INTEGRATED MANAGEMENT OF MAJOR INSECT PESTS OF PYRETHUM

KALRO
Kenya Agricultural & Livestock Research Organization

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

Introduction

Arthropod pests of pyrethrum include insects and mites. They cause significant yield losses of 10-100%, as they feed on the sap of the plants, causing damage and deformities to the reproductive parts of the plant. Some insects such as thrips transmit viruses (e.g. Tomato Spotted wilt virus) that cause disease to the plants. The incidence of insects and mites normally increases during dry weather conditions and growers should be on the look-out for them.
Farmers are advised to use integrated pest management (IPM) approaches, each of which involves a combination of interventions. Comprehensive IPM packages include cultural, mechanical, biological, host resistance and chemical control options.

Factors that favor insect and mite infestation

- High temperatures.
- Availability of the host plant and plant residue.
- Availability of alternative hosts.
- Use of infested planting material.

Insects and mites affecting pyrethrum
The key arthropod pests of pyrethrum include the following:

- Flower thrips and onion thrips.
- Green peach aphids.
- Leaf miners.
- Scales.
- Red spider mites.

The damage/symptoms caused by insects and mites on pyrethrum and their respective management strategies are described below:

Flower thrips (*Thrips nigropilosus*) and Onion thrips

Thrips are small insects that feed on the lower surface of leaves by sucking plant sap. They also attack buds and flowers. Feeding on seedlings is the most damaging and can reduce crop stands in hot weather. The eggs are laid in plant tissue, the nymphs and adult are found in the flowers and larvae pupate in the soil.

Symptoms/ Damage

- Adult thrips are small (0.5 - 2.0 mm), slender with long and narrow wings and fringed with long hairs.
- Nymphs are white or yellow
- Both adult and nymphs feed on the base of the plant within the leaf sheaths.
- Attacked leaves have a silvery sheen with small black spots of thrips excrement.

- Under heavy infestation, attacked buds and flowers fall off.

Attacked flowers show speckling with small necrotic patches, and become deformed, reducing the quality

planted next to older infested crops or an alternative hosts.
- Remove weeds which serve as alternative hosts and harbour the pest from season to season.

Thrip infestation (Infonet biovision, Janet, 2023)

Management Strategies

The control methods include:

Cultural practices

- Scout the fields twice weekly, looking for thrips
- Remove infested plants or crop residues
- Ensure that young crops are not

Biological control

Spraying with Azadirachtin-containing products (e.g. Neemark, Neemroc, Achook, Nimbecidine) or biopesticides based on Beauveria bassiana (e.g. Beauvitech, Bio-Power or Botanigard) at manufacturers' recommendations.

Chemical control

Spray using insecticides containing Alpha-cypermethrin (e.g. Alfatox, Tata Alpha) or Acetamiprid (e,g. Aceta 20SP,Acetak Top 700WG) or Spinosad (e.g. Tracer 480 SC) or lambda-cyhalothrin (e.g. Duduthrin or Karate) at manufacturers' recommendations.

Green Peach Aphids (*Myzus persicae*)

This pest sucks plant sap, thus reducing the growth of the plant. It attacks the young shoots, leaves and stems. It also secretes honeydew on which sooty moulds grow on leaves and reduces the photosynthetic surface area. The pest also transmits viruses during feeding on plants.

Symptoms/ Damage

- Aphids are soft-bodied insects (1 to 4 mm long), spear-shaped, green, greenish brown or greenish black.
- The underside of leaves and bud areas have sticky exudate (honeydew) that often turns black with the growth of sooty moulds.

Management strategies

Cultural Practices

- Regularly monitor the crops during seedling and flowering growth stages.
- Use yellow traps to monitor aphid population.
- Remove weeds from the farm and infested plants and destroy by burning.
- Spray with soapy solution (15 tablespoons liquid soap in 20 lt of water) to infested crop.

Biological control

Spraying the crop with Azadirachtin (Achook, Fortune, Neemraj Super, *Nimbecidine, Ozoneem*) or Aphitech (*Aphidius transcaspinus*, a parasitic

Green aphids on leaves of pyrethrum leaves (Janet Obanyi 2022)

wasp), Biocatch *(Verticillium lecanii)*, Bio-Power (*Beauveria bassiana*), Botanigard (*Beauveria bassiana*) at manufacturers' recommended rates.

Chemical control

Spray using Deltamethrin (e.g. Atom, Decis) or Lambda-cyhalothrin (e.g. Duduthrin, Karate) as per manufacturers' recommendations.

Leaf miner (*Liriomyza spp.*)

The adults are small black and yellow flies. They lay eggs which hatch into small larvae that feed by mining between the upper and lower epidermis of the leaves making tunnels. Occasionally, the larvae can be within the leaf mine as it feeds. The act of laying eggs and feeding on leaves can kill seedlings and in older plants allows the fungal diseases to enter the leaves.

