



2009-105: Draft Annex to ISPM 28 - Vapour heat treatment for *Bactrocera melanotus* and *B. xanthodes* on *Carica papaya*

Com m. no.	Par a. no.	Comment type	Comment	Explanation	Country	SC response
1.	G	Editorial		In some places the genus name (<i>Bactrocera</i>) is abbreviated and elsewhere it is not, eg title, paragraphs 4, 6, 22 etc. It may be appropriate to retain genus name in full in the title, but we suggest the Secretariat checks and adjusts the draft for consistency.	EPPO, European Union, Georgia, Serbia	Considered. The IPPC Secretariat will apply the appropriate style before publishing.
2.	G	Editorial		To allow the standard to effectively suit its purpose, while treatments specifications have been mentioned below, it is recommended that the standard also include a section on those situations that make a treatment invalid. eg on of the probe fruit struggling to reach the target fruit core temp and the treatment time has gone over the 3 hours. The standard may also consider a section on pretreatment activities (thermal mapping to determine cold spots, thermo-tolerance studies etc) posing as a reminder/check so that all the work needed to be done prior is done and finalized as they are not considered in the current draft. Those details will also link in well (point of reference) when contracting parties develop their regulations for the complete confidence required by the importing country.	New Zealand	Considered. According to the other annex for ISPM 28 (e.g. cold treatment), the TPPT considered that temperature monitoring and pretreatment activities instruction are important operationally but are not part of the treatment schedule. NPPOs certifying the use of heat treatments should therefore ensure these operational issues are managed appropriately. Further guidance to NPPOs on these issues will be

						addressed by the drafting of the ISPM on requirements for the use of temperature treatments.
3.	G	Substantive	I support the document as it is and I have no comments		Singapore, Lao People's Democratic Republic, Canada, Georgia, Thailand, Nepal, Barbados, Dominica, Ghana, Belize, Australia, Burundi, Gabon	Incorporated.
4.	G	Substantive	Suggest to set specific operational procedures firstly taking example of the irradiation treatments and then draft the standards as annex.	The specific operational procedures should be established as soon as possible, otherwise it can't provide guidance.	China	Considered. Further guidance to NPPOs on operational issues will be addressed by the drafting of the ISPM on requirements for the use of temperature treatments.
5.	G	Substantive	(1) This standard treatment is vapor heat treatment. (2) Target regulated articles should be specified at cultivar level. -	(1) As relative humidity of the research data is about 90% according to Waddell et al. (1997), the proposed treatment standard should be vapor heat treatment not high temperature forced air treatment. (2) With regard to differences in fruit variety, Yoshinaga et al. (2009) and Omura et al. (2014) suggested difference in mango variety had an effect on the mortality rate in vapour heat treatment. References: Masakuni Yoshinaga, Seiki Masaki and Toshiyuki Dohino. 2009. Vapor heat mortality tests on the eggs of the oriental fruit fly, <i>Bactrocera dorsalis</i> , infesting different sizes and varieties of fresh mango. Res. Bull. Pl. Prot. Japan No. 45: 41-47	Japan	(1) Modified. While Waddell et al. (1993) demonstrates that the treatment is applied at RH levels below those of classic VH treatments, the panel agrees that this is fundamentally a VH treatment albeit at a below dew-point RH level. The treatment has been renamed a VH treatment and this

				Kazutaka Omura, Toshiyuki Dohino, Masahiro Tanno, Isao Miyazaki and Norihito Suzuki. 2014. Vapor Heat Mortality Tests on the Eggs of Oriental Fruit Fly, <i>Bactrocera dorsalis</i> , Infesting Different Fruit Shape of Fresh Mango. Res. Bull. Pl. Prot. Japan No. 50 : 1 -8		reference has been added to the draft PT. (2) Modified. The TPPT agrees that the papers Yoshinaga et al. (2009) and Omura et al. (2014) clearly demonstrate that fruit size is a factor to be considered in heat treatment schedules. The TPPT modified the schedules to accommodate the different fruit sizes from those used in the confirmatory tests (Waddell et al. 1993).
6.	G	Editorial		The value of ED is described at 99.9914 in this draft. But according to the references mentioned in this draft, the number of pests used in the test is insufficient. It is necessary to add appropriate references in the draft.	Korea, Republic of, NEPPO, Costa Rica	Considered. The number of pests used in the test is provided in Waddell et al. 1993. This reference was included in the draft PT.
7.	1	Editorial	Draft Annex to ISPM 28:2007: High temperature forced air treatment for <i>Bactrocera melanotus</i> and <i>Bactrocera xanthodes</i> on <i>Carica papaya</i> (2009-105)	Edit	United States of America, Mexico	Incorporated.
8.	4	Editorial	This treatment comprises the treatment of fruit of <i>Carica papaya</i> in a high temperature forced air chamber to result in the mortality of eggs and larvae (all ages) of <i>Bactrocera melanotus</i> and <i>Bactrocera xanthodes</i> (Pacific fruit fly) at the stated efficacy ¹ .	The Secretariat should ensure that all treatments not include the common name because common names are varied across regions and across languages. In addition, common names have not been included in adopted standards.	United States of America	Considered, but not incorporated. The IPPC Secretariat will apply the appropriate style before publishing.

