

Insect Pests of Chili and Their management

Manish Kumar and Kamesh Chandra

Introduction:

One of the most precious crops in India is chili. It is a key component of many curries and chutneys, as well as pickles, vegetables, spices, condiments, and condiment sauces. Capsaicin, an alkaloid and the active ingredient in chilies, is what gives them their pungency. Chilies are thought to have their primary origin in Mexico and a secondary origin in Guatemala. The Portuguese brought the chili to India in the middle of the 17th century in Goa, and it spread quickly from there. Especially as an anti-cancer agent and an immediate pain reliever, capsaicin has several medical uses. By widening blood arteries, it also shields against heart problems. It is photo-insensitive, and day duration has little impact on fruit setting or flowering. It works effectively in humid environments. The ideal conditions for chilli production are a frost-free period of around 130–150 days with a temperature range of 15–35 °C.

1). Chillies thrips, *S. dorsalis* (Thripidae: Thysanoptera):

Distribution: It has been recorded in Asia, Africa, North America and Oceania

Host range: It has wide host range. Its incidence has been recorded from tomato, citrus, castor, mango, bean, cotton and onion and other crops in tropical and sub-tropical part of Asia, Africa and Japan.

Damage symptoms: Damage signs include crinkles and upward curling of the infected leaves. Petiole becomes elongated. Buds become brittle and drop down. Early stage, infestation leads to stunted growth and flower production and fruit set are arrested.

Life cycle: *S. dorsalis* has the following life cycle stages: egg, first- and second-instar larvae, prepupa, pupa, and adult. The eggs are inserted into plant tissues by gravid females above the soil's surface. The kidney-shaped, creamy white eggs are minuscule (0.075 mm long and 0.070 mm broad). Depending on the temperature, it may take two to seven days for the eggs to hatch. Adults and larvae frequently congregate close to the host leaf's margins or midvein. The pupal stage lasts for 2.6–3.3 days after the two larval phases are finished, which take eight to 10 days in total. The host plant species has an impact on the life duration of chilli thrips. For instance, a first instar larva on

Manish Kumar and Kamesh Chandra (PG Scholar), Department of Entomology, ANDUA&T
Kumarganj Ayodhya

pepper plants matures in 11.0 days at a temperature of 28°C. Chilli thrips pupae, in contrast to other thrips, are typically discovered on leaves, leaf litter, or in the axils, curled portions of leaves, or under the calyces of flowers and fruits.

Management:

1. Inter crop with agathi (*Sesbania grandiflora*) to provide shade which regulate the thrips population.
2. Avoid planting chillies after sorghum.
3. Avoid using mixed crops of chilli and onions.
4. Water the seedlings to prevent the thrips from multiplying.
5. Apply imidacloprid 70% WS to seeds at a rate of 12 g/kg of seed.
6. Use phorate 10% G @ 10 kg/ha or carbofuran 3% G @ 33 kg/ha.

2). Broad mite/ yellow mite: *P. latus* (Tarsonemidae: Acarina):

Distribution: It is distributed all over the world and is known by a number of common names. In Bangladesh call it the yellow jute mite. It is referred to as the broad spider in various European nations. It is known as the broad rust mite or the tropical mite in some parts of South America.

Host range: In tropical regions, the broad mite can live on a variety of hosts. The greenhouse

plants are attacked in temperate and subtropical areas.

Damage symptoms: Downward curling and crinkling of leaves. Leaves with elongated petiole and stunted growth.

Life cycle: The life cycle of the wide mite contains four stages: egg, larva, nymph, and adult. Over an eight to thirteen-day period, adult females deposit 30 to 76 eggs (on average five each day) on the undersides of leaves and in the depressions of fruit before passing away. Male adults have a five to nine-day lifespan. While unmated females lay eggs that become males, mated females usually lay four female eggs for every male egg. In two to three days, the eggs hatch, and the larvae emerge from the egg to begin feeding. Because they move slowly, larvae do not spread widely. The larvae reach a dormant larval (nymph) stage after two or three days. Quiescent female larvae become attractive to the males which pick them up and carry them to the new foliage. Males and females are very active, but the males apparently account for much of the dispersal of a broad mite population in their frenzy to carry the quiescent female larvae to new leaves. When females emerge from the quiescent stage, males immediately mate with them. There are also reports of the broad mite using insect hosts, specifically some whiteflies, to move from plant to plant.

Management:

1. Encourage the activity of predatory mite:
Amblyseius ovalis
2. Apply Phorate 10 % G @10 kg/ha

3). Tobacco caterpillar: *S. litura* (Noctuidae: Lepidoptera):

Distribution: It is widely distributed throughout tropical and temperate Asia, Australasia and the Pacific Islands.

Host range: It is polyphagous in nature and feeds on wide range of crop.

Damage symptoms: Newly hatched larvae scrap the green matter in the leaf. The affected leaf looks like a papery white structure. Later instar larvae feed by making small holes. They devour the entire lamina and petiole in cases of severe infection.

Life cycle: Up to 2000 eggs per female, coated in brown hairs are laid in masses of 230–750. In 3-5 days, larvae hatch, and they graze for around 28 days. The larval stage lasts two to three weeks. In soil, pupation takes place. Pupal period is two weeks long. The entire life cycle lasts 30 to 40 days and requires 6 to 8 generations per year.

Management:

1. Plough the soil to expose and kill pupae
2. Use Castor as a trap crop
3. Install a pheromone trap at a rate of 15 per hectare.
4. Collect and eliminate egg masses, gregarious larvae, and mature caterpillars.

