[PleaseReview document review. Review title: 2021 Second Consultation: Irradiation treatment for Tortricidae on fruits (2017-011). Document title: 2017-011\_Draft\_PT\_Ir\_Tortricidae on fruits\_2021-04-28.docx]

***[1]***DRAFT ANNEX TO ISPM 28: Irradiation treatment for Tortricidae on fruits (2017-011)

***[2]*Status box**

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| ***[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]***2021-04-28 |
| ***[6]*Document category** | ***[7]***Draft annex to ISPM 28 |
| ***[8]*Current document stage** | ***[9]****To* second consultation |
| ***[10]*Major stages** | ***[11]***2017-06 Treatment submitted in response to 2017-02 call for treatments.***[12]***2017-07 Technical Panel on Phytosanitary Treatments (TPPT) reviewed and requested further information from submitter.***[13]***2018-05 SC added the topic *Irradiation treatment for eggs and larvae of the family Tortricidae (generic)* (2017-11) to the TPPT work programme with priority 1.***[14]***2018-06 TPPT revised the draft and requested additional information from submitter.***[15]***2019-07 TPPT revised the draft, restricting the scope to fruits, and recommended it to the SC for approval for first consultation.***[16]***2020-02 SC approved for first consultation via e-decision (2020\_eSC\_May\_07).***[17]***2020-07 First consultation.***[18]***2021-02 TPPT responded to consultation comments, revised the draft and recommended for second consultation.***[19]***2021-05 SC approved for second consultation via e-decision (2021\_eSC\_May\_14) |
| ***[20]*Treatment Lead** | ***[21]***2018-06 Matthew SMYTH (AU)***[22]***2017-07 Glenn BOWMANN (AU) |
| ***[23]*Notes** | ***[24]***Edited 2020-02***[25]***Edited 2021-04 |

***[26]***Scope of the treatment

***[27]***This treatment describes the irradiation of fruits at 250 Gy minimum absorbed dose to prevent the emergence of viable adults of Tortricidae at the stated efficacy.[[1]](#footnote-1)

***[29]***Treatment description

***[30]*Name of treatment** Irradiation treatment for Tortricidae on fruits

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

***[32]*Treatment type** Irradiation

***[33]*Target pests** Species of the family Tortricidae (Lepidoptera)

***[34]*Target regulated articles** All fruits that are hosts of species of the family Tortricidae

***[35]***Treatment schedule

***[36]***Minimum absorbed dose of 250 Gy to prevent emergence of viable adults from irradiated eggs and larvae of Tortricidae.

***[37]***There is 95% confidence that the treatment according to this schedule prevents the emergence of normal-looking adults from not less than 99.9949% of eggs and larvae of Tortricidae.

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

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

***[40]***Other relevant information

***[41]***Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable Tortricidae eggs or larvae, or deformed adults, during the inspection process. This does not imply a failure of the treatment.

***[42]***The Technical Panel on Phytosanitary Treatments (TPPT) based its evaluation of this treatment on the research reported by Hallman *et al.* (2013), which supported the efficacy of irradiation as a treatment for Tortricidae on host commodities.

***[43]***The efficacy of this schedule was calculated based on a total of 58 779 fifth-instar larvae of *Grapholita molesta* treated with no viable adult emergence; the control emergence was 94.8%. The data for *G. molesta* were used as it is considered the most radio-tolerant of the species studied (Hallman, 2004).

***[44]***The TPPT also considered Arthur (2004), Arthur, Arthur and Machi (2016), Arthur, Machi and Arthur (2016), Batchelor, O’Donnell and Roby (1984), Bestagno *et al.* (1973), Burditt (1986), Burditt and Hungate (1989), Burditt and Moffitt (1985), Dentener, Waddell and Batchelor (1990), Faria *et al.* (1998), Follett (2008), Follett and Lower (2000), Follett and Snook (2012), , Hofmeyr, Hofmeyr and Slabbert (2016), Hofmeyr *et al.* (2016), Lester and Barrington (1997), Lin, Horng and Hung (2003), Mansour (2003), Mansour and Al-Attar (2014), Nadel *et al.* (2018) and Wit and van de Vrie (1986).

***[45]***Extrapolation of treatment efficacy to all fruits 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 as listed in the references. It is recognized, however, that treatment efficacy has not been tested for all potential fruit hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all fruit hosts of Tortricidae is incorrect, then the treatment will be reviewed.

***[46]***References

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

***[48]*Arthur, V.** 2004. Use of gamma radiation to control three Lepidopteran pests in Brazil. In: *Irradiation as a phytosanitary treatment of food and agricultural commodities*. Proceedings of a final research coordination meeting organized by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture 2002, pp. 45–50. IAEA-TECDOC-1427. Vienna, International Atomic Energy Agency (IAEA).

***[49]*Arthur, V., Arthur, P.B. & Machi, A.R.** 2016. Irradiation of *Ecdytolopha aurantiana* (Lepidoptera: Tortricidae) pupae in oxygen requires a lower dose to strongly reduce adult emergence and prevent reproduction than irradiation in air. *Florida Entomologist*, 99: 38–42.

***[50]*Arthur, V., Machi, A.R. & Arthur, P.B.** 2016. Adult emergence and F1 generation egg and larval production after γ-irradiation of late pupae of *Grapholita molesta* (Lepidoptera: Tortricidae). *Florida Entomologist*, 99: 67–68.