9.	4	Substantive	This treatment comprises the treatment of fruit of <i>Carica papaya</i> in a high temperature forced air chamber to result in the mortality of eggs and larvae (all ages) of <i>Bactrocera melanotus</i> and <i>Bactrocera xanthodes</i> (Pacific fruit fly) at the stated efficacy ¹ .	Suggest clarifying whether this includes all papaya varieties. Concern whether the treatment is suitable to all varieties of papayas for the indicated fruit fly species and from locations where they are grown.	United States of America	Considered and reflected in the revised treatment schedule.
10.	4	Substantive	This treatment comprises the <u>vapor heat</u> treatment of fruit of <i>Carica papaya</i> in a high temperature forced air chamber to result in the mortality of eggs and larvae (all ages) of <i>Bactrocera melanotus</i> and <i>Bactrocera xanthodes</i> (Pacific fruit fly) at the stated efficacy ¹ .	The same as Japan's general comment (1).	Japan	Modified. Same as comment No.5. While Waddell et al. (1993) demonstrates that the treatment is applied at RH levels below those of classic VH treatments, the panel agrees that this is fundamentally a VH treatment albeit at a below dew-point RH level. The treatment has been renamed a VH treatment and this reference has been added to the draft PT.
11.	4	Technical	This treatment comprises the treatment of fruit of <i>Carica papaya</i> in a high temperature forced air chamber to result in the mortality of eggs and larvae (all <u>instars</u> ages) of <i>Bactrocera melanotus</i> and <i>Bactrocera xanthodes</i> (Pacific fruit fly) at the stated efficacy ¹ .	More technically correct	United States of America	Considered and text adjusted.
12.	6	Substantive	Name of treatment High temperature forced air <u>Vapour heat</u> treatment for <i>Bactrocera melanotus</i> and <i>B. xanthodes</i> on <i>Carica papaya</i> (2009-105)	The same as Japan's general comment (1).	Japan	Considered. Same as comment No.5.
13.	9	Editorial	Target pests <i>Bactrocera melanotus</i> (Coquillett)(Diptera: Tephritidae) and <i>Bactrocera xanthodes</i> (Broun) (Diptera: Tephritidae) (Pacific fruit fly)	Common name already given in paragraph 4.	EPPO, European Union, Georgia, Serbia	Considered. The IPPC Secretariat will apply the appropriate style before publishing.

14.	9	Editorial	Target pests <i>Bactrocera melanotus</i> (Coquillett)(Diptera: Tephritidae) and <i>Bactrocera xanthodes</i> (Broun) (Diptera: Tephritidae) (Pacific fruit fly)	Ensure that the Sect make these draft standards consistent with adopted standards (i.e. Species name, author, family/order information, no common name listed)	United States of America	Considered. The IPPC Secretariat will apply the appropriate style before publishing.
15.	11	Substantive	Treatment schedule	Suggest information in this section is matched to references provided.	United States of America	Considered and text adjusted. Waddell et al. (1993) reference has been added to the draft PT.
16.	12	Substantive	Exposure in a <u>certified</u> forced air chamber:	This will factor the critical treatment certification issues which can include determining the cold spots and type of resistance thermal device to be used etc	New Zealand	Considered. Further guidance to NPPOs on operational issues will be addressed by the drafting of the ISPM on requirements for the use of temperature treatments.
17.	12	Substantive	Exposure in a forced air <u>vapor heat</u> chamber:	The same as Japan's general comment (1).	Japan	Considered. Same as comment No.5.
18.	12	Translation	Exposure in a forced air chamber:	Translation to Spanish: "Exposición a aire forzado en una cámara."	OIRSA	Considered. The IPPC Secretariat will apply the appropriate style.
19.	13	Editorial	<u>at a minimum of 60% relative humidity</u>	Dash missing.	EPPO, European Union, Georgia, Serbia	Incorporated.
20.	13	Editorial	at a minimum of 60% relative humidity _;	For better understanding	OIRSA	Considered. Previous annexes do not use semi colons here.
21.	13	Substantive	at a minimum of 60 <u>90</u> % relative humidity	The same as Japan's general comment (1).	Japan	Considered. The Waddell et al. (1993) demonstrates a

