



# CRI Cutting Edge

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## **Surveillance monitoring of *Bactrocera invadens* per registered Production Unit Code (PUC)**

Document drafted by Aruna Manrakhan & Vaughan Hattingh, CRI, on behalf of *Bactrocera Invadens* Steering Committee

Surveillance monitoring of the invasive fruit fly, *Bactrocera invadens* per Production Unit Code (PUC) has now become a requirement for phytosanitary registration of citrus for export to the special markets (USA, Japan, South Korea, China and the European Union – EU) and will be rolled out this year as a phytosanitary registration requirement for deciduous and subtropical fruit for export to the special markets (including Taiwan, Mexico and Israel).

Each PUC should have at least one Methyl Eugenol (ME) baited trap for monitoring of *B. invadens*. ME traps should be serviced every week or fortnight. A *B. invadens* characteristic chart (see attached trapping guideline) should be used as a reference when checking traps. **If a suspect specimen is found, the specimen should be placed in a closed plastic vial. The vial containing the suspect specimen should be labelled as follows: Date of collection, PUC number, trap number and collector. This should be reported immediately to the relevant surveillance co-ordinator or to the Department of Agriculture, Forestry and Fisheries (DAFF).**

Contact details for the following co-ordinators are as follows:

1. Citrus – Aruna Manrakhan  
aruna@cri.co.za, 013 759 8000
2. Deciduous fruit including grapes – Leslie Brown  
Leslie@fruitgro.co.za, 082 853 1471
3. Subtropical fruit – Wilna Stones  
Wilna@subtrop.co.za, 015 307 3676
4. Small and new fruit crops - Elrita Venter  
elrita@alternafruit.co.za, 082 346 2577
5. All other fruit and vegetable crops – Department of Agriculture, Forestry & Fisheries - Jan Hendrik Venter,  
JanHendrikV@nda.agric.za, 012 319 6384

**All trapping information should be recorded and supplied to the Early Warning Systems (e-mail: [janhendrikv@daff.gov.za](mailto:janhendrikv@daff.gov.za)), DAFF, at the end of each export season. This is a pre-requisite for future re-registration for export to special markets.**

The official trapping guideline is available on the website of DAFF: <http://www.daff.gov.za/> under Plant Health Division and is provided below.



**Die waarnemings-monitoring van  
*Bactrocera invadens* per  
geregistreerde Produksie-Eenheid  
Kode (PUC)**

Dokument saamgestel deur Aruna Manrakhan & Vaughan Hattingh, CRI, namens die *Bactrocera Invadens* Bestuurskomitee

Die waarnemings-monitoring van die Afrika-indringervlieg, *B. invadens* per Produksie-eenheid kode (PUC) is nou 'n vereiste vir fitosanitêre registrasie vir sitrusuitvoere na spesiale markte (VSA, Japan, Suid-Korea, China en die Europese Unie –EU) en gaan ook verpligtend raak as 'n vereiste vir fitosanitêre registrasie vir uitvoer van sagtevrugte en subtropiese vrugte na spesiale markte hierdie jaar (insluitend Taiwan, Mexica en Israel).

In elke PUC moet daar ten minste een metiel-eugenol (ME) lokval vir monitoring van *B. invadens* geplaas word. Lokvalle moet wekeliks of twee-wekeliks gediens word. 'n Inligtingstuk wat die kenmerkende eienskappe van *B. invadens* aandui (sien aanheg lokval riglyne), moet as verwysing gebruik word wanneer lokvalle gediens word. **As 'n verdagte eksemplaar gevind word, moet die eksemplaar in 'n geslote plasiekhouer geplaas word. Hierdie houder met die verdagte eksemplaar moet as volg gemerk word: Datum van versameling, PUC-nommer, lokvalnommer en versamelaar. Dit moet onmiddellik aan die relevante opname-koördineerder of aan die**

**Department van Landbou, Bosbou en Visserye (DAFF) gerapporteer word.**

Kontakpunte van die volgende koördineerders is as volg:

