2021 FIRST CONSULTATION

1 July – 30 September 2021

Compiled comments for Draft PT: Irradiation treatment for *Pseudococcus jackbeardsleyi* (2017-027) with Treatment Lead's response

Summary

Name	Summary
EPPO Σ	Comments from the EPPO countries
European Union	The comments on this draft standard have been entered into the OCS by the European Commission on behalf of the EU and its member States.
Singapore	Singapore is supportive of this draft.
South Africa	The NPPOZA is in agreement with this draft and has no further comments
Venezuela	No tenemos observación alguna, sobre la norma

T (Type) - B = Bullet, C = Comment, P = Proposed Change, R = Rating

FAO sequential number	Para	Text	T	Comment	SC response
1	G	(General Comment)	C	**Guyana** Guyana has no objection at this time. *Category : SUBSTANTIVE*	**Noted**
2	G	(General Comment)	C	**Costa Rica** we have no comments *Category : SUBSTANTIVE*	**Noted**
3	G	(General Comment)	C	**Nepal** Nepal has no comments on ANNEX TO ISPM 28: Irradiation treatment for Pseudococcus jackbeardsleyi *Category : EDITORIAL*	**Noted**
4	G	(General Comment)	C	**Mexico** I support the document as it is and I have no comments *Category : SUBSTANTIVE*	**Noted**
5	G	(General Comment)	C	**Russian Federation** The Russian Federation would like to formally endorse the EPPO comments submitted via the IPPC Online Comment System *Category : SUBSTANTIVE*	**Noted**
6	G	(General Comment)	C	**Canada** Canada supports the draft Annex to ISPM 28.	**Noted**

				Category : SUBSTANTIVE	
7	G	(General Comment)	C	**European Union** The comments by the EU and its MSs are provided without prejudice to the European Union food safety legislation imposing limitations on the acceptance of irradiated goods. *Category : SUBSTANTIVE*	**Noted**
8	G	(General Comment)	C	**Australia** Australia has reviewed and is supportive of this current text. *Category : SUBSTANTIVE*	**Noted**
9	G	(General Comment)	C	**Barbados** Barbados agrees with the proposed draft annex. *Category : SUBSTANTIVE*	**Noted**
10	G	(General Comment)	C	**Malawi** We support draft Annex to ISPM 28: Irradiation trt for Pseudococcus jackbeardsley (2017-027) *Category : SUBSTANTIVE*	**Noted**
11	G	(General Comment)	C	**United States of America** 1. The paper by Zhan et al. 2016 provides compelling data of large-scale confirmatory tests in potato and pumpkin that F1 generation second instar nymphs emergence may be prevented from P. jackbeardsleyi females irradiated with a minimum dose of 166 Gy. The DUR ranged from 1.19 to 1.25 in the three confirmatory tests. This appears acceptable. However, the report lacks some details about the health of the insect colony. a. The mealybug colony was originally established in 2012 and reared on sprouting potato under laboratory conditions. Was the colony replenished or replaced on an annual basis with wild individuals? Were pest populations collected from other geographical regions? The experiments appear to be based on one pest collection. Experimental colonies are more robust when they include insects from a wide range of geographical regions. This will result in a colony that is more diverse genetically and more representative of a wider range of tolerances and adaptations.	**Considered but not incorporated** 98% development into second instar in the controls in the three experiments suggests a healthy colony (raw data was provided). The colony for the dose-response tests was initiated from infested rambutan fruits imported from Thailand and intercepted in 2012. To conduct the large-scale confirmatory test 2 wild samples of Jack Beardsley mealybug were collected in Nov. 2012, and Sep. 2013, respectively. They were reared on potatoes for several generations to maintain a large number of individuals, so as to select the adult females with closest age to lay eggs on the fruits (potatoes or pumpkins). Rearing condition was described by Shao et al. (2013) and Zhan et al. (2016). There are currently no prescriptive guidelines for the establishment of insect colonies. General agreement is that colonies are more robust when they include insects from a wide range of geographical regions. But the TPPT is unaware of any scientific publications that clearly identifies that the size of the founding population or the number of locations insects are collected from prevents/reduces the impact of maintaining

