calculated based on a total of 48 700	P	**European Union** Useless word, confusing. *Category : EDITORIAL*	**Incorporated**

		and 10 7135 third-instar larvae treated with no adult ~~emergence respectively~~emergence; the control emergence was 92.4%.			
37	43	The efficacy of schedules 1 and 2 was calculated based on a total of 48 700 and 10 7135 third-instar larvae treated with no adult ~~emergence respectively~~emergence; the control emergence was 92.4%.	P	**EPPO** Useless word, confusing. *Category : EDITORIAL*	**Incorporated**
38	43	The efficacy of schedules 1 and 2 was calculated based on a total of 48 700 and ~~10 7135~~ 107 135 third-instar larvae treated with no adult emergence respectively; the control emergence was 92.4%.	P	**Australia** Clarification of figure *Category : EDITORIAL*	**Incorporated**
39	43	The efficacy of schedules 1 and 2 was calculated based on a total of 48 700 and 10 7135 third-instar larvae treated with no adult emergence respectively; the control emergence was 92.4%.	C	**Indonesia** Indonesia seek more clarification of the number "10 7135" *Category : EDITORIAL*	**Considered but not incorporated.** (Refer to response to comment 29)
40	43	The efficacy of schedules 1 and 2 was calculated based on a total of 48 700 and 10 7135 third-instar larvae treated with no adult emergence respectively; the control emergence was 92.4%.	C	**Iran** why we don't add these numbers? *Category : TECHNICAL*	**Considered but not incorporated**. (Refer to response to comment 29)
41	44	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	P	**European Union** Several typos. *Category : EDITORIAL*	**Incorporated**

		hosts: *Anastrepha fraterculus* (*Eugenia uvalha, Malus ~~pumila,~~ pumila* and *Mangifera indica*); *A. ludens* (*Citrus paradisi, Citrus sinensis, M. indica* and artificial diet), *A. obliqua* (*Averrhoa carambola, C. sinensis~~, and~~ and *Psidium guajaba*)~~;~~; *A. suspensa* (*A. carambola*, *C. paradisi* and *M. indica*), *Bactrocera tryoni* (*C. sinensis*, *Solanum lycopersicum*, *M. pumila*, *M. indica*, *Persea americana* and *Prunus avium*), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*), *Tribolium confusum* (*Triticum aestivum*, *Hordium vulgare* and *Zea mays*), *Cydia pomonella* (*M. pumila* and artificial diet) and *Grapholita molesta* (*M. domestica* and artificial diet) (Bustos *et al.*, 2004; Gould and von Windeguth, 1991; Hallman, 2004a, ~~2004b,~~ 2004b and 2013; Hallman and Martinez, 2001; Hallman *et al*., 2010; Jessup *et al.*, 1992; Mansour, 2003; Tuncbilek 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.			

42	44	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 uvalha*, *Malus* ~~*pumila,*~~ *pumila* and *Mangifera indica*); *A. ludens* (*Citrus paradisi*, *Citrus sinensis*, *M. indica* and artificial diet), *A. obliqua* (*Averrhoa carambola*, *C. sinensis*~~, and~~ and *Psidium guajaba*)~~;~~; *A. suspensa* (*A. carambola*, *C. paradisi* and *M. indica*), *Bactrocera tryoni* (*C. sinensis*, *Solanum lycopersicum*, *M. pumila*, *M. indica*, *Persea americana* and *Prunus avium*), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*), *Tribolium confusum* (*Triticum aestivum*, *Hordium vulgare* and *Zea mays*), *Cydia pomonella* (*M. pumila* and artificial diet) and *Grapholita molesta* (*M. domestica* and artificial diet) (Bustos *et al.*, 2004; Gould and von Windeguth, 1991; Hallman, 2004a, ~~2004b,~~ 2004b and 2013; Hallman and Martinez, 2001; Hallman *et al*., 2010; Jessup *et al.*, 1992; Mansour, 2003; Tuncbilek and Kansu, 1966; von	P	**EPPO** Several typos. *Category : EDITORIAL*	**Incorporated**

		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.			
43	44	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 uvalha, Malus pumila,* and *Mangifera indica*); *A. ludens* (*Citrus paradisi, Citrus sinensis, M. indica* and artificial diet), *A. obliqua* (*Averrhoa carambola, C. sinensis*, and *Psidium guajaba*);*A. suspensa* (*A. carambola*, *C. paradisi* and *M. indica*), Bactrocera dorsalis (Psidium guajava,*Bactrocera tryoni* (*C. sinensis, Solanum lycopersicum, M. pumila, M. indica, Persea americana* and *Prunus avium*), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*), *Tribolium confusum*	P	**China** This research has been published and adopted for developing a draft Annex to ISPM 28. *Category : SUBSTANTIVE*	**Considered but not incorporated**. The list of pests and hosts has been generated from reviews undertaken by the TPPT. Reasearch of *Bactrocera dorsalis* and *Psidium guajava* is currently under review and could be included in the future if the draft annex is approved.

		(*Triticum aestivum, Hordium vulgare* and *Zea mays*), *Cydia pomonella* (*M. pumila* and artificial diet) and *Grapholita molesta* (*M. domestica* and artificial diet) (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; Tuncbilek 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					
44	51	~~**Hallman**~~ **Hallman,** **G.J.** 2013. Rationale for a generic phytosanitary irradiation dose of 70 Gy for the genus *Antastrepha* (Diptera: Tephritidae). *Florida Entomologist*, 96(3): 983–990.	P	**China** One comma should be added after the last name. *Category : EDITORIAL*	**Incorporated**
45	52	**Hallman, G.J., Levang-Brilz, N.M., Zettler, J.L. & Winborne, I.C.** 2010. Factors affecting ionizing radiation phytosanitary treatments, and implications for research and generic treatments. *Journal of*	P	**European Union** Typo. *Category : EDITORIAL*	**Incorporated**

		Economic Entomology, 103:~~1950–1963~~1950–1963.			
46	52	**Hallman, G.J., Levang-Brilz, N.M., Zettler, J.L. & Winborne, I.C.** 2010. Factors affecting ionizing radiation phytosanitary treatments, and implications for research and generic treatments. *Journal of Economic Entomology*, 103:~~1950–1963~~1950–1963.	P	**EPPO** Typo. *Category : EDITORIAL*	**Incorporated**
47	56	**Tuncbilek, A.S. & Kansu, I.A.** 1966. The influence of rearing medium on the irradiation sensitivity of eggs and larvae of the flour beetle, *Tribolium confusum* J. du Val. *Journal of Stored Products Research* 32: ~~1–6~~1–6.	P	**European Union** Typo. *Category : EDITORIAL*	**Incorporated**
48	56	**Tuncbilek, A.S. & Kansu, I.A.** 1966. The influence of rearing medium on the irradiation sensitivity of eggs and larvae of the flour beetle, *Tribolium confusum* J. du Val. *Journal of Stored Products Research* 32: ~~1–6~~1–6.	P	**EPPO** Typo. *Category : EDITORIAL*	**Incorporated**
49	60	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**European Union** Typo. *Category : EDITORIAL*	**Noted**. The PT will be reviwed by the IPPC scientific editor
50	60	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**EPPO** Typo. *Category : EDITORIAL*	**Noted** The PT will be reviwed by the IPPC scientific editor
51	60	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**China** *Category : SUBSTANTIVE*	**Noted** The PT will be reviwed by the IPPC scientific editor