

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 make the fruit inedible. The medfly's host range includes more than 300 plant species.

Potential Damage

In the United States, the medfly could attack apples, apricots, avocados, citrus, cherries, figs, grapes, guavas, kumquats, loquats, mangoes, nectarines, papayas, peaches, pears, peppers, persimmons, plums, tomatoes, and several types of nuts, among many other crops.

If the medfly were to become established here, consumer prices would go up and produce would become less available. Also, pesticide use would increase in backyard gardens and commercial farms.

The estimated annual market value of U.S. commodities that could host exotic fruit flies is more than \$7.2 billion. That dollar figure is the sum of potential damage to our Nation's economy from export sanctions, lost markets, treatment costs, reduced crop yields, plant deformities, and premature fruit drop.

Distribution

The medfly is found in most tropical and subtropical areas of the world. Originating in Africa, the pest has since spread throughout the Mediterranean, Southern Europe, the Middle East, Western Australia, South and Central America, and Hawaii. Most recently, it was also detected in the Caribbean.

In general, the medfly's presence in the United States has been limited. The only State with an established medfly population is Hawaii, where it has been present since 1910. No eradication program is underway in Hawaii. On the U.S. mainland, the first infestations occurred in Florida in 1929. Several infestations have been found and eradicated on the mainland since then. These efforts have kept the medfly from becoming established in the mainland United States.

In 2015, the medfly was discovered in Punta Cana, Dominican Republic, and Cabo Rojo in Puerto Rico. The Caribbean had previously been free of this pest. In 2014, the medfly was also detected in Riverside County, CA. These detections are currently being eradicated.

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 crossbands. 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:

- 1) The adult female deposits eggs under the fruit's skin.
- 2) The eggs hatch and produce wormlike larvae (maggots).
- 3) The larvae feed on the fruit's pulp before dropping to the ground, where the larvae burrow into the soil.
- 4) The larvae transform into pupae in the soil.
- 5) The pupae mature into adults (flies) and emerge from the soil.

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

The Exotic Fruit Fly Strategic Plan

The U.S. Department of Agriculture (USDA) has a robust plan in place to protect American agriculture from medfly and other exotic fruit fly pests. The *2011–2015 Exotic Fruit Fly Strategic Plan* brings together all exotic fruit fly programs, including Mediterranean, Mexican, and Oriental fruit flies. The plan combines surveillance activities, control programs, and regulatory actions. It offers an integrated, multi-faceted approach for State and Federal officials and partnering foreign governments to fight against fruit fly pests effectively.

The main goals of the plan are to:

- Prevent individual fruit fly introductions from becoming established populations;
- Reduce the imminent threat of introduction or spread of med- and mexfly from existing populations in Central America;
- Mitigate the impact of some fruit flies already established in portions of the United States;

- Encourage 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 in the United States; and
- Provide technical support for activities to reduce fruit fly populations worldwide and further decrease the risk of fruit fly entry in our country.

Eradication Efforts

When fertile medfly adults or larvae are detected in the continental United States, USDA works closely with State agriculture officials to eradicate the infestation as quickly as possible. We treat the area around the detection with a mixture of insecticide and bait to reduce or eliminate the adult stage of the insect. We also place traps in the field to determine the extent of the infestation. After completing the bait-treatment schedule, we release sterile medflies in and around the treatment zone to interrupt the breeding cycle. When enough time has elapsed for three generations of the insect to have matured—and if the survey has not identified any more medflies—we declare the area to be, once again, free of the pest.

Survey Programs

USDA also works with State departments of agriculture to maintain trapping programs in high-risk areas of States susceptible to medfly establishment. When one or more wild medflies are collected in an area, USDA and State officials immediately begin a delimiting survey. Using the detection site as the focal point, field crews place extra traps to find out if an infestation exists and to locate and define the limits of the infested area.

Preventing Medfly Spread

If an infestation exists, USDA and the States impose quarantine regulations to help keep the pest from spreading through the movement of infested fruit—via trade shipments or by people unknowingly carrying infested fruit from one place to another. Federal quarantine laws regulate the interstate movement of any products that may harbor the fly. State regulations control the movement of these products going to uninfested areas within a State.

Regulated items include all medfly-host fruits and vegetables present in the quarantine area. Open-air fruit and vegetable stands must have protective covers for the produce to prevent infestation. Commercial and homegrown produce may not be moved without inspection, treatment, and certification.

Control Measures

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

- **Aerial and ground foliar bait spray application.** The spray contains minimal amounts of a U.S. Environmental Protection Agency-approved (EPA) insecticide and a protein/sugar bait that attracts the flies. Aerial sprays are used by commodity producers in rural growing areas.
- **Sterile insect technique (SIT).** In this technique, medflies are reared in large quantities, sterilized with a small amount of irradiation, and released from airplanes or by ground into host areas where they mate with wild medflies. These matings do not produce offspring. Eventually the wild population is eliminated through attrition. SIT is most effective against low-level medfly populations where it is possible to achieve a high proportion of sterile to wild flies. Also, before using SIT, insecticide bait spray must be applied in the area to lower the density of local medfly populations.
- **Insecticide application to soil under host trees.** This treatment is used only when larvae or mated female medflies 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, however, is an integrated approach combining some of these treatments or all three, with emphasis on using SIT.

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 maintain a barrier in Guatemala to halt the medfly's northern spread. This program is designed to suppress and eradicate medfly populations and reduce the risk of introduction into the United States from Central America.

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 where occasional outbreaks occur. Sometimes, people transport the pest north, causing outbreaks in border towns. The USDA, Mexico, and Guatemala have a Fruit Fly Commission that works toward the continued control and eradication of medfly in vulnerable areas of southern Mexico and Belize and in medfly-free areas of Guatemala.

Protecting U.S. Agriculture

Many of the insects, weeds, and plant diseases that attack U.S. crops don't exist naturally in our country. USDA has agricultural quarantine laws in place to help keep exotic plant pests and diseases out of our country and to control domestic pests and diseases we already have here.

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.

Learn More

If you have questions about the medfly or associated Federal restrictions, call our staff at (919) 855-7426. This is the central office for the Plant Protection and Quarantine (PPQ) Fruit Fly Policy Management unit of USDA's Animal and Plant Health Inspection Service (APHIS).

You may also call your local Extension office (www.nifa.usda.gov/Extension), State Plant Regulatory Official (www.nationalplantboard.org/member), or your nearest USDA-APHIS office (www.aphis.usda.gov/planthealth/sphd).

The USDA-APHIS Web site at www.aphis.usda.gov offers up-to-date information on various agricultural pests and diseases and other related topics. For general information about the medfly, visit www.HungryPests.com.

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