2019 FIRST CONSULTATION

1 July – 30 September 2019

Compiled comments for Draft PT: Irradiation treatment for *Bactrocera dorsalis* (2017-015)

Summary of comments

Name	Summary
Cuba	Estamos de acuerdo con la propuesta de tratamiento, no hay comentarios al mismo.
European Union	Comments submitted by the European Commission on Behalf of the European Union and its 28 Member States.
Malawi	Malawi supports draft to ISPM 28: Irradiation for Bactrocera dorsalis(2017-015)
South Africa	The National Plant Protection Organisation of South Africa (NPPOZA) has no comments and therefore accepts this standard.

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

FAO sequential number	Para	Text	T	Comment
1	G	(General Comment)	C	**Mexico** I support the document as it is and I have no comments *Category : SUBSTANTIVE*
2	G	(General Comment)	C	**Guyana** We support the document in its entirety and have no objection with it moving forward. *Category : SUBSTANTIVE*
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*
4	G	(General Comment)	C	**Indonesia** Indonesia supports this draft *Category : SUBSTANTIVE*
5	G	(General Comment)	C	**Barbados** Barbados has no changes to make to this draft. *Category : EDITORIAL*
6	G	(General Comment)	C	**Slovenia** Slovenia would like to formally endorse the EPPO comments submitted via the IPPC Online Comment System. *Category : TECHNICAL*

7	G	(General Comment)	C	**Bahrain** no comment *Category : TECHNICAL*
8	G	(General Comment)	C	**Israel** Israel would like to formally endorse the EPPO comments submitted via the IPPC Online Comment System *Category : SUBSTANTIVE*
9	G	(General Comment)	C	**Australia** Extrapolating from treatment efficacy of 116 Gy without the knowledge of the most-tolerant stage (MTS), commodity and pest species tested is a generalised approach which may not always 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. The MTS in another vegetable or fruit is different (as seen in Medlfy in various commodity) and may require higher dose if not lower in which case it would still be within the proposed treatment schedule. *Category : TECHNICAL*
10	G	(General Comment)	C	**Thailand** Thailand has no objection on the proposed draft irradiation treatment for Bactrocera dorsalis *Category : SUBSTANTIVE*
11	G	(General Comment)	C	**Venezuela** Para el caso de la plaga Bactroceras dorsalis¸ el tratamiento de la dosis de 95Gy es efectiva para esterilizar la mosca de la fruta. Las moscas irradiadas a dosis de 80GY, la efectividad sobre la mortalidad desciende. 100 Gy debe ser la la dosis mínima efectiva para la desinfestación y esterilización de B. dorsalis puparia La norma propone una irradiación para la esterilidad de los machos de 116 Gy para prevenir la emergencia de adultos de Bactrocera dorsalis y validando con un rango de 95 Gy hasta 100 se logra una efectiva para esterilizar la mosca de la fruta, por lo que a mayor Gy es efectiva el índice de esterilidad. *Category : TECHNICAL*
12	G	(General Comment)	C	**Uruguay** We have no comments on this draft. We agree with the proposal as it is *Category : TECHNICAL*
13	G	(General Comment)	C	**Botswana** The annex is scientifically based and we are in agreement with the proposed annex *Category : TECHNICAL*

