CONTROLLING FRUIT FLY PEST
BY RELEASING STERILE MALE INSECTS


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The larvae of **FRUIT FLY PESTS** damage plant tissues before their harvest. Fruit flies belong to the Tephritidae family.

Several species of Tephritidae have a greater impact on global agricultural horticulture trade than almost any other pest; their introduction poses a major risk to horticulture in affected countries.

Socioeconomic consequences are so severe that countries free of key fruit fly pests (such as Chile, Japan, New Zealand and USA) prohibit the import of fresh produce from countries where these pests are endemic or have been introduced.

Unfortunately, the spread of fruit flies does not stop at country borders. Globalization of trade favours the dispersal of these pests to countries and regions free of the pest. Furthermore, introduced pests are increasingly surviving in previously inhospitable areas due to a warming climate.

The Joint FAO/IAEA[2] Division of Nuclear Techniques in Food and Agriculture helps Member States control invasive pest fruit flies by providing technical and scientific support and transferring nuclear and related technologies to reduce losses in fruit and vegetable production, minimize insecticide use, preserve biological diversity. This results in facilitation of international trade, increase farmers' income and enhance food security.

KEY*facts:* *Fruit Fly Pest*

FRUIT FLIES HAVE A GREATER IMPACT ON GLOBAL AGRICULTURAL FRUIT TRADE THAN ALMOST ANY OTHER PEST

ABOUT 70 SPECIES OF TEPHRITID FRUIT FLIES ARE KEY PESTS OF FRUITS AND VEGETABLES, CAUSING HIGH LOSSES EVERY YEAR[1]

THE MEDITERRANEAN FRUIT FLY (*CERATITIS CAPITATA*) ATTACKS OVER 250 SPECIES OF FRUITS AND VEGETABLES

BIRTH CONTROL FOR INSECTS: THE STERILE INSECT TECHNIQUE

Fruit flies attack many important fruit crops, including citrus, mango, apples, peaches, apricots as well as some vegetables (especially cucurbits), seed crops and also many wild plants.

The economic implications are not only reduced production and increased control costs, but also loss of export markets and/or the cost of establishing and maintaining phytosanitary measures.

One efficient and cost-effective pest control technology is the Sterile Insect Technique (SIT). The SIT is a biologically-based pest control method in use since the late 1950's that, unlike chemical control tactics, is friendly to the environment and does not pose any health concerns.


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1 J. Appl. Entomol. 137 (Suppl. 1) (2013), © 2013 Blackwell Verlag GmbH

2 International Atomic Energy Agency

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STERILE INSECT TECHNIQUE *features*

STERILE INSECT TECHINIQUE INVOLVES THE MASS-REARING AND SUBSEQUENT STERILIZATION OF LARGE NUMBERS OF MALE INSECTS OF THE TARGET PEST

STERILE INSECTS ARE NOT SELF-REPLICATING AND THEREFORE CANNOT BECOME ESTABLISHED IN THE ENVIRONMENT

STERILE INSECT TECHNIQUE HAS BEEN APPLIED TO ERADICATE FRUIT FLY PEST POPULATIONS FROM WHOLE AREAS OR COUNTRIES

FAO/IAEA Programme

E-mail: Food-Chain-Crisis@fao.org
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Website:
www.fao.org/food-chain-crisis
http://www-naweb.iaea.org/nafa/index.html

The SIT involves the mass-rearing and subsequent sterilization of large numbers of male insects of the target pest. The sterilized male insects are then released repeatedly over the infested areas, where they mate with the fertile wild females that consequently produce no offspring. The wild pest population can be effectively suppressed if the sterile males outnumber the wild males.
In special situations of isolation, and if the pest population is treated systematically on an area-wide basis with sterile males, complete eradication can be achieved as sterile males will invariably seek out and mate with any remaining females of the target pest population, a feat that is difficult to achieve using insecticides.

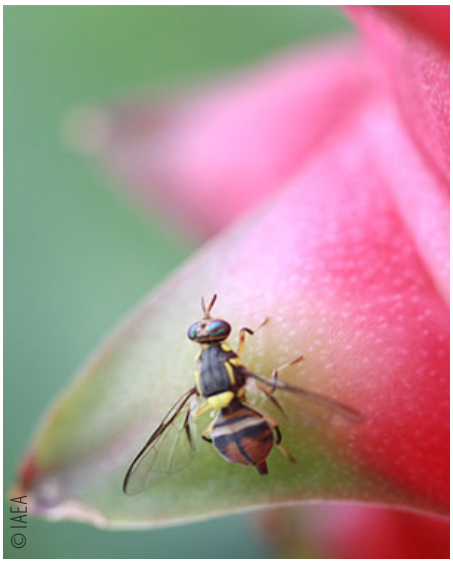
Thus, the SIT is also suited to help eliminate outbreaks of invasive, newly introduced pest populations before they spread and become fully established.

In addition, the SIT is species-specific. As such, it has no negative impact on natural enemies and pollinators, meeting the increasing public demand for safe and environmentally friendly pest control.

CONTROL STRATEGIES AND SIT APPLICATIONS

The SIT is effectively used as part of an integrated approach and in emergency situations is also effective to eliminate outbreaks of invasive pests.

With assistance of the Joint FAO/IAEA Programme the SIT has been used successfully to suppress (Argentina, Israel, South Africa, Spain), contain (Australia, Guatemala), prevent establishment (California and Florida, USA), or even eradicate (Argentina, Chile, Peru, Mexico) the Mediterranean fruit fly



from entire areas or countries.
In addition, it has been applied to prevent incursions of the Mexican fruit fly (*Anastrepha ludens*) into Texas, USA, and to eradicate the Mexican fruit fly and the West Indian fruit fly (*A. obliqua*) from northern Mexico. The SIT is also utilized against the South American fruit fly (*A. fraterculus*) in South America.

Thanks to the application of the SIT component in area-wide integrated pest management programmes, the melon fly (*Bactrocera cucurbitae*) was eradicated from the Okinawa archipelago in Japan. In Thailand, the Oriental fruit fly (*B. dorsalis*) and the Guava fruit fly (*B. correcta*), and in the Philippines the Oriental fruit fly, are being suppressed in pilot areas to reduce losses in mango. In the Mediterranean region, the interest in the use of SIT against olive fruit fly (*B. oleae*) is growing. The recent introductions and spread of several *Bactrocera* species into Africa and other regions serve as a warning about the invasiveness of these exotic species.
At present, the Insect Pest Control Subprogramme of the Joint FAO/IAEA Programme is supporting regional (Africa, Asia and Europe) and national field projects for controlling fruit flies. Research and development, training, and expert services and equipment are provided.
The SIT is proving to be one of the most successful and environment-friendly insect pest control methods ever developed.

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