- Sitrus – Aruna Manrakhan  
aruna@cri.co.za, 013 759 8000
- Sagtevrugte insluitend druie – Leslie Brown  
Leslie@fruitgro.co.za, 082 853 1471
- Subtropiese vrugte – Wilna Stones  
Wilna@subtrop.co.za, 015 307 3676
- Klein en nuwe vrugte gewasse - Elrita Venter  
elrita@alternafruit.co.za, 082 346 2577
- Alle ander vrugte en groente gewasse – Departement van Landbou, Bosbou en Visserye - Jan Hendrik Venter,  
JanHendrikV@nda.agric.za, 012 319 6384

**Alle lokval inligting moet aangeteken word en aan die “Early Warning Systems” (e-pos: [janhendrikv@daff.gov.za](mailto:janhendrikv@daff.gov.za)), DAFF, aan die einde van elke uitvoerseisoen verskaf word. Dit is 'n voorvereiste vir her-registrasie vir uitvoer na spesiale market in die toekoms.**

Die amptelike riglyne vir opsporing is op die webtuiste van DAFF beskikbaar: <http://www.daff.gov.za/> onder “Plant Health Division” en word ook hier onder verskaf.

# Trapping Guidelines for surveillance of *Bactrocera invadens* in fruit production areas



agriculture,  
forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA



# BACTROCERA INVADENS STEERING COMMITTEE, SOUTH AFRICA, January 2012

## BACKGROUND

*Bactrocera invadens*, the African Invader fly, is a quarantine pest of Asian origin capable of infesting various commercial fruit crops. *B. invadens* was first detected on the African continent, in Kenya, in 2003. It is now listed in most countries in Western, Eastern and Central Africa as well as in some Southern African countries. In South Africa, a surveillance programme specifically targeting *B. invadens* is being carried out since 2006 by the National Plant Protection Organisation of South Africa (NPPOZA) in collaboration with fruit industries. Surveillance is carried out through trapping in some production areas, in major towns and at points of entry (border areas, border posts, ports and airports). In 2010, specimens of *B. invadens* were intercepted in two separate areas in northern Limpopo. The pest was successfully eradicated from both areas following timely intervention. Interceptions of the fly in South Africa are an indication that the areas currently free of this pest are under risk of incursions. As such, in March 2011, the National *B. invadens* Steering Committee called upon all producers of export fruit to commence monitoring for *B. invadens* and to maintain such monitoring as evidence that the farm remains free of this pest.

The trapping guidelines provided in this document aim at harmonizing all procedures for monitoring of *B. invadens* in production areas for early detection of the pest. Guidance is provided on how to conduct monitoring and keep records of all monitoring data.

## ATTRACTANT AND TRAPS

The attractant recommended for the survey is the para-pheromone methyl eugenol (ME). ME attracts males of *Bactrocera invadens* and other invasive *Bactrocera* species such as *Bactrocera dorsalis* and *Bactrocera zonata*.

Various ME dispensers are commercially available in South Africa. ME is available as slow release dispensers in form of either a plug or a fibre-board block (Invader Lure). ME should be used in bucket type traps such as Moroccan trap, Lynfield trap, Chempac Bucket trap and McPhail trap (Appendix 1). Only one ME dispenser must be placed per trap. Maximum precaution is required while handling ME in order to avoid contamination on the outside of the trap. When using ME with other fruit fly attractants (e.g. Questlure, Capilure, BioLure 3 component), preferably designate different persons to handle the different attractants in order to avoid cross contamination of traps.

An insecticide such as DDVP (Dichlorvos) must also be placed in the bucket type trap to kill any attracted flies. Dichlorvos is commercially available as solid strips and one small piece (1 cm x 1 cm) should be used per trap.

## TRAP PLACEMENT AND TRAPPING DENSITY

ME baited traps should be suspended on host trees such as mango, citrus, marula and guava in the orchard and/or in home-garden within the farm. A list of known hosts for *B. invadens* is provided in Appendix 2. The trap should be placed about 1.5 m above ground and should not be exposed to direct sunlight, strong wind and dust. Trap entrances should be cleared of leaves to allow access to flies and prevent entry of ants. The wire hanging the trap should be coated with a sticky ant barrier or Vaseline for further protection against ants. The minimum required trap density for surveillance is **1 trap per km<sup>2</sup> or 1 trap per 100 ha, with at least 1 per Production Unit Code.**

## TRAP MAPPING

Once traps are placed, location of each trap should be recorded (Province, Area, Farm name, Production Unit Code (PUC), Host/cultivated crop, Orchard number, Block number, Trap number, Date trap set and GPS co-ordinates of the trap). This information must be recorded in a datasheet (See Appendix 3).

