



DRAFT ANNEX TO ISPM 28: Cold treatment for *Bactrocera zonata* on *Citrus sinensis* (2017-013)

Status box	
This is not an official part of the standard and it will be modified by the IPPC Secretariat after adoption.	
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Document category	Draft annex to ISPM 28
Current document stage	To CPM for adoption
Major stages	2017-06 Treatment submitted in response to 2017-02 call for treatments. 2017-11 Technical Panel on Phytosanitary Treatments (TPPT) reviewed the submission (virtual meeting). 2018-04 IPPC Secretariat sent summary of discussion and requested further information from submitter. 2018-05 SC added the topic <i>Cold treatment for Bactrocera zonata on Citrus sinensis</i> (2017-013) to the TPPT work programme with priority 2. 2019-05 Submitter supplied additional information. 2019-07 TPPT revised the draft and recommended it to the SC for approval for consultation. 2020-02 SC approved for first consultation via e-decision (2020_eSC_May_09). 2020-07 First consultation. 2021-03 TPPT meeting responded to consultation comments, revised the draft and recommended it for second consultation. 2021-05 SC approved for second consultation via e-decision (2021_eSC_May_15). 2021-07 Second consultation. 2021-10 TPPT reviewed and recommended to the SC for approval for adoption by the CPM. 2021-12 SC approved for adoption by the CPM via e-decision (2022_eSC_May_02)
Treatment Lead	2017-11 Toshiyuki DOHINO (JP)
Notes	2020-02 Edited 2021-04 Edited 2021-11 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 *Bactrocera zonata* 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 <i>Bactrocera zonata</i> on <i>Citrus sinensis</i>
Active ingredient	n/a
Treatment type	Physical (cold)
Target pest	<i>Bactrocera zonata</i> (Saunders, 1842) (Diptera: Tephritidae)
Target regulated articles	Fruit of <i>Citrus sinensis</i>

Treatment schedule

1.7 °C or below for 18 continuous days.

There is 95% confidence that the treatment according to this schedule kills not less than 99.9916% of eggs and larvae of *Bactrocera zonata*.

The 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).

The efficacy of this schedule was calculated based on 35 733 third-instar larvae treated with no survivors. This number is based on 36 820 larvae, corrected per replicate for control mortality; the average control mortality was 2.06%.

This schedule was based on the work of Hallman *et al.* (2013a, 2013b), Hashem, Soliman and Soliman (2004) and Mohamed and El-Wakkad (2009). The schedule was developed using the cultivars ‘Valencia’ and ‘Navel’, and using larval mortality.

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, CA, 3–5 November 1997, pp. 79-1–79-4. Fresno, United States of America, Methyl Bromide Alternatives Outreach. (also available at <https://www.mbao.org/static/docs/confs/1997-sandiego/papers/079hallman.pdf>).

Hallman, G.J., Myers, S.W., Taret, G., Fontenot, E.A. & Vreysen, M.J.B. 2013a. Phytosanitary cold treatment for oranges infested with *Bactrocera zonata* (Diptera: Tephritidae). *Journal of Economic Entomology*, 106: 2336–2340.

Hallman, G.J., Myers, S.W., El-Wakkad, M.F., Tadrous, M.D. & Jessup, A.J. 2013b. Development of phytosanitary cold treatments for oranges infested with *Bactrocera invadens* and *Bactrocera*

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

zonata (Diptera: Tephritidae) by comparison with existing cold treatment schedules for *Ceratitis capitata* (Diptera: Tephritidae). *Journal of Economic Entomology*, 106: 1608–1612.

Hashem, A.G., Soliman, N.A. & Soliman, A.M. 2004. Effect of low temperatures on eggs and larvae of Mediterranean fruit fly and peach fruit fly inside fruits as a quarantine procedure. *Annals of Agricultural Science, Moshtohor*, 42: 345–356.

Mohamed, S.M.A. & El-Wakkad, M.F. 2009. Cold storage as disinfestation treatment against the peach fruit fly, *Bactrocera zonata* (Saunders), (Diptera: Tephritidae) on Valencia orange. *Egyptian Journal of Applied Sciences*, 24: 290–301.