						minimum of 60% relative humidity be used. This reference was added to the draft PT.
22.	13	Technical	at a minimum of 60% relative humidity	The paper referenced indicate 70% relative humidity, however, in this treatment it is 60%. Please clarify.	United States of America	Considered. The Waddell et al. (1993) demonstrates a minimum of 60% relative humidity is used. This reference was added to the draft PT.
23.	14	Editorial	- with air temperature increasing from room temperature to 48.5 °C	Dash missing.	EPPO, European Union, Georgia, Serbia	Incorporated.
24.	14	Editorial	<ul style="list-style-type: none"> with air temperature increasing from room temperature to 48.5 °C_i 	For better understanding	OIRSA	Considered. Previous annexes do not use semi colons here.
25.	15	Editorial	- for at least three hours or until fruit core temperature reaches 47.5 °C	1) Dash missing. 2) Or "- for at least three hours, until..."? (cf. PT 15, annex 15 of ISPM 28). The meaning of the two sentences is slightly different.	EPPO, European Union, Georgia, Serbia	1) Incorporated. 2) Considered but not incorporated
26.	15	Editorial	<ul style="list-style-type: none"> for at least three hours or until fruit core temperature reaches 47.5 °C_i 	For better understanding	OIRSA	Considered. Previous annexes do not use semi colons here.
27.	15	Substantive	for at least three hours or until fruit core temperature reaches 47.5 °C	Part 1 a. 48.5Degrees C was the set temp for the old standard stell chanbers. Currently, 40ft containers are being converted into treatment chambers which require air temp to rise from room temp to 49.1C. Recommend that the schedule be revieewed and improved to also include current developments on new chambers being developed. b. Reading through #4 to	New Zealand	Modified. Part 1) The text has been modified include 48.5°C as the minimum required temperature and a minimum overall

				15 suggests that the ramping up time is like the treatment time whereas treatment time is when ramp up starts till when the last probe furit reaches the kill temp and hled for 20 minutes. Therefore, the 3 hours when mentioned should be ited in more with the core fruit temp (the treatment) instead of the air temp which only covers the ramping up period. Recommend teh changes to 14 and 15 to read "with air temp increasing from room temp to 48.5C until the furit core temperature reaches 47.5 over a minimum period of 3 hours as measured by the appropriate resistance thermal device in the fruit." Part 2 a. Why is the kill temperature 47.5C when it should be 47.2C based on teh outcome of the research in teh Cook Islands as referenced? New Zealand has approved papaya from Cook Islands at a 47.2C for 20 mins treatment specs. b. Recommended amending schedule to read: "... fruit core temp reaches 47.2C."		treatment duration is now included. Part 2) The treatment scheduled is based on Waddell et all 1993, which stated fruit temperatures to reach 47.5°C. This reference was added to the draft PT.
28.	15	Substantiv e	for at least three 7 hours <u>and 14minutes</u> or until fruit core temperature reaches 47.5 <u>48.6</u> °C	Time and temperature should be consistent with Waddell et al. (1997) which describes that it took seven hours and 14 minutes from the start of treatment to the endpoint that infected fruit core temperature reaches 48.57±0.26°C (2nd replication).	Japan	Modified. The text has been modified to include a minimum overall treatment duration. The treatment scheduled is based on Waddell et all 1993, which stated fruit temperatures to reach 47.5°C. This reference was added to the draft PT.
29.	15	Technical	for at least three hours or until fruit core temperature reaches 47.5 °C	This period can be relative. The relevant thing is that the treatment meet its efficacy if the temperature in the pulp of the fruit reaches 47,5° C.	COSAVE, Uruguay, Chile, Brazil, Peru, Argentina	Considered. The TPPT considers that, based on the confirmatory trials supporting this treatment, the overall