14	G	(General Comment)	C	**Malawi** Malawi supports draft ISPM 28: Irradiation for Batrocera dorsalis (2017-015) *Category : SUBSTANTIVE*
15	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*
16	G	(General Comment)	C	**Madagascar** Protocole de traitement à développer pour qu'il est plus explicatif. *Category : TECHNICAL*
17	G	(General Comment)	C	**Congo** j'approuve le projet d'annexe à la NIMP 28 *Category : SUBSTANTIVE*
18	G	(General Comment)	C	**Cuba** Estamos de acuerdo con la propuesta de tratamiento. *Category : TECHNICAL*
Treatment schedule				
19	31	**Treatment schedule**	C	**United States of America** 1. The primary supporting research from Zhao et al. 2017 represents a single genetic population. In general, APHIS prefers insects used in treatment studies be obtained from multiple distinct populations across the pest's geographic range. Additionally, insects were replaced every 9-12 months, however the number of lab-reared generations that had passed prior to each test was not reported. This raises concerns about inbreeding and reduction of colony fitness. We acknowledge that practical limitations make it difficult to acquire specimens from distinct areas, and that lab rearing is necessary to obtain sufficient quantities of specimens for testing. However, information or acknowledgement of how these factors may affect the universal applicability of the recommended treatment should be included in the research supporting the treatment. 2. Larval density was upwards of 60 larvae per fruit in the confirmatory testing. Since natural infestation was used, some fruit may have significantly more than 60 larvae per fruit. These infestation levels are higher than what has been reported in wild occurring infestations of guava. Information on the influence of pest density on survivorship would be helpful to assuage concerns that the density tested may have influenced the observed results. Additionally, since final results are aggregated for all fruit in each of the two experimental replicates, we are not able to determine if control mortality varied significantly between individual fruits.

				3. Only 2 replications were used in the confirmatory testing. APHIS research guidelines for phytosanitary irradiation research suggest researchers aim for at least 4 time-distinct replications so as to capture any natural variation in the treatment response. 4. Although Zhao et al. 2017 mentions that 5 dosimeters were used in every 20 boxes during confirmatory trials, there is insufficient information on dose mapping methods. Did the researchers determine the locations of 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 116 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. 5. 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. 6. The manuscript by Zhao et al. 2017 provides the primary support for this treatment. We have concerns about the quality of the peer review process, which in turn reduces our confidence in the manuscript itself. There are multiple errors present in the paper, including grammatical errors, formatting errors, and confusing structure (i.e. the methods for recovering larvae from the fruits was included under the section for irradiation of the pupae), and discrepancies between the methods as described vs. the methods as reported. The work, as presented, was difficult to interpret and would be very difficult to reproduce. The methods of data analysis are also unclear. For example, a generic statement about using ANOVA and Tukey's HSD for mean separation was provided, however the data being analyzed (percent eclosion) is likely not normal and no information on the shape of the data is provided. 7. We are concerned that other existing studies might bring into question the efficacy of the dose recommended here (116 Gy). For instance, Komson et al. (1992) reported that one B. dorsalis larva was able to emerge as an adult after being irradiated at 150 Gy. Also, Follett and Armstrong (2004) studied the efficacy of 125 Gy for OFF. *Category : TECHNICAL*
20	33	There is 95% confidence that the treatment according to this schedule prevents development to the adult stage of not less than 99.~~9963%~~ 9968% of eggs and larvae of *Bactrocera dorsalis*.	P	**Australia** The dose of 116 Gy prevents the formation of adults at 99.9968% mortality at 95% confidence level based on treatment of 100,684 late 3rd instars (Zhao et al., 2017) *Category : EDITORIAL*

21	35	This treatment should not be applied to fruits and vegetables stored in modified atmospheres because modified atmospheres may affect the treatment efficacy.	C	**China** This 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*
22	35	This treatment should not be applied to fruits and vegetables stored in modified atmospheres because modified atmospheres may affect the treatment efficacy.	C	**Nepal** It should be cleared the meaning of modified atmospheres. How much temperature and humidity will affect the treatment? *Category : SUBSTANTIVE*
Other relevant information				
23	37	Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Bactrocera dorsalis* (larvae or puparia) during the inspection process. This does not imply a failure of the treatment.	C	**Kenya** Since mortality is not the target, how would the inspectors ascertain that the treatment actually sterilized, or was ineffective? *Category : TECHNICAL*
24	39	The efficacy of this schedule was calculated based on a total of 100 684 third-instar larvae treated with no adult emergence; the control emergence was ~~81%~~81% when tested in guava fruit.	P	**Australia** Mention the fruit commodity (and cultivar) to maintain consistency with other ISPMs that mention the commodity tested. *Category : EDITORIAL*
25	40	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~~Citrus sinensis*, ~~and *M. indica*~~ *M. indica* and artificial diet), *A. obliqua* (*~~Averrhoa carambola, C. sinensis~~Averrhoa carambola, C. sinensis* ~~,~~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. domestica* and artificial diet) and *Grapholita molesta* (*M. pumila* 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.	P	**European Union** Several "," or "and" added or deleted. *Category : EDITORIAL*

