

OLIVE PEST AND DISEASES



INTRODUCTION

The olive tree which has its natural habitat in the Mediterranean area is no longer considered a resistant plant that does not need any care; in fact, it is a tree that necessitates specific care to yield a high-quality product. Unremitting attention shall be paid to olive trees since they have socio-economic importance and are elements of stability for the rural population. The recurrent use of broad-spectrum pesticides has encouraged the development of resistant insects and destroyed their natural enemies. Furthermore, the higher use of pesticides increases the level of toxic residues in olive fruits/oil with a deep impact on human health and on the environment. In this context, it stands to reason that the producer shall modify the plant protection method towards an Integrated Pest Management Programme (IPM).

CONCEPT OF IPM

It is a pest control strategy that uses mechanical devices, physical devices, biological methods, cultural practices, and chemical management to maintain pests below the economic threshold level whose main goal is to reduce the use of pesticides and enhance the quality of the product.

CONCEPT OF ECONOMIC THRESHOLD LEVEL

ETL is an acceptable pest density at which intervention must be taken to prevent the pest from reaching the economic injury level and at which economic losses would exceed the cost of control measures.

ADVICE AND GOOD AGRICULTURAL PRACTICES

- Avoid intercropping between olive trees (especially tomatoes, peppers, and eggplant).
- Use a balanced fertilization (decrease N input, apply K fertilizers, use well-composted manure) and apply a good irrigation program to minimize humidity.
- Use good pruning to increase air circulation and sunlight penetration inside the tree canopy.
- Apply copper products on the pruning wounds.
- Disinfect the pruning tools with a chloride solution (bleaching solution).
- Prune infested parts and destroy them.
- Use certified healthy plants when establishing a new olive grove.
- Avoid treatments in the middle of the day; spray in the morning or in the afternoon.
- Respect the interval (delay time) between the last treatment and harvest.

1. OLIVE INSECT PEST

a. OLIVE PSYLLIDS (*Euphyllura olivina costa 1839*)

DESCRIPTION

- The olive psyllids heavy infestation can cause yield losses of 30 to 60% in many areas of Pakistan within Baluchistan, Punjab, Khyber Pakhtunkhwa, and the marginal area of Pakistan.
- They are small in size, adults and larvae feed on the sap they extract from leaf and flower buds, shoots, flowers, and young fruits.
- The adults sheltered on the underside of olive twigs and especially at the base of leaves and buds.
- The larvae produce a white waxy secretion and honeydew droplets covering the infested buds. The adults need to feed frequently on plant sap.



DAMAGE

- A white, waxy, secretion may be evident over the surfaces of leaves. A clear, sticky substance may be seen over leaves. This is honeydew, and it can cause other problems.
- Honeydew can also encourage the growth of black sooty molds. Too much can prevent plant growth and cause secondary infections.
- Premature leaf and flower falls may be evident if infestations are heavy. Premature fruit drops may be evident. A reduction in yield may be evident.

- Twisted and curled leaves, yellowed foliage, and reduced plant growth.
- Olive psyllids and other sucking insects are often vectors for the transmission of powdery mildew (a white fungus that grows on above-ground parts of some plants) and other infectious diseases.

CONTROL MANAGEMENT

- Host plants need to be monitored for olive psyllids populations to prevent infestations from establishing in new locations.
- Methods of monitoring include using sticky traps, agitating foliage to count fallen adults, and careful inspection of plant parts for eggs, nymphs, and adults.

Cultural control

Olive psyllids populations may be reduced by pruning. Growers can prune infested areas, mainly suckers (Water sprouts), along with center limbs to enhance air circulation that increases heat exposure to olive psyllids.

Biological control

Olive psyllids are parasitized by the endoparasitic wasp *Psyllaephagus euphyllurae* (Masi), and its predators include a minute pirate bug, *Anthocoris nemoralis* (L.), a lacewing, *Chrysoperla carnea* (Stephens), and a lady beetle, *Coccinella septempunctata* L.

Chemical control

Ideally low toxic agrochemicals (i.e. Acetamiprid, Pyrethroids, etc.) or organic products (Wetcit, Neem Oil, and Pyrethrin, etc.). Rates are to be defined locally. Before the insecticide is applied the canopy should be irrigated with high volumes of water and insecticide soap (Potassic Salt, Marseille Soap + Oil, or Detergent) to eliminate most of the waxes which protect the insects.

Add also copper to the insecticides since also the sooty mold fungus has to be controlled.

b. OLIVE FRUIT FLY (*Bactrocera oleae*)

DESCRIPTION

- It is among the serious pest of the olive in the Mediterranean, diagnosed in some parts of Pakistan.
- Larvae feed exclusively on olive fruits causing the destruction of the pulp.
- 3- 4 generations per year between June and October.
- Females can be recognized by a small dark spot at the wing tips.
- Larvae pupate in the fruit during the summer and into the soil in autumn to spend the winter.



DAMAGE

- A pre-mature drop of attacked fruits and annual loss reaching 30 %.
- Reduction in oil level up to 20 – 50 %.
- Increase in the acidity of the oil which impairs the oil quality and flavor.
- Table olives become unmarketable.
- Penetration of secondary bacteria and fungi that rot the fruits.