PUC numbers should also be the trap number. In cases of more than one trap per PUC the trap number can be the PUC number plus an A, B, C etc.

In cases where the trap needs to be removed and replaced the trap number needs to change also. In such cases the trap number could also be the PUC number plus A, B, C etc. If such traps already has number ending with an A, B C etc. Then a numerical value can follow the alphabetical value again such as PUC number plus A.1; B.1 etc. It is then important to indicate on the trap details data sheet (Appendix3) in the comments coulomb that the trap is discontinued and on the trap service datasheet (Appendix4) under comments that the trap is discontinued at that particular service interval.

## TRAP SERVICING

Traps should be serviced every week or fortnight. All trap services should be recorded on the datasheet (see Appendix 4). When servicing a trap, the trap must be opened and checked for any insect specimens caught. A *B. invadens* characteristic chart (Appendix 5) should be used as a reference when checking traps. **If a suspect specimen is found, the specimen should be placed in a closed plastic vial. The vial containing the suspect specimen should be labelled as follows: Date of collection, PUC number, trap number and collector. This should be reported immediately to the relevant surveillance co-ordinator or to the Department of Agriculture, Forestry and Fisheries.**

Contact points of the following co-ordinators are as follows:

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- All other fruit and vegetable crops – Department of Agriculture, Forestry & Fisheries - Jan Hendrik Venter, JanHendrikV@nda.agric.za, 012 319 6384

The list of suppliers for trapping materials is provided in Appendix 6.

The ME dispenser and DDVP/Dichlorvos strip inside the trap should be replaced at least every 6 weeks. Old ME dispensers and DDVP strips must be disposed of properly away from the trapping site.

In the event that another insect is repeatedly caught in these traps, the relevant surveillance co-ordinator should be contacted to arrange for it to also be identified.

All information from trap servicing must be recorded: Date trap was checked, PUC number, trap number, replacement of attractant and insecticide, number of specimens caught. If there are no catches, this should also be recorded as "0" in the column of "number of specimens caught".

Completed trapping records for each PUC must be supplied to DAFF (e-mail: [janhendrikv@daff.gov.za](mailto:janhendrikv@daff.gov.za)) at the end of each export season. DAFF will in future provide a procedure for annual submission of these records.



The existence of historic trapping data may be of great economic benefit to growers in that it will provide evidence of pest freedom in the event of the fly becoming established in South Africa. It is imperative that growers immediately make known (in accordance with the procedures described above) any catches of suspected *B. invadens*. Growers should not fear the consequences of quarantine in the event of such an early detection and the implementation of eradication procedures, since it is still possible to move (under permit) host material from such quarantined sites in compliance with established additional risk mitigation procedures. **With early detection, the chances of successful eradication are very good.**

## APPENDIX 1. TRAP DESCRIPTION



The Morocco trap is a simple white bucket type of trap composed of a cylindrical plastic container with four equidistant holes on the upper third. A plastic basket is fitted in the lid in which the ME dispenser should be placed.



The Lynfield trap is a bucket type trap composed of a cylindrical plastic container with four equidistant holes on the upper third. The lid of the trap contains a hook to which an ME dispenser such as Invader Lure must be fitted.



The Chempac Bucket trap is a yellow cylindrical container with an opaque lid. A plastic basket can be fitted in the lid of the trap to contain an ME dispenser.



The McPhail trap consists of two parts, a clear lid and a yellow bottom section with an inverted funnel entrance underneath. The ME dispenser is suspended from a plastic basket at the top of the trap.

