DRAFT ANNEX TO ISPM 28: Irradiation treatment for all stages of the family Pseudococcidae (generic) (2017-012)

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| **Status box** | |
| This is not an official part of the standard and it will be modified by the IPPC Secretariat after adoption. | |
| **Date of this document** | 2024-05-24 |
| **Document category** | Draft Annex to ISPM 28 |
| **Current document stage** | *To* 2024-06 TPPT meeting |
| **Major stages** | 2017-06 Treatment submitted  2017-07 TPPT reviewed treatment, agree to recommend to SC for inclusion on the List of Topics for IPPC standards and requested additional information  2019-05 Submitter responded  2021-07 TPPT reviewed treatment CRP project of the IAEA  2024-06 TPPT reviewed treatment |
| **Treatment lead** | 2017-07 Mr Daojian YU (CN) |
| **Secretariat notes** |  |

Scope of the treatment

1. This treatment describes the generic irradiation treatment of fruits and vegetables to prevent no development beyond F1 1st instar for all stages of the family Pseudococcidae at the stated efficacy level[[1]](#footnote-1).

Treatment description

1. **Name of treatment** Irradiation treatment for all stages of the family Pseudococcidae (Generic)
2. **Active ingredient** N/A
3. **Treatment type** Irradiation
4. **Target pest** Pseudococcidae (Hemiptera)
5. **Target regulated articles** All fruits and vegetables that are hosts of the above mealybugs.

Treatment schedule

1. Minimum absorbed dose of 250 Gy to prevent no development beyond F1 1st instar of all stages of the family Pseudococcidae.
2. There is 95% confidence that the treatment according to this schedule prevents the continued development of F1 1st instars of up to 99.997% of all Pseudococcidae when irradiated as any stage infesting fresh commodities.
3. This treatment should be applied in accordance with the requirements of ISPM 18 (*Guidelines for the use of irradiation as a phytosanitary measure*).
4. This irradiation treatment should not be applied to fruits and vegetables stored in modified atmospheres.

Other relevant information

1. This treatment schedule was based on the work of Hofmeyr *et al.* (2016a). Dose of 250 Gy produced complete sterility in 13 824 eggs oviposited by 3093 treated adults of *Maconellicoccus hirsutus* (Jacobsen and Hara 2003). 165-258 Gy induce lethality in developing stages, sterility in adults of *Paracooccus marginatus* (Seth e al., 2016c). A dose of 150 Gy prevents the development of egg laid of up to 99.9964% of *Planococcus citri* and 99.9709% of *Planococcus ficus* (Hofmeyr *et al.* 2016b). Dose of 166 Gy prevents no development beyond F1 1st instar of up to 99.9975% on *Solanum tuberosum* and 99.9939% on *Cucurbita* sp. and 99.9982% (all females) of *Pseudococcus jackbeardsleyi* (Zhan et al., 2016). Dose of 231 Gy prevents no development beyond F1 1st instar of up to 99.99023 % of adult females of *Dysmicoccus neobrevipes*, (which is much tolerance than *Planococcus lilacinus* and *Planococcus*) (Doan et al., 2016, ISPM 28 PT 19).
2. Very little data is available for other members of the Pseudococcidae and all papers are listed in the references. In each case a dose near to or less than 200 Gy was sufficient to ensure no reproduction providing additional confidence in the proposed dose.

**References**

1. The present standard refers to International Standards for Phytosanitary Measures (ISPMs). ISPMs are available on the International Phytosanitary Portal (IPP) at https://www.ippc.int/coreactivities/standards-setting/ispms.

**Doan TT, Nguyen TK, Vo TKL, Nguyen TL, Cao VC, Tran TTA, Nguyen HHT**. 2016. Phytosanitary irradiation against the mealybugs, *Dysmicoccus neobrevipes, Planococcus lilacinus* and *Planococcus minor* (Hemiptera: Pseudococcidae) infesting dragon fruit (Caryophyllales: Cactaceae) in Vietnam. Florida Entomologist 99(special issue 2): 159-165.

**Dohino T, Masaki S**. 1995. Effects of electron beam irradiation on Comstock mealybug, *Pseudococcus comstocki* (Kuwana) (Homoptera: Pseudococcidae). Research Bulletin of the Plant Protection Service Japan 31: 31-36.

**Dohino T, Masaki S, Takano T, Hayashi T**. 1997. Effects of electron beam irradiation on sterility of Comstock mealybug, *Pseudococcus comstocki* (Kuwana) (Homoptera: Pseudococcidae). Research Bulletin of the Plant Protection Service Japan 33: 31-34.

**Hofmeyr H, Doan TT, Indarwatmi M, Seth R, Zhan GP.** 2016a. Development of a generic radiation dose for the postharvest phytosanitary treatment of mealybug species (Hemiptera: Pseudococcidae). Florida Entomologist 99(special issue 2): 191-196.

**Hofmeyr H, Hofmeyr M, Slabbert K.** 2016b. Postharvest phytosanitary irradiation disinfestation of *Planococcus citri* and *P. ficus* (Hemiptera: Pseudococcidae). Florida Entomologist 99(special issue 2): 166-170.

**Kuswadi AN, Indarwatmi M, Nasution IA, Sasmita HI.** 2016. Minimum gamma irradiation dose for phytosanitary treatment of the cacao mealybug, *Exallomochlus hispidus* (Hemiptera: Pseudococcidae). Florida Entomologist 99(special issue 2): 69-75.

**Miller DR, Miller GL, Watson GW**. 2002. Invasive species of mealybugs (Hemiptera: Pseudococcidae) and their threat to U.S. agriculture. Proceedings of the Entomological Society of Washington. 104: 825-836.

**Seth RK, Zarin M, Khan Z, Seth R.** 2016a. Efficacy of ionizing radiation as phytosanitary treatment against the various ontogenic stages of the Solenopsis mealybug, *Phenacoccus solenopsis* (Hemiptera: Pseudococcidae). Florida Entomologist 99(special issue 2): 76-87.

**Seth R, Zarin M, Khan Z, Seth RK.** 2016b. Effects of gamma radiation on metamorphic disruption and sterility in the pink hibiscus mealybug, *Maconellicoccus hirsutus* (Hemiptera: Pseudococcidae), to establish phytosanitary irradiation against infested agro-commodities. Florida Entomologist 99: 107-113.

**Seth R, Zarin M, Khan Z, Seth RK**. 2016c. Towards phytosanitary irradiation of *Paracoccus marginatus* (Hemiptera: Pseudococcidae): Ascertaining the radiosensitivities of all life stages. Florida Entomologist 99(special issue 2): 88-101.

**Zhan GP, Shao Y, Yu Q, Xu L, Liu B, Wang YJ, Wang QL,** 2016. Phytosanitary irradiation of Jack Beardsley mealybug (Hemiptera: Pseudococcidae) females on rambutan (Sapindales: Sapindaceae) fruits. Florida Entomologist 99(special issue 2): 114-120.

1. The scope of phytosanitary treatments does not include issues related to pesticide registration or other domestic requirements for contracting parties’approval of treatments for use in their territory. Treatments adopted by the CPM may not provide information on specific effects on human health or food safety, which should be addressed using domestic procedures prior to contracting parties approving a treatment for use in its territory. 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)