CONTROL MANAGEMENT

Field monitoring

Start *Bactrocera oleae* monitoring with chromo tropic traps in May.

- Use 3–5 traps/ha.
- Traps must be hung in the southern inside part of the crown at a human level and checked every week.
- Start fruit sampling in June (100 olives from 10 trees, 10 olives/tree).

ATTENTION

Early detection of female fruit flies is essential to evaluate the degree of fruit infestation with the help of a technician.

Chemical control

Apply bait spray with a pesticide (Dimethoate) mixed with hydrolyzed proteins as a nutritive lure. Spray the mixture on each row of every other 3 rows.

Cultural control

- Early harvesting can minimize the use of pesticides to control fruit fly attacks and consequently reduce the pesticide residues in olive oil.
- Collection of olives that are on the ground for alternative use (soap production).

Biological control

The most important are: *Opius concolor*, *Euplmus urozonus*, and *Pnigalio mediterraneus*.

THE ALTERNATIVE STRATEGY (IPM AND ORGANIC MANAGEMENT)

- Attract-and-kill preventive spring treatment: In large olive groves, start with mass trapping to control the population increase, using plastic bottles activated with fish or ammonium salts.
- When olive fly females are found in the chromo-tropic traps and the stone of the fruit is hard, spray copper compounds (oxychloride) every 30 days. This strategy has 2 advantages: it is no need to sample olives and it also controls the peacock's eye.

2. OLIVE DISEASES

a. OLIVE ANTHRACNOSE (*Colletotrichum lindemuthianum*)

DESCRIPTION

- It is a widespread and severe disease in most olive-growing countries, causing significant yield losses, and poor fruit and oil quality.
- The disease incidence depends on the olive variety, environment, and virulence of the pathogen among other factors.
- The disease may affect up to 80% of olives in susceptible cultivars.
- The fungus overwinters as mycelium and conidia on infected mummified fruits, twigs, and leaves.
- Affected groves may have one or both species of the pathogen present.

DAMAGE

- Anthracnose symptoms initially appear as small, dark olive-colored water-soaked spots.
- As the spots enlarge, they become tan in color. Under disease-favorable conditions, lesions become larger and more numerous, eventually coalescing and killing entire leaves and petioles.
- If weather conditions become less favorable for disease, severely infected leaves will drop from the plant and new foliage will appear relatively free from infection.



CONTROL MANAGEMENT

Cultural control

- Plant-certified variety free from the anthracnose pathogen.
- Avoid overhead irrigation, especially during humid, cloudy weather.
- Deeply bury crop residues soon after harvest to reduce pathogen survival and overwintering.

Chemical control

Recommended fungicides Benomyl, cuprous oxide, and captafol are used for the control of anthracnose.

b. PEACOCK'S EYES (*Spilocaea oleagina*)

DESCRIPTION

- The causal agent of this fungal disease is *Spilocaea oleagina*, which attacks olive trees.
- This disease is causing serious problems when the humidity is relatively high and the weather is warm.

DAMAGE

- Symptoms generally appear from September to April.
- It attacks the leaves causing a dysfunction of photosynthesis.
- In case of high infestation, it causes the defoliation of branches. As a result, the olive tree will show a weak canopy, reduced vigor, and lower yield.
- On the leaves, the fungi will occur as a black circular spot on the upper blade surrounded by a yellow halo ("peacock's eye").



CONTROL MANAGEMENT

Field monitoring

- Between July and August, an early diagnosis should be carried out on the leaves for the presence of the disease even if symptoms are not apparently visible on the tree.
- Check the new leaves and sprouts, in particular when the humidity is high during spring and summer. Another control during autumn and after harvest is desirable.

Economic threshold

More than 20 % of leaves present black spots (it depends on the susceptibility of variety to the disease).

Chemical Control

Preventive use of copper compounds 20 days before harvest or after harvest in an area with high humidity and curative treatment in spring after pruning (copper hydroxide).

Cultural practices

Pruning of branches and good exposure to air.

c. VERTICILLIUM WILT (*Verticillium dahliae*)

DESCRIPTION

- The causal agent of this soil-borne fungal disease is *Verticillium dahliae*.
- The disease appears in spring and early summer. It attacks mature trees.
- The fungus survives in the soil for several years and in the roots of infected trees. This disease can be spread by soil movements during tillage, irrigation water, and infected tools.

DAMAGE

- Sudden wilting of the tree and sometimes death of mature trees.
- Darkening of xylem tissue, a key symptom for distinguishing Verticillium wilt.



CONTROL MANAGEMENT

Cultural practices

- Since systemic fungicides are unable to prevent or control the disease, preventive measures before planting are the most effective management strategies to protect the grove from contamination.
- Avoid plots that have been planted for several years with crops that are highly susceptible to the disease (such as eggplant, pepper, potato, and tomato).
- Analyze the soil in a laboratory to detect the presence of the fungus.

In a grove, to minimize the dissemination of the disease to other trees:

- Do not apply flood irrigation to limit the dissemination of the disease by water.
- Minimize plowing to avoid wounds on the roots. Pull out infected trees.
- Use of certified plants.

Chemical control: Use of phosetyl aluminum.



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