

Right: An autodissemination device applied with dry fungal conidia for fruit fly control.



How long can the spores last in the trap?

The dry spores can last for up to 4 weeks in the trap.

How long can the spores last in the soil?

The suspension of the biopesticide applied to the soil can last for up to 3 months. It is advisable to apply it twice during the season.

How safe is the biopesticide?

The biopesticide is safe to humans, animals and fruit fly natural enemies (parasitoids and predators) that are found in the farm.

Recommended fruit fly management methods

- Population monitoring
- Protein bait
- Male annihilation
- Field sanitation
- Biological control (biopesticides, parasitoids and weaver ants).

icipe – Working in Africa for Africa...

International Centre of Insect Physiology and Ecology (*icipe*) – was established in 1970 in direct response to the need for alternative and environmentally-friendly pest and vector management strategies. Headquartered in Nairobi, Kenya, *icipe* is mandated to conduct research and develop methods that are effective, selective, non-polluting, non-resistance inducing, and which are affordable to resource-limited rural and urban communities. *icipe*'s mandate further extends to the conservation and utilisation of the rich insect biodiversity found in Africa.

icipe contributes to sustainable food security in Africa through the development of integrated pest management systems for major agricultural and horticultural crops. Such strategies include biological control, and use of behaviour-modifying and arthropod-active botanicals. *icipe* puts emphasis on control approaches that have no detrimental impact on the environment. These options are always designed to fit the needs of the farmers, and are developed on-farm and with farmers' participation. In addition to fruit flies, other key areas of *icipe*'s research include pests of tomato, brassicas, beans, and staple food crops such as maize and sorghum.

African Fruit Fly Programme is an *icipe*-led fruit fly management programme for income generation, poverty alleviation, and improving food and nutritional security of growers across Africa.

COVER PHOTOS

Top: A farmer with clean and health ripe mango fruits.

Bottom left: Native fruit fly, *Ceratiti cocyra* ovipositing on mango fruit.

Bottom right: Biopesticide; *Metarhizium anisopliae*.

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Fruit fly Biological Control with Biopesticides

...for quality horticulture for Africa



Photos: icipe, Peter-Luethi_Biovision



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International Centre of Insect Physiology and Ecology (*icipe*)
 PO Box 30772-00100 Nairobi, Kenya
 Email: icipe@icipe.org | Website: www.icipe.org | technologytransfer.icipe.org
 Support *icipe*: www.icipe.org/support-icipe



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Left: Application of biopesticide around mango canopy.

Right: Fungal (*Metarhizium anisopliae*) based biopesticide commercialised as Campaign™.



Right: Entomopathogenic fungal infected fruit fly larva.



What is biological control?

Biological control is the human use of specifically chosen organisms (parasitoids, predators and pathogens) also known as “farmers’ friends” to reduce damage caused by a pest.

What are Biopesticides?

Biopesticides are pesticides derived from natural materials such as animals, plants and bacteria. Microbial pesticides consist of a disease-causing microorganism (e.g. bacteria, fungi, protozoa, nematodes or viruses).

Can fruit flies be controlled with biopesticides?

Yes. The maggots that are ready to exit from rotten fruits to pupate in the soil, the resting stage called the puparia and the adult stage of fruit flies can be effectively managed with biopesticides.

Are there any biopesticides for fruit fly control in Africa?

Yes. *icipe*, in close collaboration with ReallPM has been developing biopesticides for the control of different species of insects. A commercial fungal-based biopesticide called Campaign, which was developed by both *icipe* and ReallPM for thrips and mealybug control, is also effective against fruit flies

How do I apply the fungal-based biopesticide to control fruit flies?

The fungal-based biopesticide is targeted at:

- (1) Maggots and pupae: Mix the biopesticide by following the instructions on the label and apply directly to the soil (e.g. under the dripline of the mango canopy).
- (2) Adult fruit flies: The auto-dissemination technique is the recommended control method for adult fruit flies.

What is the auto-dissemination technique?

This technique is based on attracting the adult fruit flies using lure to a focal point. The fruit flies pick up the fungal spores (biopesticides) are then killed.

The dry spores of the biopesticide can also be applied to home-made traps baited with protein bait or methyl eugenol.

Cross contamination between infected and healthy flies

One of the major advantages of the auto-dissemination technique is transfer of spores among infected and healthy flies in the farm. Adult fruit flies that enter the trap and pick up spores can transfer infection to other healthy flies through mating, physical contact and lekking (gathering of males to attract females). Infection can rapidly build up among the fruit fly population in the farm and result in reduction of the fruit flies.

Is there a special trap for using with the biopesticide?

Yes. You can use a home-made bucket trap and line the inside of the trap with a velvet material or woven cloth. Apply the dry spores of the biopesticide (0.8–1 to the cloth. A loofah, or synthetic sponge soaked in fruit fly attractant (e.g. Fruit Fly Mania or methyl eugenol), is attached to the trap using a wire hanger to serve as the fruit fly bait. The flies are attracted to the trap by the bait, thereby picking the spores and are killed.

Can I mix the bait or attractant directly with the biopesticide and spray?

No. This is not recommended as the bait or attractant will kill the spores/biopesticides and render them ineffective.

