



Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Integrated pest management using the sterile insect technique



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The Joint Food and Agriculture Organization of the United Nations/International Atomic Energy Agency (FAO/IAEA) Division of Nuclear Techniques in Food and Agriculture is a global leader in the development and implementation of the sterile insect technique (SIT) and related biologically-based pest management technologies. The SIT is a type of birth control for insects, involving the mass-rearing and sterilization of large numbers of the target pest insect and the releasing of sterile male insect over target areas. The SIT is environmentally friendly and therefore a more sustainable method to manage populations of major insect pests of crops, animals and humans.

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What FAO does

In order to facilitate the application of SIT worldwide, The Joint FAO/IAEA Division achieves its mandate through strategic and applied research, technology transfer, capacity building, policy advice and information management.

- Researches and develops, at its own dedicated facilities, all aspects of the SIT and related technologies, including the development of male-only strains, insect mass-rearing technologies, irradiation of mass-reared insects to ensure sterility and quality control;
- Assists member countries through more than 35 national and regional technical cooperation projects;
- Provides policy advice to national and provincial governments and participates in several national and regional advisory boards on national strategies

for the application of biological control, including SIT;

- Assists member countries in declaring pest-free areas, areas of low pest prevalence and systems approaches to facilitate fruit trade according to the International Standards for Phytosanitary Measures (ISPMs) developed under the International Plant Protection Convention (IPPC), and engages with IPPC to develop and formulate appropriate phytosanitary standards;
- Develops, makes available and assists stakeholders in the use of its *International Database on Insect Disinfestation and Sterilization* and its *World-Wide Directory of SIT Facilities*;
- Educates around 140 trainees annually, both at its own laboratories at Seibersdorf and through workshops and training courses on-location in member countries.

Contributes to FAO's Strategic Objectives 2 and 5



Make agriculture, forestry and fisheries more productive and sustainable
Increase the resilience of livelihoods to threats and crises

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Understanding the context

The rapid growth in global trade and, in particular, passenger travel and postal shipments, has led to an increase in insect pest incursions. Climate change and insecticide resistance also play a major role in the increase and geographical expansion of agricultural pests. Cost-benefit studies confirm that investment in detection, surveillance and rapid response to single or recurrent pest incursions is highly favourable - economically, socially and environmentally.

Cases of successful implementation of the SIT, as part of an area-wide integrated pest management approach, are numerous. They include the eradication of the Mediterranean fruit fly from Mexico. First detected in Mexico in 1977, the Moscardem Programme succeeded by 1982 in eradicating the invasive Mediterranean fruit fly from the areas that it had previously invaded. The significant investments by the Government of Mexico in this programme for over 30 years have been extremely cost-effective, with cost-benefit ratio of 1:112, and have facilitated the multi-billion dollar horticultural industry that has developed during this period.

Tsetse-transmitted trypanosomosis is one of the main constraints to agricultural production and development



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in Africa. The SIT successfully eradicated tsetse flies from Unguja Island (Zanzibar) in 1997 and no tsetse has subsequently been detected. Socio-economic studies have demonstrated significant improvements attributable to the elimination of trypanosomosis: within three years of its eradication, the proportion of small farmers rearing indigenous cattle increased from 31% to 94%; sales of milk from indigenous cattle increased from 11% to >62%; and the percentage of farmers with improved cattle breeds increased from 2% to 24%.

Ongoing research and development activities to optimize the SIT for mosquitoes focus on the development of male-only strains, optimization of mass-rearing processes, development and validation of quality control tests, handling and release of sterile flies and improvement of traps for male mosquitoes. In due course, and following appropriate SIT pilot projects, the SIT is expected to be available for the suppression of also disease-transmitting mosquitoes.

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MORE INFORMATION

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