26	40	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* ~~and~~ , *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. domestica* and artificial diet) and *Grapholita molesta* (*M. pumila* 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.	P	**EPPO** Several "," or "and" added or deleted. *Category : EDITORIAL*
27	40	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* and *M. indica* and artificial diet), *A. obliqua* (*Averrhoa carambola, C. sinensis*, 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. domestica* and artificial diet) and *Grapholita molesta* (*M. pumila* 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	C	**Kenya** It's important to establish that the extrapolation mentioned would be correct for mostly traded fruits and vegetables before adoption of the annex, otherwise a publication demonstrating this should be shared. We propose that the annex only apply to the specific commodities/pests that have been tested. Efficacy my vary from commodity to commodity. It may even vary under controlled/laboratory conditions versus operational conditions *Category : SUBSTANTIVE*

		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.		
28	40	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* and *M. indica* and artificial diet), *A. obliqua* (*Averrhoa carambola, C. sinensis*, 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*), Insert "Bactrocera (Zeugodacus) tau, (Cucurbita maxima),*Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*), *Tribolium confusum* (*Triticum aestivum, Hordium vulgare* and *Zea mays*), *Cydia pomonella* (*M. domestica* and artificial diet) and *Grapholita molesta* (*M. pumila* 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.	P	**China** This research has been published and adopted for developing draft Annex to ISPM 28. *Category : SUBSTANTIVE*
References				
29	49	**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	**European Union** Typo. *Category : EDITORIAL*
30	49	**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*
31	53	**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*

32	53	**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*
33	55	**von Windeguth, D.L. & Ismail, M.A.** 1987. Gamma irradiation as a quarantine treatment for Florida grapefruit infested with Caribbean fruit fly, *Anastrepha suspensa* (Loew). *Proceedings of the Florida State Horticultural Society*, 100: 5–7.Zhan, G.P., Ren, L.L., Shao, Y., Wang, Q.L., Yu, D.J., Wang, Y.J. & Li, T.X. 2015. Gamma irradiation as a phytosanitary treatment of Bactrocera tau (Diptera: Tephritidae) in pumpkin fruits. Journal of Economic Entomology, 108(1): 88–94.	P	**China** *Category : SUBSTANTIVE*
34	56	**Zhao, J., Ma, J., Wu, M., Jiao, X., Wang, Z., Liang, F. & Zhan, G.** 2017. Gamma radiation as a phytosanitary treatment against larvae and pupae of *Bactrocera dorsalis* (Diptera: Tephritidae) in guava fruits. *Food Control*, 72: 360–366.	C	**European Union** To be put at the end of the list (alphabetical order). *Category : EDITORIAL*
35	56	~~**Zhao, J., Ma, J., Wu, M., Jiao, X., Wang, Z., Liang, F. & Zhan, G.** 2017. Gamma radiation as a phytosanitary treatment against larvae and pupae of *Bactrocera dorsalis* (Diptera: Tephritidae) in guava fruits. *Food Control*, 72: 360–366.~~	P	**EPPO** To be put at the end of the list (alphabetical order). *Category : EDITORIAL*
36	56	~~**Zhao, J., Ma, J., Wu, M., Jiao, X., Wang, Z., Liang, F. & Zhan, G.** 2017. Gamma radiation as a phytosanitary treatment against larvae and pupae of *Bactrocera dorsalis* (Diptera: Tephritidae) in guava fruits. *Food Control*, 72: 360–366.~~	P	**China** This reference should be moved to the last line (Line 57). The references should be sequenced by time. *Category : EDITORIAL*
37	57	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**European Union** Typo. *Category : EDITORIAL*
38	57	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**EPPO** Moved at the end of the list (alphabetical order). Typo. *Category : EDITORIAL*
39	57	**Zhan, G.P., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y.J. & Wang, Q.L.** 2016.	P	**China** *Category : EDITORIAL*