***[51]*Batchelor, T.A., O’Donnell, R.L. & Roby, J.R.** 1984. Irradiation as a quarantine treatment for ‘Granny Smith’ apples infested with *Epiphyas postvittana* (Walk.) (light brown apple moth) stages. In: O.T. McCarthy & G.L. Robertson, eds. *Proceedings of the National Symposium on Food Irradiation*, 10 and 11 October 1984, Palmerston North, New Zealand, pp. 127–151. Palmerston North, New Zealand, Massey University Printery. 223 pp.

***[52]*Bestagno, G., Piana, S., Roberti, L. & Rota, P.** 1973. Radiazioni ionizzanti contro le tortrici del garofano. *Notiziaro sulle Malattie delle Piante*, 88–89: 195–220.

***[53]*Burditt Jr, A.K.** 1986. γ irradiation as a quarantine treatment for walnuts infested with codling moths (Lepidoptera: Tortricidae). *Journal of Economic Entomology*, 79: 1577–1579.

***[54]*Burditt Jr, A.K. & Hungate, F.P.** 1989. Gamma irradiation as a quarantine treatment for apples infested by codling moth (Lepidoptera: Tortricidae). *Journal of Economic Entomol*ogy, 82: 1386–1390.

***[55]*Burditt Jr, A.K. & Moffitt, H.R.** 1985. Irradiation as a quarantine treatment for fruit subject to infestation by codling moth larvae. In: J.H. Moy, ed. *Radiation disinfestation of food and agricultural products*.Proceedings of the International Conference, Honolulu, 1983, pp. 87–97. Honolulu, United States of America, University of Hawaii at Manoa.

***[56]*Dentener, P.R., Waddell, B.C. & Batchelor, T.A.** 1990. Disinfestation of lightbrown apple moth: a discussion of three disinfestation methods. In: *Managing postharvest horticulture in Australasia*.Proceedings of the Australian Conference on Postharvest Horticulture. Australian Institute of Science Occasional Publication No. 46, pp. 166–177.

***[57]*Faria, J.T., Arthur, V., Wiendl, T.A. & Wiendl, F.M.** 1998. Gamma radiation effects on immature stages of the orange fruit borer, *Ecdytolopha arantiana* (Lima). *Journal of Nuclear Agriculture and Biology*, 21: 52–56.

***[58]*Follett, P.A.** 2008. Effect of irradiation on Mexican leafroller (Lepidoptera: Tortricidae) development and reproduction. *Journal of Economic Entomology*, 101: 710–715.

***[59]*Follett, P.A. & Lower, R.A.** 2000. Irradiation to ensure quarantine security for *Cryptophlebia* spp. (Lepidoptera: Tortricidae) in sapindaceous fruits from Hawaii. *Journal of Economic Entomology*, 93: 1848–1854.

***[60]*Follett, P.A. & Snook, K.** 2012. Irradiation for quarantine control of the invasive light brown apple moth (Lepidoptera: Tortricidae) and a generic dose for tortricid eggs and larvae. *Journal of Economic Entomology*, 105: 1971–1978.

***[61]*Hallman, G.J.** 2004. Ionizing irradiation quarantine treatment against oriental fruit moth (Lepidoptera: Tortricidae) in ambient and hypoxic atmospheres. *Journal of Economic Entomology*, 97: 824–827.

***[62]*Hallman, G.J., Arthur, V., Blackburn, C.M. & Parker, A.G.** 2013. The case for a generic phytosanitary irradiation dose of 250 Gy for Lepidoptera eggs and larvae. *Radiation Physics and Chemistry*, 89: 70–75.

***[63]*Hofmeyr, H., Hattingh, V., Hofmeyr, M. & Slabbert, K.** 2016. Postharvest phytosanitary disinfestation of *Thaumatotibia leucotreta* (Lepidoptera: Tortricidae) in citrus fruit: Validation of an ionizing radiation treatment. *Florida Entomologist*, 99: 54–58.

***[64]*****Hofmeyr, H., Hofmeyr, M. & Slabbert, K.** 2016. Postharvest phytosanitary disinfestation of *Thaumatotibia leucotreta* (Lepidoptera: Tortricidae) in citrus fruit: Tolerance of eggs and larvae to ionizing radiation. *Florida Entomologist*, 99: 48–53.

***[65]*Lester, P.J. & Barrington, A.M.** 1997. Gamma irradiation for postharvest disinfestation of *Ctenopseustis obliquana* (Walker) (Lep., Tortricidae). *Journal of Applied Entomology*, 121: 107–110.

***[66]*Lin, J.Y., Horng, S.B. & Hung, C.C.** 2003. Effects of gamma radiation on survival and reproduction of the carambola fruit borer, *Eucosma notanthes* Meyrick (Lepidoptera: Tortricidae). *Formosan Entomologist*, 23: 189–197.

***[67]*Mansour, M.** 2003. Gamma irradiation as a quarantine treatment for apples infested by codling moth (Lep., Tortricidae). *Journal of Applied Entomology*, 127: 137–141.

***[68]*Mansour, M. & Al-Attar, J.** 2014. Effects of gamma irradiation on the grape vine moth, *Lobesia botrana*, mature larvae. *Radiation Physics and Chemistry*, 97: 370–373.

***[69]*Nadel, H., Follett, P.A., Perry, C.L. & Mack, R.G.** 2018. Postharvest irradiation treatment for quarantine control of the invasive *Lobesia botrana* (Lepidoptera: Tortricidae). *Journal of Economic Entomology*, 111: 127–134.

***[70]*Wit, A.K.H. & van de Vrie, M.** 1986. Possibilities for irradiation to control insects and mites in cut flowers after harvest. Irradiation as a quarantine disinfestation treatment. Report of the 1st Meeting of the Coordinated Research Project, Chiang Mai. Vienna, IAEA. 11 pp.

1. ***[28]*** 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)