

The Mediterranean Fruit Fly

The Mediterranean fruit fly (*Ceratitis capitata*), commonly called Medfly, or Moscamed in Spanish, is one of the world's most destructive agricultural pests.

The female Medfly attacks ripening fruit, piercing the soft skin and laying eggs in the puncture. The eggs hatch into larvae (maggots) that feed inside the fruit pulp and renders the fruit inedible.

Appearance and Life Cycle

The adult Medfly is slightly smaller than a common housefly and is very colorful. It has dark blue eyes, a shiny, black thorax (back), and a yellowish abdomen with silvery cross bands. Its wings, normally drooping, display a blotchy pattern with yellow, brown, and black spots and bands.

The life cycle of the Medfly has five phases:

- The adult female deposits eggs under the skin of fruit,
- The eggs hatch and produce maggots or worm-like larvae,
- The larvae feed on the pulp of fresh fruits and vegetables before dropping to the ground, where the larvae burrows into the soil,
- The larvae transform into pupae in the soil, and
- The pupae mature into adults and emerge from the soil.

Under tropical summer weather conditions, the Medfly completes its life cycle in 21 to 30 days.

History

The Medfly originated in Africa. It has since spread throughout the Mediterranean region, southern Europe, the Middle East, Western Australia, South and Central America, and Hawaii. In general, it is found in most tropical and subtropical areas of the world.

The Medfly became established in Hawaii in 1910. Hawaii remains infested with this pest, and no eradication program is currently under way. The first of numerous U.S. mainland infestations occurred in Florida in 1929.

The Exotic Fruit Fly Strategic Plan

In January 2006, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) released its plan to further protect the health and value of American agricultural resources threatened by the introduction and establishment of exotic fruit fly pests.

The agency's Exotic Fruit Fly Strategic Plan harmonized all exotic fruit fly programs, including Mediterranean, Mexican, and Oriental fruit flies. Using an integrated, multi-faceted approach that incorporates surveillance activities, control programs and regulatory actions, State and Federal officials can more effectively respond to a pest that attacks more than 400 host plants. The plan sets five priorities:

- Preventing individual fruit fly introductions from becoming established populations
- Reducing the imminent threat of introduction or spread of Med- and Mexfly populations from existing populations in Mexico
- Mitigating the impact of fruit flies presently established in portions of the United States
- Encouraging the development of exotic fruit fly detection and management programs in the Caribbean Basin and Central America to act as an early warning system and further reduce the risk of introduction
- Providing technical support to reduction activities worldwide to further reduce the risk of fruit fly entry

Eradication

When fertile adults or larvae of Medflies are detected in the continental United States, every effort is made to eradicate the infestation as quickly as possible. The area around the detection is treated with a mixture of insecticide and bait to reduce or eliminate the adult stage of the insect. Along with the bait treatment, additional traps are placed in the field to delineate the extent of the infestation. After the bait-treatment schedule is completed, sterile Medflies are released in and near the treatment zone to interrupt the breeding cycle. Once enough time has elapsed for three generations of the insects to have matured, if a local survey discloses no Medflies, the area is declared once again free of the pest.

Survey

The USDA-APHIS along with State departments of agriculture, maintains trapping programs in high-risk areas of States susceptible to Medfly establishment. When one or more wild Medflies are collected in an area, APHIS and State officials immediately begin a delimiting survey. Using the detection site as the focal point, field crews position additional traps to determine if an infestation exists and to locate and define the limits of the infested area.

Regulation

If an infestation exists, Federal and State quarantine regulations are imposed to help prevent spread of the pest by humans or vehicles. Federal quarantine laws regulate the interstate movement of any article that may harbor the fly. State regulations control the movement of these articles going to uninfested areas of the same State. Articles regulated by State and Federal authorities include all Medfly-host fruits and vegetables present in the area. Open-air fruit and vegetable stands must provide protective covers for the produce to prevent infestation. Commercial and homegrown produce may not be moved without special inspection, treatment, and certification.

Control

Three kinds of treatment are used alone or in combination to eradicate the Medfly:

- *Aerial and ground bait spray application.* This treatment is approved for use by the U.S. Environmental Protection Agency. The spray contains minimal amounts of an insecticide and a protein/sugar bait that attracts the flies.
- *Sterile insect technique (SIT).* In the SIT, Medflies are reared in large quantities, sterilized with a small amount of irradiation, and released from airplanes into areas where they mate with wild Medflies. Such matings do not produce offspring. Eventually the wild population is eliminated through attrition.

SIT is most effective against low-level Medfly populations where a high proportion of sterile to wild flies can be achieved to ensure success. Initial applications of insecticide bait spray are sometimes necessary to bring local populations down to low densities.

- *Insecticide application to soil under host trees.* Application of insecticides to the soil is used only when larvae are detected. These products will kill some larvae as they enter the soil to pupate and most of the adults as they later emerge.

The preferred and most popular eradication strategy is an integrated approach combining all three treatments, with emphasis on the use of SIT.

Damage

In the United States, the Medfly could attack peaches, pears, plums, apples, apricots, avocados, citrus, cherries, figs, grapes, guavas, kumquats, loquats, nectarines, peppers, persimmons, tomatoes, and several nuts.

If the Medfly were to become established, consumer prices would go up and produce would become less available. In addition, backyard gardens, as well as commercial production areas, would require increased use of pesticides on a routine basis.

APHIS estimated the U.S. market value of the commodities that could host exotic fruit flies at about \$7.2 billion in 2002. That dollar figure is the sum of damage to the economy from export sanctions, lost markets, treatment costs, reduced crop yields, deformities, and premature fruit drop.

The Medfly in Mexico and Guatemala

In 1977, the Governments of the United States, Mexico, and Guatemala began a cooperative effort known as the Moscamed Program to eradicate the Medfly from Mexico and to maintain a barrier in Guatemala to halt the Medfly's northern spread. This program is designed to suppress Medfly populations and reduce the risk of introduction into the United States.

The Moscamed Program operates two facilities that produce sterile Medflies—one in Metapa de Dominguez, Mexico, and one in El Pino, Guatemala.

Mexico has been free of Medfly since 1982, except for the southernmost State of Chiapas, adjacent to Guatemala. Occasionally, people transport the pest north, causing outbreaks in border towns. In September 2004, Medflies were found in Tijuana, Mexico, municipality. In a cooperative effort, Mexican and U.S. agricultural officials eradicated the infestation by March 2005.

Keeping the Medfly Out

Many of the insects, weeds, and plant diseases that attack U.S. crops are foreign invaders. APHIS administers agricultural quarantine laws to help keep foreign plant pests and diseases out and to control domestic pests and diseases of limited distribution.

Travelers returning to the continental United States from Hawaii or a foreign country are prohibited from bringing into the country fresh fruits, meats, plants, birds, and plant and animal products that may harbor pests or diseases.

Additional Information

If you have questions about the Medfly, call the central office of APHIS' Plant Protection and Quarantine (PPQ) unit at (301) 734-8645, or contact a U.S. Federal regulatory official, listed in the Federal Government section of your telephone directory under USDA, APHIS, PPQ.

You may also call your State's regulatory officials, usually listed under department of agriculture, plant protection or regulatory division, in the State government section of your telephone directory.

In addition, APHIS' Internet home page (<http://www.aphis.usda.gov>) provides up-to-date information on various agricultural pests and diseases and other related topics.

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