					insects in laboratory cultures and if this does influence the radiotolerance of the insects.
				b. It would be helpful to have some information on the survivorship of the colony at each developmental stage and fecundity of the organisms in the colony, although some information can be deduced from Table 2 of Zhan et al. 2016. More than 98% of the F1 generation developed into second instars in controls in the three experiments, suggesting a healthy colony. Information on whether the infestation rate used in the experiments was not excessive (i.e., no overcrowding resulting in the breakdown of the host commodity) would be helpful. For example, the rate of infestation was almost three times higher in potato than in pumpkin, which is a larger commodity than potato although the paper does not state which pumpkin species specifically was used in the experiments. (Line 41 of the Draft ANNEX TO ISPM 28: Irradiation treatment for Pseudococcus jackbeardsleyi-2017-027 indicates that Curcubita pepo was used in the Zhan et al. study. However, the paper only states Cucurbita sp.)	Additional data provided by the submitter shows for the controls a healthy insect colony with high fecundity and fertility rates. The data in Table 2 of Zhan paper shows an average of 559 females per fruit (potatoes 1st CT), of 186 females per fruit in pumpkin (C. pepo) (2nd CT) and 201 females per fruit in pumpkin (3rd CT). The number of 2nd instars from the F1 in the controls and the low rate of mortality (no more than 2%), suggests that there was no detrimental effect of the infestation rate. The submitter confirmed that the species of pumkin used in the experiments is *C. pepo*.
				c. We note that the large-scale experiment in potato was only conducted once, while two replicates at different times were conducted on pumpkin. A minimum of four replicates in each of the host commodity performed over a period of time to maximize natural variation in response within the experimental units is recommended.	The study used 3 replicates (2 on pumpkins and 1 on potatoes) and this is considered to be adequate.
				d. Another concern is that P. jackbeardsleyi is a host on a number of economically important commodity, including banana, rambutan, durian and pineapple, that is traded internationally. While the data presented on potato and pumpkin by Zhan et al. look promising, it appears premature to recommend a minimum dose of 166 Gy for phytosanitary treatment of P. jackbearsleyi infestation in any host commodity. A generic dose should be supported by data on a range of species that adequately represents major quarantine pests within the taxa, with large-scale confirmatory trials being conducted.	The number of insects tested (97,089 in potatoes and 34,423 in pumpkin) and the results showed no 2nd instar develpomenet using 150 Gy (aborbed dose of 133 to 164 Gy). This provides 95% confidence that the treatment according to this schedule prevents offspring developing to the second-instar nymph stage from not less than 99.9977% (probit 9.08) of mature adult females of *Pseudococcus jackbeardsleyi*. All adopted irradiation treatements are applicable to all host commodities of the target pest. Extrapolation of treatment efficacy to all fruits vegetables and ornamental plants was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research

					studies on a variety of pests and commodities support this.
				Information on the condition of the commodity at the time of the study should also be provided.	Insecticide free potatoes and pumpkins were used in the dose-response and confirmatory tests. Fruits were mature as they are stored in wahrehouses before sale (photos are available showing the stage of the infested fruits upon request to the IPPC Secretariat).
				2. The report by Zhan et al. 2016 cites Shao et al. 2013, which determined the most radiation-tolerant state of P. jackbeardsleyi to be the late female stage, which was used in the experiments by Zhan et al. Unfortunately, only the abstract of the Shao et al. paper is in English. Therefore, it is difficult to ascertain the methodology details of the dose-response testing that determined the most radio-tolerant developmental stage. For example, how many individuals of each life stage were tested? How many replicates were performed? How was the mealybug colony reared and were the most-tolerant stage experiments also conducted on P. jackbeardsleyi-infested potato or pumpkin?	The submitter presented the number of insects used in the tests and the developmental data. For each developmental stage and each irradiation dose and the control, three replicates were conducted (based on additional information provided by the submitter). Results clearly show that the most tolerant stage is the late adult female. The most-tolerant stage experiments were conducted on sprout potatos.
				3. Hofmeyr et al. 2016 reported that P. jackbeardsleyi ovipositing females were not sterilized at 200 Gy, but produced fertile eggs that eclosed into non-viable F1 first instars, supporting observations reported by Zhan et al. 2016. However, the paper lacks some details regarding the: a. Health, origin, maintenance of the P. jackbeardsleyi colony; b. Specific rate of infestation of pumpkins and potatoes (only a range of 30-100 is provided); c. Dosimetry and DUR; d. Determination of how the most radio-tolerant stage was determined in the various mealybug species tested, even though Hofmeyr et al. 2016 confirmed that the most radio-tolerant stage for treatment validation was ovipositing P. jackbeardsleyi females. *Category : SUBSTANTIVE*	These comments are addressed with the above responses.