						treatment duration is important to this treatment schedule efficacy.
30.	16	Editorial	_ followed by 20 minutes at a minimum of 60% relative humidity in an air temperature of 48 °C and with fruit pulp temperature at a minimum of 47.5 °C.	Dash missing.	EPPO, European Union, Georgia, Serbia	Incorporated
31.	16	Editorial	<ul style="list-style-type: none"> followed by 20 minutes at a minimum of 60% relative humidity in an air temperature of 48 °C and with fruit pulp temperature at a minimum of 47.5 °C. 	For better understanding	OIRSA	Considered. Previous annexes do not use semi colons here.
32.	16	Substantive	followed by 20 minutes actual treatment time at a minimum of 60% relative humidity in an air temperature of 48 °C and with fruit pulp temperature at a minimum of 47.5 °C.	To clarify this is the treatment.	United States of America	Considered. The TPPT considers that, based on the confirmatory trials supporting this treatment, the overall treatment duration is important to this treatment schedule efficacy. The comment just refers to one component of the treatment schedule.
33.	16	Substantive	followed by 20 minutes at a minimum of 60 90 % relative humidity in an air temperature of 48 5 °C and with fruit pulp temperature at a minimum of 47.5 °C.	The same as Japan's general comment (1).	Japan	Considered. The Waddell et al. (1993) demonstrates a minimum of 60% relative humidity is used. This reference was added to the draft PT.

34.	16	Technical	followed by 20 minutes at a minimum of 70.69 relative humidity in an air temperature of 48 °C and with fruit pulp temperature at a minimum of 47.2 47.5 °C.	Scientific paper mentions 70%. Scientific paper mentions 47,2°C.	COSAVE, Uruguay, Chile, Brazil, Peru, Argentina	Considered. The Waddell et al. (1993) demonstrates a minimum of 60% relative humidity and core fruit temperature of 47.5 °C be used. This reference was added to the draft PT.
35.	17	Editorial	Once the treatment is complete, fruits are hydro-cooled in a shower of water at 24–26 °C for 70 minutes.	Clearer with an additional comma.	EPPO, European Union, Georgia, Serbia	Incorporated.
36.	17	Substantive	Once the treatment is complete fruits are <u>immediately</u> hydro-cooled in a shower of water at 24–26 °C for 70 minutes.	- It will be difficult maintaining the water temperature for a very long time because the cooling water is mostly circulating water from the water tank within the treatment system and not straight from the tap. - Different countries will have different cooling water temps and needs to be factored accordingly or else it can be used against countries during audits. - From a commercial perspective they may argue that 70 mins is a long time especially if there will be more than 1 treatment. Based on this, it is recommended to amend the cooling requirement to read: "Once the treatment is complete, fruits are immediately hydro-cooled for 70 mins or when the temp drops to(maybe 32C?). " This will also consider the fact that when the set air temperature reaches the optimum temps for the chamber, the cooling fan is activated automatically which helps also in controlling the temp and later on in the cooling together with hydro-cooling. Also, fruit will cool down differently so there will be no point going for the full 70 mins when the fruit can drop down to the cooling temp in well less than 70 mins. - There is also no mention of recording time interval mentioned here consistent with VHT treatment .	New Zealand	Modified. Text was modified to reflect how the cooling was done according to the research supporting the treatment (Waddell et al., 1993). This reference was added to the draft PT.

				Recommend that this is also included for HTFA.		
37.	17	Substantive	Once the treatment is complete fruits are hydro-cooled in a shower of water at 24–26 °C keeping fruit core temperature more than 36°C for 7 90 minutes.	As the operation might affect the mortality, time and temperature should be consistent with Waddell et al. (1997) which describes that test fruit was hydro-cooled for 90 minutes until fruit core temperature reached at 33±2.6°C after heat treatment.	Japan	Modified. Text was modified to reflect how the cooling was done according to the research supporting the treatment (Waddell et al., 1993). This reference was added to the draft PT (see comment 36).
38.	17	Technical	Once the treatment is complete fruits are hydro-cooled in a shower of water at 24–26 °C for 70 minutes.	Scientific paper mentions 30°C. What is the technical justification for choosing a lower temperature?	COSAVE, Uruguay, Chile, Brazil, Peru, Argentina	Modified. Text was modified to reflect how the cooling was done according to the research supporting the treatment (Waddell et al., 1993). This reference was added to the draft PT (see comment 36).
39.	18	Editorial	The efficacy is: effective dose (ED) ^{99.9914} at the 95% confidence level.	For better understanding	OIRSA	Considered. New standard wording to PTs is provided.
40.	18	Technical	The efficacy is effective dose (ED) ^{99.9914} 99.9759 at the 95% confidence level. To add the following explanation in the next paragraph Pre heating should not be conducted.	(1) ED 99.9914 is indicated in draft ISPM but the value we calculated based on the result of Waddell et al. (1997) is ED 99.9759. (2) Pre heating may affect the mortality.	Japan	Considered. 1) The number of pests used in the test is provided in Waddell et al. 1993. This reference was included in the draft PT. 2) see comment no. 28.

