DRAFT ANNEX TO ISPM 28: Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis* (2017-029)

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	2023-12-01
Document category	Draft annex to ISPM 28
Current document stage	*To* Standards Committee (SC) for approval for adoption
Major stages	2017-06 Treatment submitted in response to 2017-02 Call for treatments (*Cold treatment of fruit and vegetables including citrus fruit* Citrus *spp. for* Thaumatotibia leucotreta). 2017-07 Technical Panel on Phytosanitary Treatments (TPPT) reviewed and requested further information from submitter. 2018-05 SC added *Cold treatment* Thaumatotibia leucotreta *on* Citrus *spp*. to the TPPT work programme with priority 2. 2018-02 Submitter provided further information. 2019-07 TPPT revised the draft, restricting the scope to *Citrus sinensis*, and recommended it to the SC for approval for consultation. 2020-02 SC approved for first consultation via e-decision (2020_eSC_May_08). 2020-07 First consultation. 2021-03 TPPT reviewed consultation comments, revised the draft and requested further information from submitter. 2021-05 Submitter provided further information. 2021-07 TPPT reviewed information provided by submitter. 2022-09 TPPT revised and recommended to SC for second consultation. 2023-05 SC approved for consultation via e-decision (2023_eSC_Nov_03). 2023-07 Second consultation. 2023-10 TPPT reviewed consultation comments, revised the draft and recommended it to the SC for approval for adoption by the CPM.
Treatment Lead	2019-07 Peter LEACH (AU) 2017-07 Yuejin WANG (CN)
Notes	2020-02 Edited 2023-05 Edited 2023-12 Edited

Scope of the treatment

This treatment describes the cold treatment of fruit of *Citrus sinensis*[1] to result in the mortality of eggs and larvae of *Thaumatotibia leucotreta* at the stated efficacy.[2]

[1] Citrus species and hybrids are named according to the nomenclature in Cottin, R. 2002. *Citrus of the world – A citrus directory*, version 2.0. France, SRA INRA-CIRAD.

[2] 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

Treatment description

Name of treatment	Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis*
Active ingredient	n/a
Treatment type	Physical (cold)
Target pest	*Thaumatotibia leucotreta* (Meyrick, 1913) (Lepidoptera: Tortricidae)
Target regulated articles	Fruit of *Citrus sinensis*

Treatment schedules

Schedule 1: −0.2 °C or below for 16 continuous days

There is 95% confidence that the treatment according to this schedule kills not less than 99.9970% of eggs and larvae of *Thaumatotibia leucotreta.*

Schedule 2: 1.0 °C or below for 19 continuous days

There is 95% confidence that the treatment according to this schedule kills not less than 99.9973% of eggs and larvae of *Thaumatotibia leucotreta.*

For both schedules, fruit must reach the treatment temperature before treatment exposure time commences. The fruit core temperature should be monitored and recorded, and the temperature should not exceed the stated level throughout the duration of the treatment.

This treatment should be applied in accordance with the requirements of ISPM 42 (*Requirements for the use of temperature treatments as phytosanitary measures*).

Other relevant information

In evaluating this treatment, the Technical Panel on Phytosanitary Treatments considered issues associated with temperature regimes and thermal conditioning, taking into account the work of Hallman and Mangan (1997).

Schedules 1 and 2 were based on the work of Moore *et al*. (2017) and were developed using the fourth- and fifth-instar larvae of *Thaumatotibia leucotreta* bred on an artificial diet. Comparison of the cold tolerance of larvae on fruit and artificial diets has demonstrated that larvae bred on an artificial diet can be used to examine the efficacy of cold treatment of larvae on fruit, without overestimating the efficacy of the treatment at high efficacy (LD99 or greater) (Myburg, 1965; Moore *et al*., 2016, 2022).

The efficacy of schedule 1 was calculated based on 100 044 fourth- and fifth-instar larvae treated with no survivors; the overall control mortality was 1.7%.

The efficacy of schedule 2 was calculated based on 109 304 fourth- and fifth-instar larvae treated with no survivors; the overall control mortality was 0.4%.

References

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.

Hallman, G.J. & Mangan, R.L. 1997. Concerns with temperature quarantine treatment research. In: G.L. Obenauf, ed. *Proceedings of the 1997 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reduction*, San Diego, USA, 3–5 November 1997, pp. 79-

require additional consideration. There is no obligation for a contracting party to approve, register or adopt the treatments for use in its territory.

1–79-4. Fresno, USA, Methyl Bromide Alternatives Outreach. https://www.mbao.org/static/docs/confs/1997-sandiego/papers/079hallman.pdf

Moore, S.D., Kirkman, W., Albertyn, S. & Hattingh, V. 2016. Comparing the use of laboratory-reared and field-collected *Thaumatotibia leucotreta* (Lepidoptera: Tortricidae) larvae for demonstrating efficacy of postharvest cold treatments in citrus fruit. *Journal of Economic Entomology*, 109(4) 1571–1577. Erratum (2016), *Journal of Economic Entomology*, 110(2): 793. https://doi.org/10.1093/jee/tow137 (article) https://doi.org/10.1093/jee/tow270 (erratum)

Moore, S.D., Kirkman, W., Stephen, P.R., Albertyn, S., Love, C.N., Grout, T.G. & Hattingh, V. 2017. Development of an improved postharvest cold treatment for *Thaumatotibia leucotreta* (Meyrick) (Lepidoptera: Tortricidae). *Postharvest Biology and Technology*, 125: 188–195. https://doi.org/10.1016/j.postharvbio.2016.11.017

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Myburgh, A.C. 1965. Low temperature sterilization of false codling moth, *Argyroploce leucotreta* Myer., in export citrus. *Journal of the Entomological Society of Southern Africa*, 28(5): 277–285. https://journals.co.za/doi/epdf/10.10520/AJA00128789_3425