12	G	(General Comment)	C	**Thailand** Thailand has no objection on the Draft PT: Irradiation treatment for Pseudococcus jackbeardsleyi. *Category : SUBSTANTIVE*	**Noted**
13	G	(General Comment)	C	**Russian Federation** The Russian Federation would like to formally endorse the EPPO comments submitted via the IPPC Online Comment System *Category : SUBSTANTIVE*	**Noted**
Draft ANNEX TO ISPM 28: Irradiation treatment for Pseudococcus jackbeardsleyi (2017-027)					
14	1	**DRAFT ANNEX TO ISPM 28: Irradiation treatment for *Pseudococcus jackbeardsleyi* (2017-027)**	C	**Viet Nam** VN agrees with this draft annex to ISPM 28, *Category : SUBSTANTIVE*	**Noted**
15	1	**DRAFT ANNEX TO ISPM 28: IRRADIATION TREATMENT FOR *PSEUDOCOCCUS JACKBEARDSLEYI* (2017-027)**	C	**Uruguay** We agree with the document as it is. No comments *Category : TECHNICAL*	**Noted**
16	11	2017-06 ~~Submitted to~~ Treatment submitted in response to 2017-02 call for treatments.	P	**European Union** For consistency with the other draft treatments. *Category : EDITORIAL*	**Incorporated**
17	11	2017-06 ~~Submitted to~~ Treatment submitted in response to 2017-02 call for treatments.	P	**EPPO** For consistency with the other draft treatments. *Category : EDITORIAL*	**Incorporated**
18	18	2021-03 Standards Committee (SC) ~~for~~ approved for first consultation via e-decision (2020_eSC_May_12).	P	**European Union** Typo. *Category : EDITORIAL*	**Incorporated**
19	18	2021-03 Standards Committee (SC) ~~for~~ approved for first consultation via e-decision (2020_eSC_May_12).	P	**EPPO** Typo. *Category : EDITORIAL*	**Incorporated**
20	21	2017-07 Andrew PARKER ~~(AT)~~(IAEA)	P	**European Union** Please see draft annexes to ISPM 28 "Irradiation treatment for Zeudodacus tau" and "Irradiation treatment for Sternochetus frigidus on Mangifera indica". *Category : TECHNICAL*	**Incorporated**
21	21	2017-07 Andrew PARKER ~~(AT)~~(IAEA)	P	**EPPO** Please see draft annexes to ISPM 28 "Irradiation treatment for Zeudodacus tau" and "Irradiation treatment for Sternochetus frigidus on Mangifera indica". *Category : TECHNICAL*	**Incorporated**

