

Integrated Pest Management of Invasive Black Thrips (*Thrips parvispinus*)

Cultural Practices

- Raise seedlings in protrays under polyhouse condition with insect proof nets.
- Destroy soil-inhabiting stages of thrips (pre-pupae and pupae) and other insect pests through deep summer ploughing or soil solarization.
- Incorporate neem cake @ 500 kg/ha and vermicompost @ 1.5–2.0 tons/ha to enhance plant resistance against thrips.
- Avoid high-density planting, as it promotes pest proliferation.
- Use well-decomposed farmyard manure (FYM) @ 2.5 tons/ha, enriched with *Metarhizium anisopliae* or *Pseudomonas fluorescens* at 2 kg/ton.
- Utilize silver-colour polyethylene mulches (25–30 microns thick) to reduce soil pupation of thrips.
- Frequent inter-cultivation practices (e.g., earthing up or soil raking) disrupt soil-dwelling pupae of thrips and other pests.
- Clean cultivation and maintaining weed-free bunds are crucial for the management of pests. Uprooting and destruction of weeds such as *Parthenium hysterophorus*, *Cleome viscosa*, *Prosopis* sp., *Lantana camara*, *Calotropis* sp., *Tecoma* sp., *Abutilon* sp., wild *Solanum* sp., etc. present in the vicinity of field bunds which act as off-season and alternate host for thrips.

Mechanical Control

- Prune and destroy heavily infested apical shoots during the vegetative stage to eliminate thrips populations.
- Uproot and either bury or burn severely infested plants during early stages of crop growth.
- Erect blue or yellow sticky traps at crop canopy height @ 65–75 traps/ha for mass trapping or 20–25 traps/ha for monitoring purposes.
- Adopt sprinkler irrigation instead of flood irrigation, as the water jets disrupt thrips development and reproduction.

Biological Control

- Apply microbial insecticides like *Beauveria bassiana* or *Lecanicillium lecanii* @ 4.0 g or mL/L (spore load: 1×10^8 cfu/g or mL).
- Spray *Steinernema carpocapsae* (Entomo-Pathogenic Nematode, EPN) foliar formulation at 10 g/L + 1 g wetting agent.
- Drench soil with EPNs (*Steinernema carpocapsae* or *Heterorhabditis indica*) @ 7.5–12.5 kg/ha, mixed in 500–750 L of water. Apply early morning or late evening to avoid UV exposure and high temperatures.

Botanical Control

- Spray neem-based solutions such as 5% Neem Seed Kernel Extract (NSKE), 5% Neem Seed Powder Extract. 0.5% or Neem oil (5 mL/L) can be used.
- Use commercial neem formulations (Azadirachtin 3000 ppm) @ 2 mL/L.
- Apply 2% Fish Oil Rosin Soap (20 mL/L), either alone or with NSKE.
- Spray seaweed extract (*Kappaphycus alvarezii*) @ 2 mL/L to enhance plant resilience against thrips.

Chemical Control

- Treat seeds with Imidacloprid 70WS @ 10 g/kg seed.
- Perform seedling root dips with Imidacloprid 17.8% SL @ 0.5 mL/L for 30 minutes.
- Apply following chemical insecticides judiciously and as a last resort, ensuring adherence to label recommendations.

Insecticides	Dosage per ha in required water	Waiting period (in days)
Acephate 95 % SG	790 g in 500 L	07
Acetamiprid 20% SP	50-100 g in 500-600L	03
Cyantraniliprole 10.26% OD	600 g in 500 L	03
Eamectin benzoate 05% SG	200 g in 500 L	03
Eamectin benzoate 1.90% EC	375 ml in 500L	14
Fipronil 5% SC	800-1000 g in 500L	07
Fipronil 80% WG	50.0 – 62.5 g in 500 L	05
Imidacloprid 30.5% SC	125-150 g in 500L	05
Imidacloprid 17.8% SL	125-250 ml in 500-700 L	40
Lambda cyhalothrin 4.90% CS	500 ml in 500 L	05
Lambda cyhalothrin 5% EC	300 ml in 400-600 L	05
Spinosad 45% SC	160 g in 500 L	03
Spirotetamat 15.31% OD	400 g in 500 L	05
Thiacloprid 21.70% SC	225 – 300 g in 500 L	05
Tolfenpyrad 15% EC	1 L in 500 L	07
Eamectin Benzoate 1.5% + Fipronil 3.5% SC	500 – 750 g in 500 L	03
Eamectin benzoate 5% + Lufenuron 4% WG	60 g in 500 L	03
Flubendiamide 19.92% + Thiacloprid 19.92% SC	200 – 250 ml in 500 L	05
Fipronil 07 % + Hexythiazox 02 % SC	1 L in 500 L	07
Hexythiazox 3.5% + Diafenthiuron 42% WDG	650 g in 500 L	07
Indoxacarb 14.5 % + Acetamiprid 7.7 % SC	825-875 ml in 500 L	05
Profenofos 40 % + Fenpyroximate 2.5 % EC	1 L in 500 L	07

General Guidelines for Chemical Control

- Ensure uniform spraying across the plant canopy.
- Add suitable stickers and spreaders to insecticide solutions.
- Avoid unregistered agrochemical applications, including pesticides, plant growth regulators, and nutrient mixtures.
- Follow recommended waiting periods for insecticides to prevent residue in harvested crops.
- Avoid repeated use of insecticides with the same mode of action and sub-lethal dosages to prevent pest resurgence.

Source: Directorate of Plant Protection, Quarantine and Storage