



Food and Agriculture  
Organization of the  
United Nations



International  
Plant Protection  
Convention

ISPM 28  
ANNEX 46

ENG

INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES 28

PHYTOSANITARY TREATMENT

# PT 46: Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis*

Produced by the Secretariat of the  
International Plant Protection Convention (IPPC)

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## ISPM 28

### Phytosanitary treatments for regulated pests

#### PT 46: Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis*

Adopted 2024; published 2024

##### Scope of the treatment

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

##### Treatment description

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

##### 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*).

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<sup>1</sup> 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.

<sup>2</sup> 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.

## 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. 79–1–79-4. 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)
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- Moore, S.D., Peyper, M., Kirkman, W., Marsberg, T., Albertyn, S., Stephen, P.R., Thackeray, S.R. et al.** 2022. Efficacy of various low temperature and exposure time combinations for *Thaumatotibia leucotreta* (Meyrick) (Lepidoptera: Tortricidae) larvae. *Journal of Economic Entomology*, 115(4): 1115–1128. <https://doi.org/10.1093/jee/toac064>
- 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](https://journals.co.za/doi/epdf/10.10520/AJA00128789_3425)

**Publication history**

*This is not an official part of the standard*

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 Standards Committee (SC) added *Cold treatment Thaumatotibia leucotreta on Citrus spp.* (2017-029) to TPPT work programme.

2018-02 Submitter provided further information.

2019-07 TPPT revised the draft, restricting the scope to *Citrus sinensis*, and recommended it to 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 SC for approval for adoption by CPM.

2023-12 SC recommended to CPM for adoption via e-decision (2024\_eSC\_May\_01).

2024-04 CPM-18 adopted the phytosanitary treatment.

**ISPM 28. Annex 46.** Cold treatment for *Thaumatotibia leucotreta* on *Citrus sinensis*. IPPC Secretariat. Rome, FAO.

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## **IPPC**

The International Plant Protection Convention (IPPC) is an international plant health agreement that aims to protect global plant resources and facilitate safe trade. The IPPC vision is that all countries have the capacity to implement harmonized measures to prevent pest introductions and spread, and minimize the impacts of pests on food security, trade, economic growth, and the environment.

### **Organization**

- » There are over 185 IPPC contracting parties.
- » Each contracting party has a national plant protection organization (NPPO) and an official IPPC contact point.
- » Ten regional plant protection organizations (RPPOs) have been established to coordinate NPPOs in various regions of the world.
- » IPPC liaises with relevant international organizations to help build regional and national capacities.
- » The secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).

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