## APPENDIX 2. BACTROCERA INVADENS HOST LIST

Scientific name	Common name	Scientific name	Common name
<i>Mangifera indica</i>	Mango	<i>Carica papaya</i>	Papaya
<i>Anacardium occidentale</i>	Cashew	<i>Lycopersicon esculentum</i>	Tomato
<i>Sclerocarya birrea</i>	Marula	<i>Capsicum annum</i>	Bell pepper
<i>Sorindeia madagascariensis</i>	Sondriry	<i>Capsicum frutescens</i>	Chili pepper

<i>Spondias cytherea</i>	Jew plum	<i>Psidium guajava</i>	Common guava
<i>Spondias mombin</i>	Tropical plum	<i>Syzygium malaccense</i>	Malay apple
<i>Citrus aurantium</i>	Sour orange	<i>Syzygium samarangense</i>	Java apple
<i>Citrus sinensis</i>	Orange	<i>Annona cherimola</i>	Cherimoya
<i>Citrus limon</i>	Lemon	<i>Annona muricata</i>	Soursop
<i>Citrus reticulata</i>	Tangerine / mandarin	<i>Annona squamosa</i>	Sugar-apple
<i>Citrus paradisi</i>	Grapefruit	<i>Averrhoa carambola</i>	Carambola
<i>Fortunella japonica</i>	Kumquat	<i>Terminalia catappa</i>	Indian Almond
<i>Musa spp.</i>	Banana	<i>Flacourtia indica</i>	Governor's plum
<i>Musa x paradisiaca</i>	Plantain	<i>Cordia spp.</i>	Grey leaved saucer berry
<i>Prunus persica</i>	Peach	<i>Strychnos mellodora</i>	Monkey orange
<i>Eriobotrya japonica</i>	Loquat	<i>Dracaena steudneri</i>	
<i>Diospyros kaki</i>	Japanese persimmon	<i>Irinia gabonensis</i>	African wild mango
<i>Diospyros montana</i>	Mountain persimmon	<i>Ficus sycomorus</i>	Wild fig
<i>Citrullus lanatus</i>	Watermelon	<i>Blighia sp.</i>	
<i>Cucumis sativus</i>	Cucumber	<i>Chrysophyllum albidum</i>	White star-apple
<i>Cucumis figarei</i>	Hyena's watermelon (direct translation )	<i>Vitellaria paradoxa</i>	Sheanut
<i>Cucurbita maxima</i>	Pumpkin	<i>Landolphia sp.</i>	
<i>Cucumis pepo</i>	Gourd	<i>Maerua duchesnei</i>	
<i>Persea americana</i>	Avocado	<i>Garcinia mannii</i>	Chewing stick

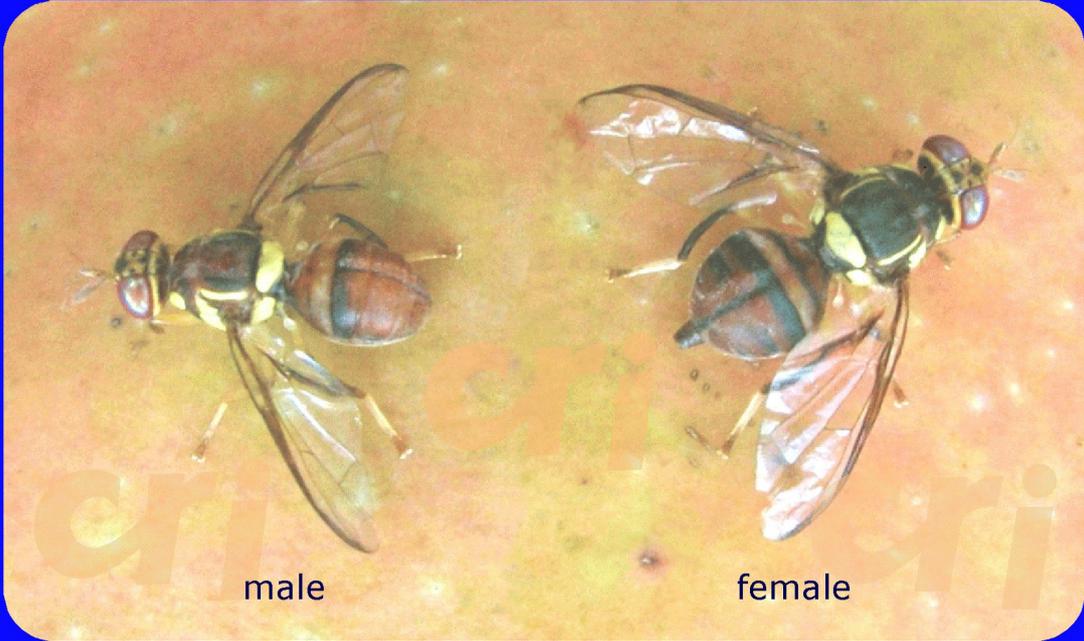
DE MEYER, M., MOHAMED, S. & WHITE, I. M. 2007. Invasive fruit fly pests in Africa. <http://www.africamuseum.be/fruitfly/AfroAsia.htm>