22	26	This treatment describes the irradiation of fruits, vegetables and ornamental plants at 166 Gy minimum absorbed dose to prevent development ~~of~~ to the second-instar ~~nymphs from mature adult females~~ nymph stage of progeny from *Pseudococcus jackbeardsleyi* at the stated efficacy.[1]	P	**European Union** Easier to understand - Consistency with paragraphs 35, 36 and 42. *Category : EDITORIAL*	**Modified** This treatment describes the irradiation of fruits, vegetables and ornamental plants at 166 Gy minimum absorbed dose to prevent development of F1 second-instar nymphs from mature adult females of Pseudococcus jackbeardsleyi at the stated efficacy
23	26	This treatment describes the irradiation of fruits, vegetables and ornamental plants at 166 Gy minimum absorbed dose to prevent development ~~of~~ to the second-instar ~~nymphs from mature adult females~~ nymph stage of progeny from *Pseudococcus jackbeardsleyi* at the stated efficacy.[1]	P	**EPPO** Easier to understand ? Consistency with paragraphs 35, 36 and 42. *Category : EDITORIAL*	**Modified** This treatment describes the irradiation of fruits, vegetables and ornamental plants at 166 Gy minimum absorbed dose to prevent development of F1 second-instar nymphs from mature adult females of Pseudococcus jackbeardsleyi at the stated efficacy
Treatment schedule					
24	36	There is 95% confidence that the treatment according to this schedule prevents offspring developing to the second-instar nymph stage from not less than 99.~~9964%~~ 9982% of mature adult females of *Pseudococcus jackbeardsleyi*.	P	**China** According to the research reported by Zhan et al. (2016) "No F 1 generation 2nd instar nymph emerged from an estimated 118,520 late females reared on potato, or 49,290 late females reared on pumpkin" *Category : SUBSTANTIVE*	**Incorporated**
25	38	This treatment should not be applied to ~~fruit~~fruits, vegetables or ornamental plants stored in modified atmospheres because modified atmosphere may affect the treatment efficacy.	P	**China** Pseudococcus jackbeardsleyi has a variety of host fruits *Category : EDITORIAL*	
Other relevant information					
26	40	Because irradiation may not result in outright mortality, inspectors may encounter live but non-viable *Pseudococcus jackbeardsleyi* eggs, nymphs and adults during the inspection process. This does not necessarily imply a failure of the treatment.	P	**New Zealand** Live larvae may survive from a treatment failure or other unknown circumstances. *Category : SUBSTANTIVE*	**Incorporated**
27	40	Puesto que la irradiación podrá no ocasionar la muerte inmediatamente, los inspectores podrán encontrar huevos, ninfas y adultos de *Pseudococcus jackbeardsleyi* vivos, aunque no	C	**Colombia** En texto: "Puesto que la irradiación podrá no ocasionar la muerte inmediatamente, los inspectores podrán encontrar huevos, ninfas y adultos de Pseudococcus jackbeardsleyi vivos, aunque no viables, durante el proceso de	**Considered but not incorporated** The possibility of encountering live but not viable insects during the inspection process in fruits that were treated with irradiation is true for all insects not just for *P. jackbeardsleyi*. This is

		viables, durante el proceso de inspección. Esto no implica que el tratamiento sea ineficaz.		inspección. Esto no implica que el tratamiento sea ineficaz." Se deberían incluir las alternativas a seguir para definir claramente cuando fue o no eficaz el tratamiento. Se da por entendido que los insectos vivos de Pseudococcus son no viables, pero habría que evaluarse esta condición para confirmarlo o desmentirlo. En caso que se hallen plagas vivas, la ONPF tendría que considerar tomar un tratamiento de emergencia e iniciar la evaluación de la viabilidad de las plagas encontradas vivas No es claro cuál sería la referencia para evaluar la eficacia o no del tratamiento por parte de los inspectores. Lo que se podría prestar para interpretaciones erróneas en el resultado final del tratamiento. *Category : SUBSTANTIVE*	a treatment schedule, aimed at recommending an effective quarantine dose. Giving alternatives to follow when live insects are found is out of the scope of the schedule. ISPM 18 refers to the situation when live insects are found.
28	41	The Technical Panel on Phytosanitary Treatments (TPPT) based its evaluation of this treatment on the research reported by Zhan *et al.* (2016), which determined the efficacy of irradiation as a treatment for this pest on potato (*Solanum tuberosum*) and pumpkin (*Cucurbita pepo*). The TPPT also considered information on the effect of irradiation on *Pseudococcus jackbearsleyi* in ~~Hofmeyr~~Shao et al. (2013) and Hofmeyr et al. (2016). ~~*et al.* (2016) and Shao *et al.* (2013).~~	P	**China** Reference literature should be arranged in chronological order *Category : SUBSTANTIVE*	**Incorporated**
29	42	The efficacy of this schedule was calculated based on a total of 83,905 mature adult females treated preventing offspring developing to the second instar nymph stage; in the ~~control~~ control, development of offspring from neonates was 98.0%.	P	**European Union** A comma added for ease of reading. *Category : EDITORIAL*	**Incorporated**
30	42	The efficacy of this schedule was calculated based on a total of 83,905 mature adult females treated preventing offspring developing to the second instar nymph	P	**EPPO** A comma added for ease of reading. *Category : EDITORIAL*	**Incorporated**