41.	18	Translation	The efficacy is effective dose (ED) _{99.9914} at the 95% confidence level.	"The efficacy is: effective dose (ED) _{99.9914} at the 95% confidence level." should be translated into Spanish as "La eficacia es: dosis efectiva (DE) 99.9914 a un nivel de confianza de 95%."	OIRSA	Considered. The IPPC Secretariat will apply the appropriate style.
42.	20	Editorial	In evaluating this treatment the Technical Panel on Phytosanitary Treatments (TPPT) considered the technical justification for including other pest Tephritid fruit flies (<i>Anastrepha ludens</i> (Loew), <i>Anastrepha suspensa</i> (Loew), <i>Bactrocera cucurbitae</i> (Coquillett), <i>Bactrocera dorsalis</i> (Hendel), <i>Bactrocera facialis</i> (Coquillett), <i>Bactrocera kirki</i> (Froggatt), <i>Bactrocera passiflorae</i> (Froggatt), <i>Bactrocera psidii</i> (Froggatt), <i>Bactrocera tryoni</i> (Froggatt) and <i>Ceratitis capitata</i> (Wiedemann)) and other fruit crops (all fruit hosts of Tephritid fruit flies) in the treatment description as originally submitted. The TPPT recommended, however, including only two pest Tephritid fruit flies, <i>B. melanotus</i> and <i>B. xanthodes</i> , for only one fruit crop, <i>C. papaya</i> , based on Waddell <i>et al.</i> (1997).	A bracket is missing after "(Wiedemann)".	EPPO, European Union, Georgia, Serbia	Incorporated
43.	20	Editorial	In evaluating this treatment the Technical Panel on Phytosanitary Treatments (TPPT) considered the technical justification for including other pest Tephritid fruit flies (<i>Anastrepha ludens</i> (Loew), <i>Anastrepha suspensa</i> (Loew), <i>Bactrocera cucurbitae</i> (Coquillett), <i>Bactrocera dorsalis</i> (Hendel), <i>Bactrocera facialis</i> (Coquillett), <i>Bactrocera kirki</i> (Froggatt), <i>Bactrocera passiflorae</i> (Froggatt), <i>Bactrocera psidii</i> (Froggatt), <i>Bactrocera tryoni</i> (Froggatt) and <i>Ceratitis capitata</i> (Wiedemann)) and other fruit crops (all fruit hosts of Tephritid fruit flies) in the treatment description as originally submitted. The TPPT recommended, however, including only two pest Tephritid fruit flies, <i>B. melanotus</i> and <i>B. xanthodes</i> , for only one fruit crop, <i>C. papaya</i> , based on Waddell <i>et al.</i> (1997). see comment	What will be the impact on other hosts and fruit fly species? There are few hosts that require different kill temps and holding periods eg capsicum from New Caledonia HTFA treqtcd at 43C held for 3.5 hours.	New Zealand	Considered. The treatment schedule is based on the work of Waddell <i>et al.</i> , 1993 , which does not include treatment data for other species of fruit flies and fruit types. The TPPT has determined the schedule can be recommended only for <i>Bactrocera melanotus</i> and <i>B. xanthodes</i> , for one fruit crop, <i>Carica papaya</i> .
44.	23	Substantive	Footnote 1: The scope of phytosanitary treatments does not include issues related to pesticide registration or other domestic requirements for contracting parties' approval of treatments. see comments IPPC adopted treatments 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. In addition, potential effects of	There is a clear distinction between treating for domestic markets and treating for the export market. This statement generalizing the approvals can completely water-down the importance of the treatment from an importing country perspective whereby the responsibility is on the domestic NPPO to	New Zealand	Considered. This is a standard wording to all PTs.

		<p>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.</p>	<p>approve and monitor facilities for import country trading partners.</p>		
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