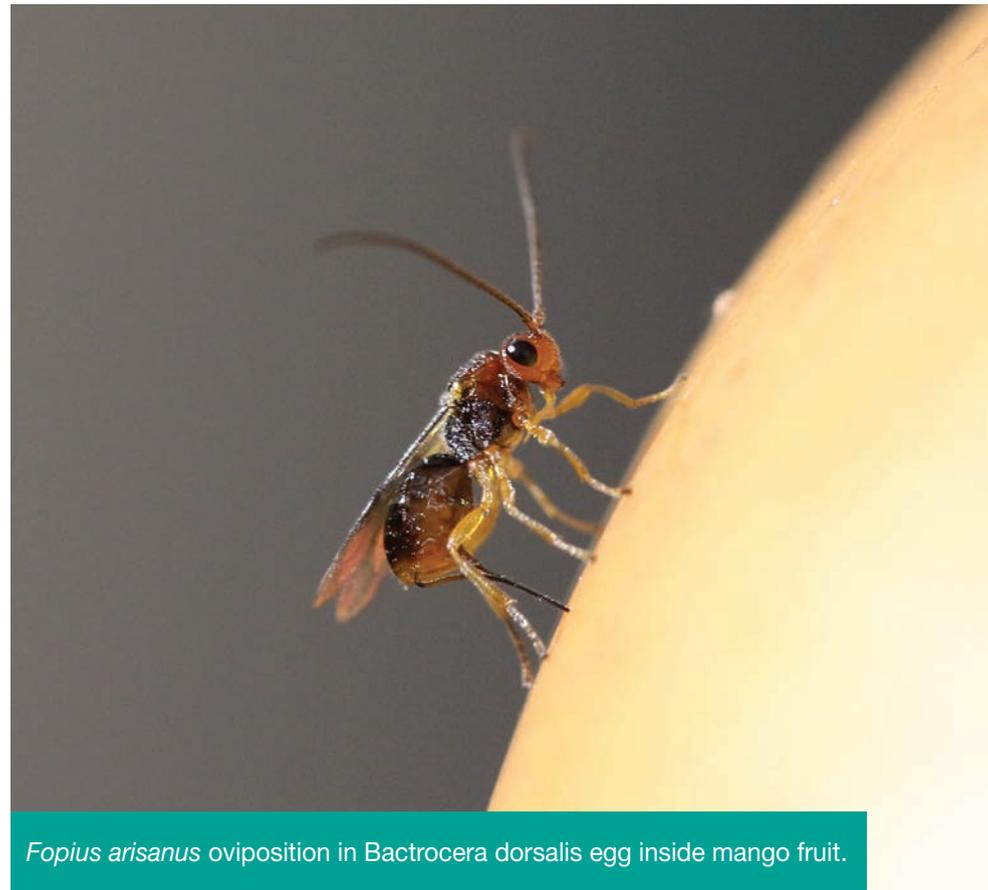


Recommended fruit fly management methods

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



Fopius arisanus oviposition in *Bactrocera dorsalis* egg inside mango fruit.



...for quality horticulture for Africa

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 PHOTO

A farmer with colony of fruit fly parasitoid.

DONORS: European Union; BMZ/GIZ, Germany; USAID, USA; USDA-APHIS, USA; FAO, Italy; IAEA, Austria, Biovisioan, Switzerland.

COLLABORATORS: USDA-APHIS, USA; Royal Museum for Central Africa - Tervuren, Belgium; University of Bremen, Germany; Max Planck Institute, Jena, Germany; USDA/ARS, Hawaii, USA; IITA; Russell IPM, UK; Ministry of Agriculture, Kenya; Ministry of Agriculture, Food Security and Co-operatives, Tanzania; KALRO, Kenya; Mikocheni Agricultural Research Institute, Tanzania; Mozambique Ministry of Agriculture; Eduardo Mondlane University, Mozambique; Private Sector in Mozambique; Real IPM, Kenya.



Photos: *icipe*, Peter-Luethi_Biovision

Fruit fly Biological Control with Parasitoids

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ACKNOWLEDGEMENT: We gratefully acknowledge the financial and technical support of our core donors: Swiss Agency for Development and Cooperation (SDC), Switzerland; Swedish International Development Cooperation Agency (Sida), Sweden; UK Aid, Government of the United Kingdom; Ministry of Higher Education, Science and Technology, Kenya; and Government of the Federal Democratic Republic of Ethiopia.



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Fopius arisanus ovipositing in *Bactrocera dorsalis* eggs.

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 Parasitoids?

Parasitoids are a group of beneficial insects whose immature stage develops on or within a single pest, ultimately killing the host (e.g. *Diachasmimorpha longicaudata*) add label to all the photos.



Native parasitoid: *Psyttalia cosyrae*.



Introduced parasitoid:
Diachasmimorpha longicaudata.

Are there any fruit fly parasitoid species in Africa?

Yes. There are many native fruit fly parasitoid species in Africa. However, the native species are less effective for fruit fly species that have invaded the African continent from elsewhere (e.g. *Bactrocera dorsalis*) (add photo of Bd)

Are there any fruit fly parasitoids that have been brought into Africa to control the foreign fruit flies?

Yes. Important and effective parasitoid species from other places have been brought into Africa. They are *Fopius arisanus* (which attacks eggs) and *Diachasmimorpha longicaudata* (which attacks maggots). They work together by attacking these different stages to control the fruit flies. These parasitoids are now established in several localities across Africa.

What are the major advantages of these parasitoids in the farms?

Once the parasitoids are established in the system, their persistence and activity does not need farmer intervention and their action comes at no cost to the farmers.



Parasitoid releases in mango orchard.

Can the parasitoids attack fruits and vegetables?

Parasitoids do not attack or eat fruits. They lay their eggs in fruit fly eggs and maggots that are growing in previously damaged fruits. Therefore, parasitoids do not attack fruit that has not been already damaged with fruit fly eggs and maggots.

Do the parasitoids attack other beneficial insects, animals or Humans?

Parasitoids are fairly specific to their target fruit fly species and they do not attack other beneficial organisms in the field, animals or humans.

What can I do to conserve the parasitoids in my farm?

Blanket spraying of pesticides will kill the parasitoids. Use pesticides carefully and use the recommended fruit fly control methods (e.g. spot application of bait). As much as possible, use the augmentorium for field sanitation. Maintain flowering plants within and around the farm that the parasitoids can use as resting sites and food sources.

