

**Thematic Plan for**  
**FRUIT FLY CONTROL**  
**USING THE STERILE INSECT TECHNIQUE**  
**SUMMARY REPORT**

**Objective**

To support the fruit production and trade industry through the development of programmes aimed at controlling or eradicating the key pest, the fruit fly. This involves the application of the Sterile Insect Technique (SIT) in an area-wide integrated pest management and eradication strategy. The sustainability of eradication activities has been achieved in some countries notably, the USA, where the application of SIT has produced significant impact on socio-economic development, in terms of both cost-effectiveness and improved environmental quality.

In line with the TC strategy, this thematic plan reviews successful experiences gained in the control of the fruit fly and outlines a strategy for implementing integrated pest control programmes at the regional, sub-regional and national level. Synergies are sought with partner organisations to expand the knowledge base and capabilities for SIT based pest control activities and to strengthen TC particularly TCDC.

**The Problem**

Extensive fruit industries are developing in many parts of the world in response to the large demand for high quality fresh fruits and vegetables. Significant investments are made by governments and major lending institutions to assist in this development. Tephritid fruit flies, however, cause devastating direct losses to many of the fresh fruits and vegetables that these investors target for the market place thus requiring regular pesticide treatments to protect the maturing crop. In addition, few insects have a greater impact on international marketing and world trade in agricultural produce than tephritid fruit flies. (See Attachment 1 - List of Countries With Quarantines Against Specific Fruit Flies or All Fruit Flies). With increasing international trade, the importance of fruit flies as major quarantine pests of fruits and vegetables will be increasing along with demands by Member States to implement areawide national or regional (trans-boundary) control programmes against fruit fly pests.

Fruit flies of the *Bactrocera* and *Anastrepha* groups are devastating pests in the Asia/Pacific and Latin American regions, where production of tropical fresh fruit for export is rapidly growing. In these mostly tropical regions, several fruit fly species of economic importance are present. Eradication is not practical at present in most multi-species environments. Efforts are therefore directed at intensive pre-harvest management, including SIT and augmentative releases of natural enemies, followed by post-harvest treatment, possibly irradiation, to allow fresh fruit exports to countries free of these pests. One strategy is to support the creation of certified Low Fly Prevalence Areas. With increasing sophistication, these can eventually become certified Fly Free Areas, which no longer require post-harvest treatments.

## **Thematic Planning Meeting**

This thematic plan for fruit flies is the summation of ideas and recommendations put forth by a group of experts composed of fruit fly programme managers and workers, stakeholders from the affected industry, a commodity specialist from the FAO, and technical, planning and policy specialists from the IAEA and the FAO. This document provides strategic guidance and direction on how and where the Sterile Insect Technique (SIT) can most effectively be applied to control or eradicate fruit flies in the future. The presence of certain fruit flies in a country can pose a significant barrier to trade in fresh fruits and vegetables. SIT can play a major role in facilitation of trade through the development of fruit fly free zones and low prevalence areas that facilitate new and expanding market opportunities.

One of the driving forces for using the SIT in the future will be the need to protect and preserve the environment. Use of SIT for purposes of control, not just eradication, could significantly reduce pesticide use, residues, pollution, and associated costs. Solid evidence suggests that benefit-cost ratios are increasing for the Mediterranean fruit fly, *Ceratitis capitata* (med fly) SIT as an alternative to insecticides, and as a mitigating technique for environmental and human health concerns about insecticide use. In fact, the cost of med fly control in Israel with SIT is the same as control with insecticide applications.

Increased use of the SIT and other biological insect management systems will result from additional government restrictions on pesticide use. These biologically based systems will meet the demands of regulatory agencies and the public with regard to pollution, insecticide residues, and effects on non-target organisms. Of particular concern is the imminent reclassification of malathion, one of the most widely used insecticides today for fruit fly control, as a potential carcinogen by the United States Environmental Protection Agency. Other countries are sure to follow suit with similar legislation further limiting the tools available for fruit fly control. As a result, the market for sterile med flies for pest control programmes is expected to expand dramatically.

Major breakthroughs from FAO/IAEA R&D, particularly the development of genetic sexing (male only) strains and improved rearing systems, serves to increase the efficiency of the SIT and lower operational costs. This also addresses other constraints, such as sterile female stings on fruit that reduces market value of the crop. Commercial application of the SIT will drive operational costs even lower with improvements in sterile fly production, handling and release methods.

