

The Mediterranean Fruit Fly in Central America

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The Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), or medfly, is a serious pest in most of the sub-tropical regions of the world. The female fly pierces the fruit's skin, an economic damage per se, and lays groups of eggs in the pocket thus created. After hatching, the larvae consume internal portions of the fruit. This damage further reduces the market value of the crop and may even make the fruit unfit for human consumption.

The medfly is known to infest some 200 species of soft-skinned fruits and vegetables including citrus, tomatoes, chili, coffee, mango, avocado and various melons. At present, the medfly is normally controlled with insecticides usually formulated in a bait and applied by aircraft to large areas. However, in developing countries, the cost and availability of the materials and application equipment make medfly control prohibitive except in highly commercialized operations. Besides the direct losses in yield due to this pest, increased pesticide costs are incurred along with difficulty in exporting infested produce into countries in which the medfly does not exist. Thus the USA, for example, has strict quarantine regulations governing the importation of known medfly hosts and virtually eliminates unregulated importation of these commodities into the continental United States from medfly infested areas. Elsewhere, if fruit is imported from a medfly area, it normally must either be fumigated or shipped to locations where the possibility of an escaped medfly surviving is almost zero.

Since it was first reported in Costa Rica in 1955, the medfly has moved progressively north and now infests virtually all Central American countries. The estimated losses due to the medfly in 1970 in Costa Rica, Panama and Nicaragua were in excess of \$2.4 million. In 1975, the medfly was recorded in El Salvador and is now reported to be in Guatemala. The latest reported trapping of the fly was within 80 miles of the Mexican border, and the pest is now threatening the agricultural production of Mexico and possibly that of the USA. Understandably, this northward movement is causing great alarm in these two countries. The Mexican Government is extremely concerned about the problem because one of its main sources of agricultural revenue is from fresh fruits and vegetables exported to the United States. If the medfly were to become established in Mexico, it is estimated that losses of \$100 million per year would result. In addition to the direct losses caused by the medfly, the export of Mexican grown produce to the USA would be in jeopardy.

Similar or even higher losses would occur if the insect became established in the USA. The medfly has been introduced into the continental USA on six different occasions since 1929 and on each occasion it was eradicated at considerable expense. The most recent invasion took place in southern California in 1975, and it was stopped by the combined use of bait sprays, intensive trapping surveys and the use of the sterile insect technique.

The harvest value of crops endangered by this infestation in California alone is \$700 million. For these reasons, the U.S. Government is deeply concerned that the proximity of the medfly may increase the chances of its introduction into and establishment in the continental USA.

THE PROGRESSION OF THE MEDFLY THROUGH CENTRAL AMERICA
AFTER INITIAL DISCOVERY IN COSTA RICA IN 1955.



MEDFLY 1st REPORTED:

★ COSTA RICA 1955

② PANAMA 1963

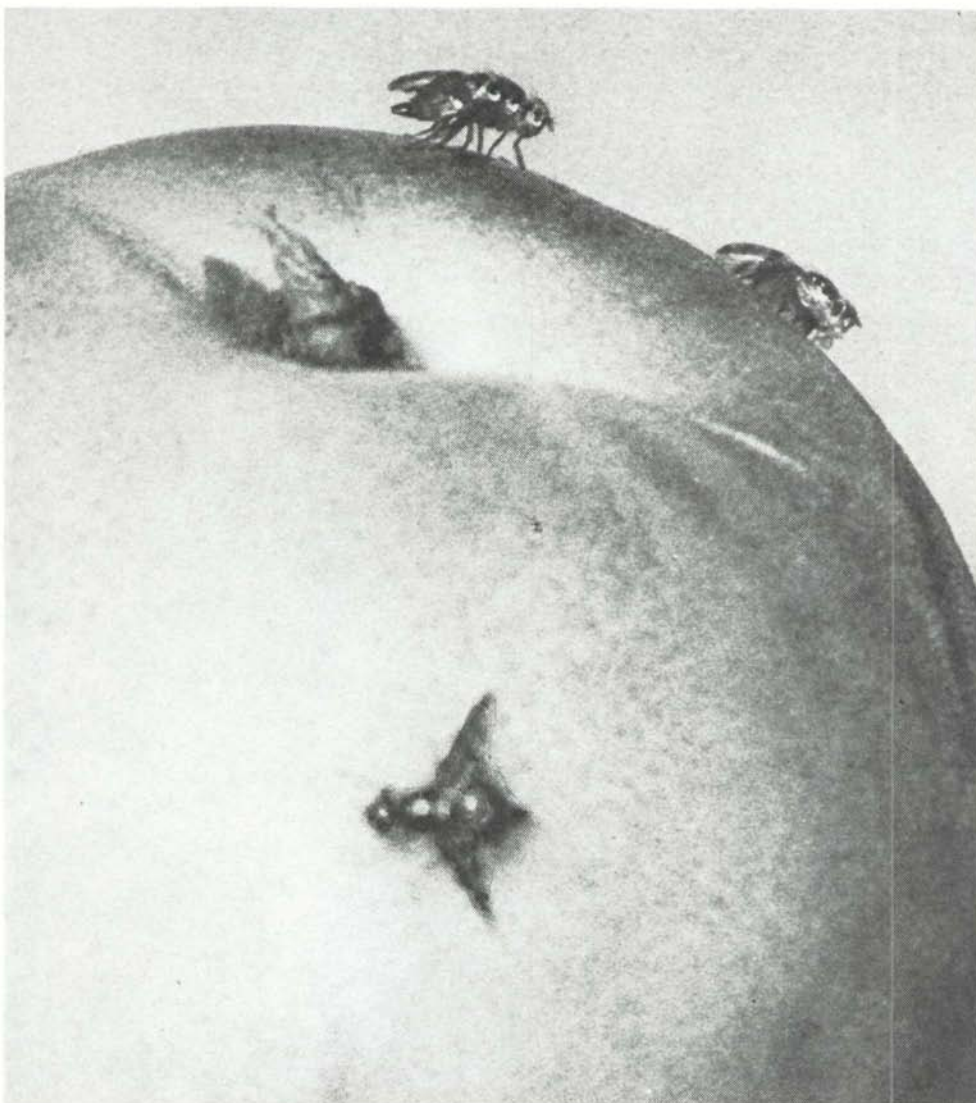
③ NICARAGUA 1961

④ EL SALVADOR 1975

⑤ GUATEMALA 1975

UNITED STATES
OF AMERICA

MEXICO



Mediterranean fruit flies on a peach. Photos: IAEA/Holzinger

Recognizing the tremendous economic impact the medfly has had on the agricultural industries of many countries, various national and international organizations are attempting to solve the Mediterranean fruit fly problem in Central America, and alleviate its potential threat to the Mexican and U.S. agricultural industries. Extensive trapping programmes are being planned by the Mexican Government to detect any further movement of the medfly towards the agricultural areas of southern Mexico. Preparations are also being made by the United Nations Development Programme in consultation with FAO to intensify and improve plant protection and quarantine procedures in Central America, Mexico and the Caribbean. This project is directed against a very broad front of organisms detrimental to agriculture. Hence, besides the Ministries of Agriculture of the countries concerned,



Damaged peach showing medfly larvae (near tip of blade and on blade).

the International Regional Organization against Plant and Animal Diseases (OIRSA), the Caribbean Plant Protection Commission (CEC) and the Tropical Agronomic Centre for Research and Training (CATIE) would all be involved in the operation of the UNDP project. Because containment of the medfly is a major component of the UNDP project proposal, a primary objective is the training of local personnel in quarantine and plant protection methods against the medfly. With the co-operation of the various agencies mentioned above, it is quite possible that the medfly populations can be kept at low enough levels so that the damage they cause is not economically significant and the continued northern movement of the medfly is checked. However, unless action is initiated soon, the medfly may escape its present boundaries.

Various methods of controlling the medfly are available and include the use of insecticides, bait sprays and the sterile insect technique (SIT). Each of these control strategies may be used alone or in sequence. With regard to the application of the SIT, the Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture through its Insect and Pest Control Section and Entomology Laboratory is in an excellent position to assist in containing the medfly in Central America. For the past 12 years, the laboratory has participated in all phases of medfly control by sterile insect releases in various climates. This involvement has included planning of medfly campaigns, development of pre-release techniques (bait spraying, trapping, etc.) and shipment and release of sterilized medflies. Small-scale field tests utilizing the SIT have been carried out by nine countries: Italy (Procida, Capri), Spain, Cyprus, Israel, Tunisia, Peru, Panama, Costa Rica and Nicaragua. Other field projects presently being counselled and serviced are located in Argentina, Venezuela and the Canary Islands.

The research and development that are still needed to effectively stabilize and gain control of the medfly situation in Central America include:

- The development and use of effective quarantine procedures in various countries;
- Development of effective conventional medfly control procedures under the conditions found in Central America;
- Development of methods to determine the geographic origin of medflies introduced into new areas;
- Medfly mass production (viz. all aspects of rearing Central American strains);
- Assessing the performance (competitiveness, etc.) of various strains;
- Logistics, including the development of systems for releasing pre-adult stages;
- Genetic rearing methods: developmental research in this area is particularly promising since the preferential production of males would allow considerable savings in the rearing costs of medflies for release;
- Development of adequate surveillance through dual marking, e.g. a dye coupled with dysprosium chloride followed by neutron activation analysis and autoradiography.

This methodology should provide an almost foolproof identification of released medflies.

In summary, the problem posed by the medfly to agricultural production in Central America is recognized by regional, national and international institutions. Several of these institutions are implementing plans for controlling this insect in Central America and checking the spread to North America. Because of its experience and expertise, the Agency has already been approached to help develop the programme against the medfly. The Entomology Section of the FAO/IAEA Joint Division is prepared to help these organizations in lifting the economic threat that the medfly is posing to agriculture in Central and North America, as well as in other infested regions.