		stage; in the ~~control~~ control, development of offspring from neonates was 98.0%.			
31	42	The efficacy of this schedule was calculated based on a total of ~~83~~167,~~905~~ 810 mature adult females treated preventing offspring developing to the second instar nymph stage; in the control development of offspring from neonates was 98.0%.	P	**China** According to the research reported by Zhan et al. (2016) "No F 1 generation 2nd instar nymph emerged from an estimated 118,520 late females reared on potato, or 49,290 late females reared on pumpkin" *Category : SUBSTANTIVE*	**Incorporated**
32	43	Extrapolation of treatment efficacy to all fruits vegetables and ornamental plants was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research studies on a variety of pests and commodities. These include studies on the following pests and hosts: *Anastrepha fraterculus* (*Eugenia pyriformis*, *Malus pumila* and *Mangifera indica*); *Anastrepha ludens* (*Citrus paradisi*, *Citrus sinensis*, ~~*Mangifera*~~ *M. indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, ~~*Citrus*~~ *C. sinensis* and *Psidium guajava*); *Anastrepha suspensa* (~~*Averrhoa*~~ *A. carambola*, ~~*Citrus*~~ *C. paradisi* and ~~*Mangifera*~~ *M. indica*), *Bactrocera tryoni* (~~*Citrus*~~ *C. sinensis*, *Solanum lycopersicum*, *Malus domestica*, ~~*Mangifera*~~ *M. indica*, *Persea americana* and *Prunus avium*), ~~Cydia pomonella~~ *Cydia pomonella* (~~*Malus*~~ *M. pumila* and artificial diet) and *Grapholita molesta* (~~*Malus*~~ *M. pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*~~),~~) and *Tribolium confusum* (*Triticum aestivum*, *Hordeum vulgare* and *Zea mays*) (Bustos *et al*., 2004; Gould and von Windeguth, 1991; Hallman, 2004a, 2004b, 2013; Hallman and	P	**European Union** Full scientific names already given above in the paragraph + typos. *Category : EDITORIAL*	**Considered but not incorporated** The editorial recommendation in this case is to spellout the full name (genus and species) every time.

		Martinez, 2001; Hallman ~~et al~~*et al*., 2010; Jessup ~~et al~~*et al*., 1992; Mansour, 2003; Tunçbilek and Kansu, 1996; von Windeguth, 1986; von Windeguth and Ismail, 1987; Zhan *et al*., 2016). It is recognized, however, that treatment efficacy has not been tested for all potential fruit, vegetable and ornamental plant hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect, the treatment will be reviewed.			
33	43	Extrapolation of treatment efficacy to all fruits vegetables and ornamental plants was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research studies on a variety of pests and commodities. These include studies on the following pests and hosts: *Anastrepha fraterculus* (*Eugenia pyriformis, Malus pumila* and *Mangifera indica*); *Anastrepha ludens* (*Citrus paradisi, Citrus sinensis*, ~~*Mangifera*~~ *M. indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, ~~*Citrus*~~ *C. sinensis* and *Psidium guajava*); *Anastrepha suspensa* (~~*Averrhoa*~~ *A. carambola*, ~~*Citrus*~~ *C. paradisi* and ~~*Mangifera*~~ *M. indica*), *Bactrocera tryoni* (~~*Citrus*~~ *C. sinensis, Solanum lycopersicum, Malus domestica*, ~~*Mangifera*~~ *M. indica, Persea americana* and *Prunus avium*), ~~Cydia pomonella~~ *Cydia pomonella* (~~*Malus*~~ *M. pumila* ~~and artificial diet) and~~ and artificial diet), *Grapholita molesta* (~~*Malus*~~ *M. pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum*	P	**EPPO** Full scientific names already given above in the paragraph + typos. *Category : EDITORIAL*	**Considered but not incorporated** The norm in this case is to spellout the full name (genus and species) every time.