Symptoms

- Tunnels in leaves showing damage by "mining" .
- Whitish blotches inside leaves caused by extensive mining.
- Death and premature falling of infested leaves.

Management

Cultural practices

- Avoid planting new crops next to an infested field.
- Apply mulch to prevent pupae getting to the soil for further development into adults.
- Avoid continuous cropping of pyrethrum and solanaceous plants (potato, tomato eggplant, nightshades) in the same field.
- Practise good crop hygiene by removal of infested plants and destroying by burning.

Tunnels in leaves (left) and Leaf miner adult (right) (Central Science Laboratory, Harpenden Archive, British Crown, Bugwood.org)

- Hand pick mined leaves (in low infestation cases) and those with the larvae still in the tunnel and destroy by burying 30 cm deep
- Use yellow sticky trap to attract and kill adult leaf miners.

Biological control

Use soft/safe pesticides such as Nimbecidine, Achook, Neemroc or apply bio-pesticides based on Phytoseiulus persimilis (e,g, Phytotech, Spidex, Phytogard) or Neoseilus californicus/Amblyseius californicus (e.g. Amblytech) at manufacturers' recommendations.

Chemical Control

Spray using insecticides based on any of the following active ingredients: Abamectin or Abamectin + Acetamiprid (e.g. Abalone, Abamite, Agrimech, Dynamec, Amazing Top), bifenthrin (e.g. Thiamerin or Foray), Flubendiamide (e.g. Belt 480SC) at manufacturer's recommendations. Avoid using the same active ingredient for more than 3 times in a season.

Scales

Scale insects have a body covered by a protective waxy shell, often resembling scales or cottony cushions.

Symptoms /damage

- White cotton-like masses made of flocks of bugs on the underside of leaves, stems, flowers, and fruits.
- Presence of honeydew on attacked parts.
- Causes stunting, chlorosis, defoliation, and wilting of plants.
- Dead heart of infested plants.

Insect scales on the stem (infornet)

Management Strategies

Integrated management of scales includes a combination of the cultural practices, bio-control and chemical control options that are outlined below:

Cultural practices

- Use clean seedlings free from scales.
- Provide alternative habitats by conserving flowering plants at the borders of the field to promote natural enemies.
- Prune out light infestations

and burn the pruned plant parts.

- Practice good crop hygiene by removal of infested plants and destroying by burning.
- Spray infested plants with a mild solution of water with dish-washing detergent at rate of 1 tea spoonful of detergent in 1 litre of water.
- Avoid planting new crops next to an infested field.
- Avoid continuous cropping of pyrethrum and solanaceous plants (potato, tomato, eggplant, nightshades) in the same field.

Biological control

Use products like Beauvitech® WP or Lecatech® WP every 5 - 7 days with 2 - 4 repeat applications.

Chemical control

Spray with Paraffin oil 98% e.g. Segatron Ultra liquid or with synthetic pesticides e.g. Closer 240SC, Engeo 247 SC, Shield 600 FS or Amazing Top WDG at manufacturers' recommendations.

Red spider mites (*Tetranychus hudeni*)

Red spider mite is a major pest that attacks pyrethrum and other hosts. It has a great reproductive capacity and can destroy plants in a short time. It is spread by the irrigation water, clothing, implements and wind. Infestation starts on the border rows of the field. The leaves are injured as a result of the mites sucking plant sap causing speckling and leaf fall during dry periods.

- Look out for tiny red or brown oval-shaped pests with 8 legs underneath the leaves.
- There is a spinned web on the underside of the leaves.
- Check for yellow clusters of yellow spots on the upper surface of the leaf which may appear chlorotic.
- The leaves become mottled and speckled.
- Take action when 8-10 mites per leave are seen.

Red spider mite (Pyrethrum compendium, 2022)

Management Strategies

Cultural practices

- Avoid planting new pyrethrum crop next to an infested field
- Avoid continuous cropping of pyrethrum and solanaceous plants (potato, eggplant, nightshades) on the same farm
- Practice good crop hygiene by removing the infested plants and destroy by burning.

Biological Control

Use soft/safe pesticides such as Nimbecidine, Achook, Neemroc or apply bio-pesticides based on Phytoseiulus persimilis (e,g, Phytotech, Spidex, Phytogard) or Neoseilus californicus/Amblyseius californicus (e.g. Amblytech) at manufacturers' recommendations.

Chemical Control

Spray using Abamectin or Abamectin + Acetamiprid, abamectin-based synthetic pesticides (e.g. Dynamec 20EC, Knockbect 40EC) or Amitraz-based miticides (e.g. Kilitac 20EC, Mitac 20 EC) or Clofentezine-based products at manufacturers' recommendations.

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