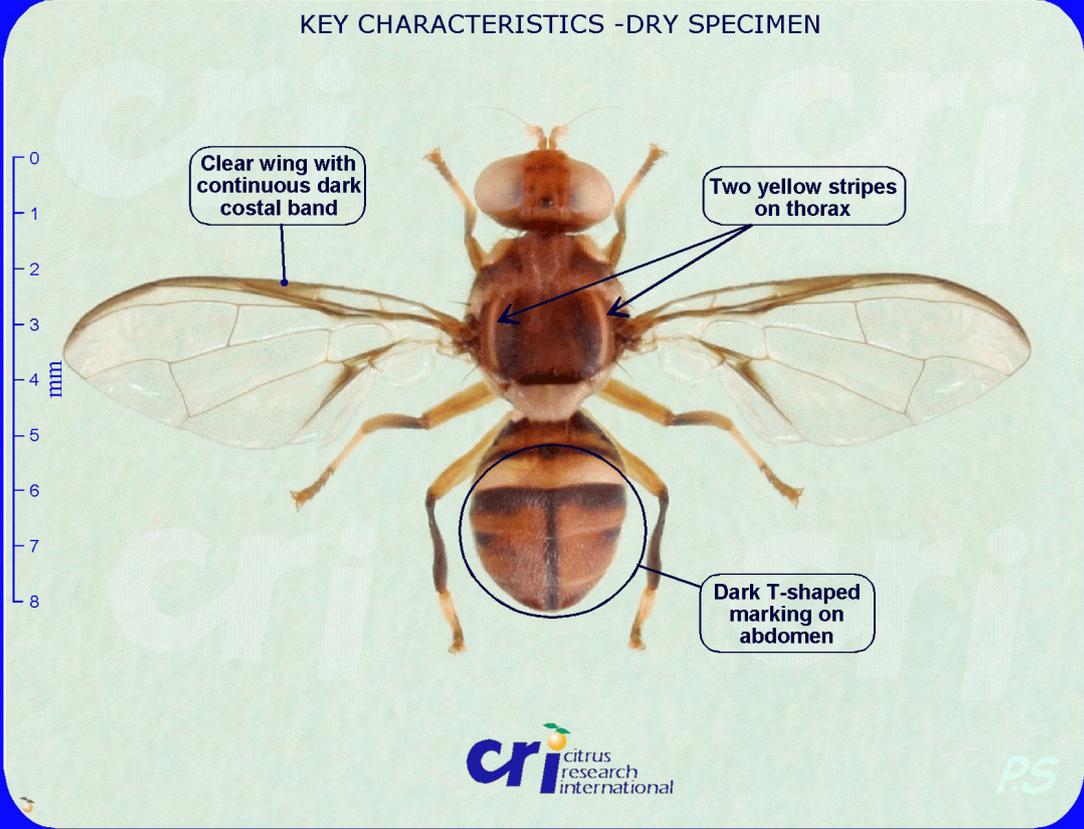


**APPENDIX 5. B. INVADENS CHARACTERISTIC CHART**

*Bactrocera invadens*: African Invader fly



KEY CHARACTERISTICS - DRY SPECIMEN



## **APPENDIX 6. LIST OF TRAPPING MATERIALS SUPPLIERS**

Chempac (Pty) Ltd.

Oakhurst Building

Main Road R45

Simondium, 7670

Western Cape

Tel: 021 874 1055

Fax: 021 874 1214

Insect Science (Pty) Ltd

26A First Avenue

Tzaneen 0850

Limpopo

South Africa

Tel: 015 307 1391

Fax: 015 307 6555

Email: [info@insectscience.co.za](mailto:info@insectscience.co.za)

River Bioscience (Pty) Ltd

CSIR Building

Gomery Ave

Summerstrand

Port Elizabeth

Tel: 041 583 3464

Fax: 041 583 3657

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