[PleaseReview document review. Review title: 2024 consultation: Draft annex to ISPM 28: Irradiation treatment for Paracoccus marginatus (2023-034). Document title: 2023-034\_Draft\_PT\_Ir\_Pmarginatus\_eng.docx]

***[1]***Draft ANNEX to ISPM 28: Irradiation treatment for *Paracoccus marginatus* (2023-034)

***[2]*Status box**

|  |
| --- |
| ***[3]****This is not an official part of the annex to the standard and it will be modified by the IPPC Secretariat after adoption.* |
| ***[4]*Date of this document** | ***[5]***2024-03-11 |
| ***[6]*Document category** | ***[7]***Draft annex to ISPM 28 |
| ***[8]*Current document stage** | ***[9]****To* first consultation |
| ***[10]*Major stages** | ***[11]***2023-08 Treatment submitted in response to 2017 call for treatments (ongoing).***[12]***2023-09 SC added *Irradiation treatment for* Paracoccus marginatus (2023-034) to the TPPT work programme, subsequently (in 2023-11) assigning it priority 1.***[13]***2023-10 TPPT revised the draft and recommended it to SC for first consultation. |
| ***[14]*Treatment Lead** | ***[15]***2023-08 Meghan NOSEWORTHY (CA, Treatment Lead) |
| ***[16]*Notes** | ***[17]***2024-02 Edited |

***[18]***Scope of the treatment

***[19]***This treatment describes irradiation of fruits and vegetables at 185 Gy minimum absorbed dose to prevent the hatching of eggs from *Paracoccus marginatus* at the stated efficacy.[[1]](#footnote-1)

***[21]***Treatment description

***[22]*Name of treatment** Irradiation treatment for *Paracoccus marginatus*

***[23]*Active ingredient** n/a

***[24]*Treatment type** Irradiation

***[25]*Target pest** *Paracoccus marginatus* Williams and Granara de Willink, 1992 (Hemiptera: Pseudococcidae)

***[26]*Target regulated articles** All fruits, vegetables and ornamental plants that are hosts of *Paracoccus marginatus*

***[27]***Treatment schedule

***[28]***Minimum absorbed dose of 185 Gy to prevent the hatching of eggs from *Paracoccus marginatus.*

***[29]***There is 95% confidence that the treatment according to this schedule prevents the hatching of eggs from not less than 99.9950% of all life stages of *Paracoccus marginatus.*

***[30]***This treatment should be applied in accordance with the requirements of ISPM 18 (*Requirements for the use of irradiation as a phytosanitary measure*).

***[31]***This treatment should not be applied to hosts stored in a modified atmosphere because the modified atmosphere may affect the treatment efficacy.

***[32]***Other relevant information

***[33]***Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Paracoccus marginatus* life stages during the inspection process. This does not imply a failure of the treatment.

***[34]***The Technical Panel on Phytosanitary Treatments (TPPT) based its evaluation of this treatment on the research reported by Song *et al.* (2023), which determined the efficacy of irradiation as a treatment for *Paracoccus marginatus* on *Solanum tuberosum*. The TPPT also considered the information on the effect of irradiation on *Paracoccus marginatus* in Seth *et al.* (2016).

***[35]***The efficacy of this schedule was calculated based on a total of 60 368 gravid females treated with no egg hatching; the control egg hatching was 96.96% in all confirmatory trials conducted.

***[36]***Extrapolation of treatment efficacy to all hosts 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 indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, *C. sinensis* and *Psidium guajava*), *Anastrepha suspensa* (*Averrhoa carambola*, *C. paradisi* and *Mangifera indica*), *Bactrocera tryoni* (*C. sinensis*, *Solanum lycopersicum*, *Malus pumila*, *Mangifera indica*, *Persea americana* and *Prunus avium*), *Cydia pomonella* (*Malus pumila* and artificial diet), *Grapholita molesta* (*Malus 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, 1996; 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 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.

***[37]***Potential implementation issues

***[38]***This section is not part of the standard. The Standards Committee in May 2016 requested the Secretariat to gather information on any potential implementation issues related to this draft. Please provide details and proposals on how to address these potential implementation issues.

***[39]***References

***[40]***The present annex may refer to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at [www.ippc.int/core-activities/standards-setting/ispms](http://www.ippc.int/core-activities/standards-setting/ispms).