The group also recognizes the need for continued investment in FAO/IAEA R&D. The Joint FAO/IAEA Division is the global leader in SIT technology for fruit fly control by virtue of its international position, technical competencies and capabilities, and following among plant protection specialists. Based on this high level of expertise, these efforts must continue together in partnership with others who share a common interest in protecting the environment, in facilitating global trade of agricultural commodities and in increasing farm productivity and sustainability to address both food safety and food security needs of IAEA and FAO Member States.

The expert group identified Central America, Southern Cone of South America and the Mediterranean Basin as regions where the greatest gains in using the SIT for fruit flies can occur in the short and medium term. These areas were chosen because of the high level of interest by industry and governments together with strong plant health infrastructures that lend themselves toward area-wide implementation of the SIT. In addition, the state of technological development against specific species of fruit flies, primarily med fly, was a major consideration. Med fly serves as a model for development of SIT for other fruit flies species. Since the SIT package for med fly is the most advanced and demonstrably cost-effective, it should be the initial technology package for building new partnerships between the IAEA, FAO and the private sector. Thus, a major strategic objective of the SIT programme for fruit flies of IAEA and its Joint Division with FAO is to complete a commercial technology package for med fly over the next ten years.

Member States in other areas cannot be ignored, however, but in many cases this will require a long-term commitment toward R&D, often supported by IAEA and FAO, before minimum requirements to use the SIT effectively for other fruit fly pests can be met. Genetic transformation and other biotechnology approaches could potentially shorten the time required to develop new fruit fly strains in the future. Therefore, an operational objective of the SIT programme for fruit flies of IAEA and its Joint Division with FAO is to develop technology packages for other fruit fly species over the next ten years.

The fact that SIT can be used for "control", and not solely for eradication, was emphasised throughout the discussions. This, more than any other development, will open the doors to greater acceptance and use of the SIT in the future. Out of necessity, it also will lead to increased commercial use and sustainability of SIT technology. It eliminates the criticism often directed at the SIT that eradication is unrealistic, and unsustainable in many cases, for lack of adequate quarantines.

Present day public fly-production facilities cannot meet current market demand for sterile med flies and other fruit fly species needed for control. The group recognizes that the involvement of the private sector is essential for expanded success in applying the SIT to fruit flies. The obvious profit center is the production of sterile fruit flies for control activities. Commercialization of fly production is the only practical solution for meeting the increasing demand for sterile flies and would undoubtedly result in greater efficiencies in production and provide commercial incentive for further research and development efforts. Such collaboration would benefit all stakeholders from farmers to fruit consumers.

Commercial investment in SIT for med fly will accelerate if IAEA and FAO emphasize activities that minimize investment risk: pursuing research and development activities that improve production efficiency and operational effectiveness; building technical competency to manage field operations; and disseminating best practices and lessons from successful field programmes to stakeholders.

## Annex E - List of Quarantine Species and Countries

### LIST OF COUNTRIES WITH QUARANTINES AGAINST SPECIFIC FRUIT FLIES OR ALL FRUIT FLIES<sup>1</sup>

COUNTRY	Medfly	<i>Dacus</i> sp. or <i>Bactrocera</i> sp. <sup>2</sup>	Melon Fly	<i>Anastrepha</i> sp. <sup>3</sup>	<i>Rhagoletis</i> sp. <sup>4</sup>	All Fruit Flies
American Samoa	X	X				
Argentina	X			X		
Australia						X
Austria	X				X	X
Barbados						X
Bermuda						X
Bolivia	X					
Brazil		X		X		
British Virgin Islands	X					
Brunei						X
Bulgaria	X					
Canada					X	
Cayman Islands	X	X				
Ceylon	X					
Chile	X	X	X	X		
China	X	X				
Cook Islands		X				X
Costa Rica	X			X		
Cuba	X					
Denmark	X				X	
Dominican Rep.	X	X				
El Salvador	X	X				
Fiji	X					
Finland	X					X
France	X				X	
Germany	X <sup>7</sup>	X		X	X	
Great Britain	X	X	X	X	X	
Grenada	X					
Guatemala	X					
Haiti	X					
Hungary	X				X	
Italy		X		X	X	
Inter-African Group		X		X		