



DRAFT ANNEX TO ISPM 28: Irradiation treatment for *Pseudococcus jackbeardsleyi* (2017-027)

Status box

This is not an official part of the annex to the standard and it will be modified by the IPPC Secretariat after adoption.	
Date of this document	2022-11-01
Document category	Draft annex to ISPM 28
Current document stage	To CPM for adoption
Major stages	<p>2017-06 Treatment submitted in response to 2017-02 call for treatments.</p> <p>2017-07 Technical Panel on Phytosanitary Treatments (TPPT) reviewed and requested further information from submitter.</p> <p>2018-05 SC added the topic <i>Irradiation treatment for Pseudococcus jackbeardsleyi</i> (2017-027) to the TPPT work programme with priority 3.</p> <p>2018-03 TPPT revised the draft PT and requested further information from submitter.</p> <p>2019-07 TPPT requested further information from submitter.</p> <p>2020-06 Submitter provided further information.</p> <p>2020-10 TPPT reviewed the draft and recommended it to the SC for consultation.</p> <p>2021-03 SC approved for first consultation via e-decision (2020_eSC_May_12).</p> <p>2021-07 First consultation.</p> <p>2022-05 TPPT reviewed and recommended it to the SC for consultation.</p> <p>2022-06 SC approved for second consultation via e-decision (2022_eSC_Nov_04).</p> <p>2022-07 Second consultation.</p> <p>2022-10 TPPT reviewed the responses to consultation comments, revised the draft and recommended it to the SC for approval for adoption by the CPM.</p> <p>2022-12 SC approved the draft PT for adoption via e-decision (2022_eSC_Nov_01)</p>
Treatment Lead	<p>2019-07 Walther ENKLERLIN (IAEA)</p> <p>2017-07 Andrew PARKER (IAEA)</p>
Notes	<p>2021-02 Edited</p> <p>2022-11 Edited</p>

Scope of the treatment

This treatment describes the irradiation of fruits, vegetables and ornamental plants at 166 Gy minimum absorbed dose to prevent development of F1 second-instar nymphs from mature adult females of *Pseudococcus jackbeardsleyi* at the stated efficacy.¹

Treatment description

Name of treatment Irradiation treatment for *Pseudococcus jackbeardsleyi*

¹ 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.

Active ingredient	n/a
Treatment type	Irradiation
Target pest	<i>Pseudococcus jackbeardsleyi</i> Gimpel & Miller, 1996 (Hemiptera: Pseudococcidae)
Target regulated articles	All fruits, vegetables and ornamental plants that are hosts of <i>Pseudococcus jackbeardsleyi</i>

Treatment schedule

Minimum absorbed dose of 166 Gy to prevent development to the second-instar nymph stage of progeny from mature adult females of *Pseudococcus jackbeardsleyi*.

There is 95% confidence that the treatment according to this schedule prevents offspring developing to the second-instar nymph stage from not less than 99.9977% of mature adult females of *Pseudococcus jackbeardsleyi*.

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, vegetables or ornamental plants stored in modified atmosphere because modified atmosphere may affect the treatment efficacy.

Other relevant information

Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Pseudococcus jackbeardsleyi* eggs, nymphs and adults during the inspection process. This does not imply a failure of the treatment.

The Technical Panel on Phytosanitary Treatments (TPPT) based its evaluation of this treatment on the research reported by Zhan *et al.* (2016), which determined the efficacy of irradiation as a treatment for this pest on potato (*Solanum tuberosum*) and pumpkin (*Cucurbita pepo*). The TPPT also considered information on the effect of irradiation on *Pseudococcus jackbeardsleyi* in Hofmeyr *et al.* (2016) and Shao *et al.* (2013).

The efficacy of this schedule was calculated based on a total of 131 512 mature adult females treated with offspring prevented from developing to the second-instar nymph stage; in the control, development of the second instar from neonates was estimated at 98.5%.

Extrapolation of treatment efficacy to all fruits, vegetables and ornamental plants 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*, *Citrus sinensis* and *Psidium guajava*), *Anastrepha suspensa* (*Averrhoa carambola*, *Citrus paradisi* and *Mangifera indica*), *Bactrocera tryoni* (*Citrus sinensis*, *Solanum lycopersicum*, *Malus pumila*, *Mangifera indica*, *Persea americana* and *Prunus avium*), *Cydia pomonella* (*Malus pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita pepo* 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 fruit, vegetable and ornamental plant 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

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.

- 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.
- 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.
- 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.
- Hallman, G.J.** 2004b. Irradiation disinfestation of apple maggot (Diptera: Tephritidae) in hypoxic and low-temperature storage. *Journal of Economic Entomology*, 97: 1245–1248.
- 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.
- 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.
- 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.
- Hofmeyr, H., Doan, T.T., Indarwatmi, M., Seth, R. & Zhan, G.** 2016. Development of a generic radiation dose for the postharvest phytosanitary treatment of mealybug species (Hemiptera: Pseudococcidae). *Florida Entomologist*, 99 (Special Issue 2): 191–196.
- 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, August 1990, pp. 13–42. Vienna, International Atomic Energy Agency.
- Mansour, M.** 2003. Gamma irradiation as a quarantine treatment for apples infested by codling moth (Lepidoptera: Tortricidae). *Journal of Applied Entomology*, 127: 137–141.
- Shao, Y., Ren, L., Liu, Y., Wang, Y., Jiao, Y., Wang, Q. & Zhan, G.** 2013. The primary results of the impact on the development and reproduction of Jack Beardsley Mealybug irradiated with Colbot-60 gamma rays. *Plant Quarantine*, 27(6): 51–55 (in Chinese with English abstract).
- 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.
- 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.
- 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., 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.