		tuberosum~~),~~) and *Tribolium confusum* (*Triticum aestivum*, *Hordeum vulgare* and *Zea mays*) (Bustos *et al*., 2004; Gould and von Windeguth, 1991; Hallman, 2004a, 2004b, 2013; Hallman and Martinez, 2001; Hallman ~~et al~~*et al*., 2010; Jessup ~~et al~~*et al*., 1992; Mansour, 2003; Tunçbilek and Kansu, 1996; von Windeguth, 1986; von Windeguth and Ismail, 1987; Zhan *et al*., 2016). It is recognized, however, that treatment efficacy has not been tested for all potential fruit, vegetable and ornamental plant hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect, the treatment will be reviewed.			
34	43	Extrapolation of treatment efficacy to all fruits vegetables and ornamental plants was based on knowledge and experience that radiation dosimetry systems measure the actual radiation dose absorbed by the target pest independent of host commodity, and evidence from research studies on a variety of pests and commodities. These include studies on the following pests and hosts: *Anastrepha fraterculus* (*Eugenia pyriformis*, *Malus pumila* and *Mangifera indica*); *Anastrepha ludens* (*Citrus paradisi*, *Citrus sinensis*, *Mangifera indica* and artificial diet), *Anastrepha obliqua* (*Averrhoa carambola*, *Citrus sinensis* and *Psidium guajava*); *Anastrepha suspensa* (*Averrhoa carambola*, *Citrus paradisi* and *Mangifera indica*), *Bactrocera tryoni* (*Citrus sinensis*, *Solanum lycopersicum*, *Malus domestica*, *Mangifera indica*, *Persea americana* and *Prunus*	C	**China** Scientific name should be in italics *Category : EDITORIAL*	**Incorporated**

		avium), Cydia pomonella (*Malus pumila* and artificial diet) and *Grapholita molesta* (*Malus pumila* and artificial diet), *Pseudococcus jackbeardsleyi* (*Cucurbita* sp. and *Solanum tuberosum*), *Tribolium confusum* (*Triticum aestivum*, *Hordeum vulgare* and *Zea mays*) (Bustos *et al*., 2004; Gould and von Windeguth, 1991; Hallman, 2004a, 2004b, 2013; Hallman and Martinez, 2001; Hallman et al., 2010; Jessup et al., 1992; Mansour, 2003; Tunçbilek and Kansu, 1996; von Windeguth, 1986; von Windeguth and Ismail, 1987; Zhan *et al*., 2016). It is recognized, however, that treatment efficacy has not been tested for all potential fruit, vegetable and ornamental plant hosts of the target pest. If evidence becomes available to show that the extrapolation of the treatment to cover all hosts of this pest is incorrect, the treatment will be reviewed.			
References					
35	45	The present annex ~~may refer~~ refers to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at .	P	**European Union** The present annex refers to ISPMs 28 and 18. There is no reason to write "may refer". We understand that this is a general statement for all PTs and this comment may apply to other already adopted PTs. *Category : EDITORIAL*	**Considered but not incorporated** Keep standard language.
36	45	The present annex ~~may refer~~ refers to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at .	P	**EPPO** The present annex refers to ISPMs 28 and 18. There is no reason to write "may refer". *Category : EDITORIAL*	**Considered but not incorporated** Keep standard language.
37	53	~~**Hofmeyr, H., Doan, T.T., Indarwatmi, M., Seth, R. & Zhan, G.** 2016. Development of a generic radiation dose for the postharvest phytosanitary treatment of mealybug species (Hemiptera:~~	P	**China** Reference literature is written mistakenly *Category : EDITORIAL*	**Incorporated**

		~~Pseudococcidae). *Florida Entomologist*, 99 (Special Issue): 191–196.~~Hofmeyr, H., Doan, T.T., Indarwatmi, M., Seth, R. & Zhan, G. 2016. Development of a generic radiation dose for the postharvest phytosanitary treatment of mealybug species (Hemiptera: Pseudococcidae). Florida Entomologist, 99 (Special Issue 2): 191–196.			