5. Use SINPV at 1.5x10¹² POB/ha in the evening hours.
6. Use one of the pesticides listed below.

Insecticide	Dose
Emamectin benzoate 5 % SG	4 g/10 lit.
Flubendiamide 20 WDG	6.0 g /10 lit.
Indoxacarb 14.5 % SC	6.5 ml/10 lit.
Novaluron 10 % EC	7.5 ml/10 lit.
Spinosad 45 % SC	3.2 ml/10 lit.

4). Fruit borer: *H. armigera* (Noctuidae: Lepidoptera):

Distribution: It is widespread in central and southern Europe, temperate Asia, Africa, Australia, and Oceania. It has recently invaded Brazil and has since spread across much of South America and reached the Caribbean. It is a migrant species, able to reach Scandinavia and another northern territory.

Host range: The most important crop hosts of which *H. armigera* is a major pest are cotton, pigeonpea, chickpea, tomato, sorghum, and cowpea; other hosts include groundnut, okra, peas, field beans (*Lablab* spp.), soybeans, lucerne, *Phaseolus* spp., other Leguminosae, tobacco, potatoes, maize, flax, a number of fruits (*Prunus*, *Citrus*), forest trees and a range of vegetable crops. A wide range of wild plant species supports larval development: important species in India include *Acanthospermum* spp. and *Datura* spp.

Damage symptoms: Early instar feeds on plants, causing damage. Larvae that have grown up mainly bore into the fruits.

Life cycle: Adult moths feed on nectar. They live for around 10 days during which time females lay 1000 eggs. Eggs are laid singly, or in clusters, on leaves, flower buds, flowers and developing fruits, and sometimes on stems and growing points. Moths tend to lay eggs on the top third of healthy plants and on vigorously growing terminals. Fertile eggs hatch in about three days during warm weather (25°C average) and 6–10 days in cooler conditions. Larvae develop through six growth stages (instars) and become fully grown in 2–3 weeks in summer or 4–6 weeks in spring or autumn. Once larvae are fully grown, they crawl to the base of the plant, tunnel up to 10 cm into the soil and form a chamber in which they pupate.

Management:

1. Collect and destroy the infected fruits and grown up larvae
2. Install a 15/ha pheromone trap using Helilure.
3. Six releases of *Trichogramma chilonis* @50,000/ha per week coinciding with flowering time
4. Release *Chrysoperla carnea* at weekly interval at 50,000 eggs or grubs / ha from 30 DAS.

5. Spray HaNPV at 1.5x10¹² POB/ha along with cotton seed oil 300 g/ha to kill larvae.
6. Provide poison bait with carbaryl 1.25 kg, rice bran 12.5 kg, jaggery 1.25 kg and water 7.5 lit/ha or spray any one of the following insecticide
7. Spray any one of the following insecticides.

Insecticide	Dose
Emamectin benzoate 5 %SG	4.0g/10 lit.
Flubendiamide 20 WDG	6.0 g /10 lit.
Indoxacarb 14.5 % SC	6.5 ml/10 lit.
Novaluron 10 % EC	7.5 ml/10 lit.
Spinosad 45 % SC	3.2 ml/10 lit.
Thiodicarb 75 % WP	2.0 g/lit.

5). Stem borer: *E. perticella* (Phycitidae: Lepidoptera)

Damage symptoms: In both young and elderly plants, larva bores into the main stem before moving downward. Young plants' top shoots crump and wither. Older plants become stunted. Fruit-bearing capacity is adversely affected. There is a distinct thickening of stem at the entry point.

Management:

1. Collect and destroy the damaged and dead plants
2. Use light traps @ 1/ha to attract and kill the moths.
3. Conserve larval parasitoids *Pristomerus testaceus* and *P. euzopherae*.

4. Spray any insecticide starting a month after planting at intervals of 15 days. Azadirachtin 1.0% 1.0-1.5 L, Fenpropathrin 30 EC 250-340 ml, Carbaryl 50 WP 2 kg, Wettable Sulfur 50 WP 2 kg, NSKE 5%, or Thiodicarb 75 WP 625-1000 g.

5. Avoid using synthetic pyrethroids as they cause resurgence of sucking pests.

6). **Cut worm: *A. ipsilon* (Noctuidae: Lepidoptera):**

Damage symptoms: It eats fragile leaves and cuts seedlings at ground level as they emerge at night. Pest economic threshold level is 2 larvae per meter row.

Management:

1. Hand-pick and remove the larvae from cracks and crevices in the field in the morning and evening.
2. Plough the soil during the summer months to expose larvae and pupae to predation by birds.
3. Use a light trap with 12 traps per hectare.
4. Set up pheromone traps with 12 traps per hectare to draw male moths
5. **Poison bait:** Rice bran 12.5 Kg +Molasses or Brown sugar 2.5Kg + Carbaryl 50 WP 1.25 Kg – Mix the ingredients well – Keep around the field in the evening hours.
6. Irrigate during the day to make larvae visible to avian predators.

7). **Green peach aphid: *M. persicae* (Aphididae: Hemiptera):**

Damage symptoms: The infested plants turn pale with sticky appearance, leaves become curled and crinkled. Sooty mould grows as a result of excreted honeydew. Stunted growth of the plant

Management:

1. Treat seeds with imidacloprid 70% WS @12 g/kg of seed
2. Apply phorate 10 % G @10 kg/ha
3. Spray any one of the following insecticide

Insecticide	Dose
Oxydemeton –Methyl 25% EC	1.6 ml/lit.
Fipronil 5 % SC	1.0 ml/lit.
Imidacloprid 17.8 % SL	3.5 ml/10 lit.