***[41]*Bustos, M.E., Enkerlin, W., Reyes, J. & Toledo, J.** 2004. Irradiation of mangoes as a postharvest quarantine treatment for fruit flies (Diptera: Tephritidae). *Journal of Economic Entomology*, 97: 286–292. <https://doi.org/10.1093/jee/97.2.286>

***[42]*Gould, W.P. & von Windeguth, D.L.** 1991. Gamma irradiation as a quarantine treatment for carambolas infested with Caribbean fruit flies. *Florida Entomologist*, 74: 297–300. <https://journals.flvc.org/flaent/article/view/58735>

***[43]*Hallman, G.J.** 2004a. Ionizing irradiation quarantine treatment against oriental fruit moth (Lepidoptera: Tortricidae) in ambient and hypoxic atmospheres. *Journal of Economic Entomology*, 97: 824–827. <https://doi.org/10.1093/jee/97.3.824>

***[44]*Hallman, G.J.** 2004b. Irradiation disinfestation of apple maggot (Diptera: Tephritidae) in hypoxic and low-temperature storage. *Journal of Economic Entomology*, 97: 1245–1248. <https://doi.org/10.1093/jee/97.4.1245>

***[45]*Hallman G.J.** 2013. Rationale for a generic phytosanitary irradiation dose of 70 Gy for the genus *Anastrepha* (Diptera: Tephritidae). *Florida Entomologist*, 96(3): 983–990. <https://journals.flvc.org/flaent/article/view/82599>

***[46]*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. <https://doi.org/10.1603/EC10228>

***[47]*Hallman, G.J. & Martinez, L.R.** 2001. Ionizing irradiation quarantine treatment against Mexican fruit fly (Diptera: Tephritidae) in citrus fruits. *Postharvest Biology and Technology*, 23: 71–77. [https://doi.org/10.1016/S0925-5214(01)00090-4](https://doi.org/10.1016/S0925-5214%2801%2900090-4)

***[48]*Jessup, A.J., Rigney, C.J., Millar, A., Sloggett, R.F. & Quinn, N.M.** 1992. Gamma irradiation as a commodity treatment against the Queensland fruit fly in fresh fruit. In: *Use of irradiation as a quarantine treatment of food and agricultural commodities*. Proceedings of the Final Research Coordination Meeting on Use of Irradiation as a Quarantine Treatment of Food and Agricultural Commodities, Kuala Lumpur, 27–31 August 1990, pp. 13–42. Vienna, International Atomic Energy Agency. 182 pp. <https://www-pub.iaea.org/MTCD/Publications/PDF/Pub873.pdf>

***[49]*Mansour, M.** 2003.Gamma irradiation as a quarantine treatment for apples infested by codling moth (Lepidoptera: Tortricidae). *Journal of Applied Entomology*, 127: 137–141. <https://doi.org/10.1046/j.1439-0418.2003.00723.x>

***[50]*Seth, R., Zarin, M., Khan, Z. & Seth, R.K.** 2016. Towards phytosanitary irradiation of *Paracoccus* *marginatus* (Hemiptera: Pseudococcidae): ascertaining the radiosensitivities of all life stages. *Florida Entomologist*, 99 (Special Issue 2): 88–101. <https://journals.flvc.org/flaent/article/view/88681>

***[51]*Song, Z.-J., Zhao, Q.-Y., Ma, C., Chen, R.-R., Ma, T.-B., Li, Z.-H. & Zhan, G.-P.** 2023. Quarantine disinfestation of papaya mealybug, *Paracoccus* *marginatus* (Hemiptera: Pseudococcidae) using gamma and X-rays irradiation. *Insects*, 14: 682. <https://doi.org/10.3390/insects14080682>

***[52]*Tunçbilek, A.Ş. & Kansu, I.A.** 1996. 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. [https://doi.org/10.1016/0022-474X(95)00039-A](https://doi.org/10.1016/0022-474X%2895%2900039-A)

***[53]*von Windeguth, D.L.** 1986. Gamma irradiation as a quarantine treatment for Caribbean fruit fly infested mangos. *Proceedings of the Florida State Horticultural Society*, 99: 131–134. <https://journals.flvc.org/fshs/article/view/94783>

***[54]*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. <https://journals.flvc.org/fshs/article/view/94415>

***[55]*Zhan, G., Shao, Y., Yu, Q., Xu, L., Liu, B., Wang, Y. & Wang, Q.** 2016. Phytosanitary irradiation of Jack Beardsley mealybug (Hemiptera: Pseudococcidae) females on rambutan (Sapindales: Sapindaceae) fruits. *Florida Entomologist*, 99 (Special Issue 2): 114–120. <https://journals.flvc.org/flaent/article/view/88683>

1. ***[20]*** The scope of phytosanitary treatments does not include issues related to pesticide registration or other domestic requirements for contracting parties’ approval of treatments. Treatments adopted by the Commission on Phytosanitary Measures may not provide information on specific effects on human health or food safety, which should be addressed using domestic procedures before contracting parties approve a treatment. In addition, potential effects of treatments on product quality are considered for some host commodities before their international adoption. However, evaluation of any effects of a treatment on the quality of commodities may require additional consideration. There is no obligation for a contracting party to approve, register or adopt the treatments for use in its territory. [↑](#footnote-ref-1)