



MAJOR PESTS OF CHILLI (*Capsicum Annuum* L.) AND THEIR MANAGEMENT

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Chilli (*Capsicum annuum* L.) is cultivated in Britain, Australia, New Zealand, South Africa, India, USA, Central American and South American countries and other Asian countries. India is the world's largest producer, consumer and exporter of chili peppers. Guntur in Andhra Pradesh produces 30 per cent of all the chillies produced in India and the state of Andhra Pradesh as a whole contributes 75 per cent of India's chili exports. Though the crop has great export potential (besides a huge domestic market), it suffers from low productivity. Occurrence of viral diseases and insect pests is significant (Gundannavar *et. al.*, 2007). The pest spectrum in chilli is complex, with more than 293 insect and mite species debilitating the crop both in the field and in storage (Anonymous 1987). Among these, aphids: *Myzus persicae* Suler., *Aphis gossypii* Glover; thrips: *Scirtothrips dorsalis* Hood., yellow mite, *Polyphagotarsonemus latus* Banks, and the fruit borer, *Helicoverpa armigera* Hubner, are the most important (Reddy *et.al.*, 2011). So keeping this in view the managements of major insect pests are discussed below.

1. Chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae): The Chilli thrips is a polyphagous pests and widely distributed in India. Besides chilli, it also infests brinjal, cotton, groundnut, castor, bottle gourd, guava, tea and grapevine. It is more common on un-irrigated chilli crop than irrigated one, (Mondal and Mondal, 2012).

Nature of damage: The infested leaves curl upward, crumble and shed. Infested buds become brittle and drop down. Affected fruits show light brown scars. Early stage, infestation leads to stunted growth and flower production, fruit set are arrested.

Life cycle: The adults are slender, yellowish brown in colour, having apically pointed wings and they measure about 1 mm in length. The female possess long, narrow wing with the fore margin fringed with long hairs. The nymphs resemble the adults in shape and colour but are wingless and smaller in size. Female lays 40-45 eggs which are hyaline, globular in mass inside the leaf tissues of leaves and shoots. The eggs hatch in about 5 days. The Nymphs are tiny, slender, fragile and straw yellow in colour feed for 7-8 days and pupate for 2-4 days. Adults are slender, yellowish brown with heavily fringed wings and can survive up to 31 days with several overlapping generations in a year.

Management:

- Grow resistant/tolerant varieties like Pusa Jwala, Phule Jyoti.
- Inter cropping with agathi (*Sesbania grandiflora*) to provide shade which regulates the thrips population. Avoid growing chilli after sorghum.

- Do not follow mixed cropping of chilli and onion (Both crops are attacked by thrips).
- Sprinkle water over the seedlings to check the multiplication of thrips.
- Apply neem cake to the beds @ 100 Kg/acre in two split doses at the time of planting and 30 days after transplanting.
- Conserve predators such as predatory mite (*Amblyseius swirskii*), insidious flower bugs (*Orius insidiosus*) etc.
- Treat seeds with imidacloprid 70% WS @ 12 g/kg of seed.
- Apply carbofuran 3% G @ 33 kg/ha or phorate 10 % G @ 10 kg/ha.
- Spray any one of the following insecticide-

Insecticide	Dose
Imidacloprid 17.8 % SL	3.0 ml/10 lit.
Emamectin benzoate 5 % SG	4 g/10 lit.
Fipronil 5 % SC	1.5 ml/lit.
Oxydemeton –Methyl 25 % EC	1.0 ml/lit.
Spinosad 45 % SC	3.2 ml/10 lit.
Thiacloprid 21.7 % SC	6.0 ml/10 lit.

2. Aphid, *Myzus persicae* (Sulzar) and *Aphis gossypii* (Glover) (Hemiptera: Aphididae): This is a cosmopolitan pest and highly polyphagous.

Nature of damage: It appears on the tender shoots, leaves and on the lower surface of the leaves. Aphids excrete honeydew, which attracts ants and sooty mould develops, making the leaves turn black and thereby reducing the photosynthesis rate of plant. Suck the sap and reduce the vigour of the plant. The fruits that develop black colour due to sooty mould lose quality and fetch low price. The yields are also reduced by aphids directly and more through the spread of viral diseases by acting as vectors indirectly.

Life cycle: Eggs are very tiny, shiny-black, and are found in the crevices of bud, stems, and barks of the plant. Aphids usually do not lay eggs in warm parts of the world as they reproduce parthenogenetically. Nymphs (immature stages) look like the wingless adults but are smaller. They become adults within 7 to 10 days. Adults are small; pear shaped, 1-4 mm long, soft-bodied insects with pair of long antennae that resemble horns. Most aphids have two short cornicles (horns) on the dorsal side of the 5th or 6th abdominal segments.

Management:

- Conserve parasitoids such as *Aphidius colemani*, *Diaeretiella* spp. *Aphelinus* spp. etc.
- Conserve predators such as anthocorid bugs/pirate bugs (*Orius* spp.), mirid bugs, syrphid/hover flies, green lacewings (*Mallada basalis* and *Chrysoperla carnea*), predatory coccinellids (*Stethorus punctillum*), staphylinid beetle (*Oligota* spp.), predatory cecidomyiid fly (*Aphidoletis aphidimyza*) and predatory gall midge, (*Feltiella minuta*), earwigs, ground beetles, rove beetles, spiders, wasps etc.
- Clip and destroy infested shoots.
- Thoroughly spray neem or pongamia soap (1%) or Neem Seed Kernel Extract (NSKE) 5%.
- Treat seeds with imidacloprid 70% WS @12 g/kg of seed.
- Spray any one of the following insecticide-

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

➤ Alternate chemicals at 10 days interval till the end of aphid population.

3. Gram pod borer: *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae): It is a polyphagous pest, infesting gram, lablab, safflower, chillies, groundnut, tobacco, cotton etc.

Nature of damage: Young larva feeds on the leaves for some time and then attacks fruits. Internal tissues are eaten severely and completely hollowed out. While feeding, the caterpillar thrust its head inside leaving the rest of the body outside. Bored fruits find with round holes. It feeds on leaves, shoots and buds. The activity of *Helicoverpa* starts on greengram, summer vegetables and maize and continues their generation by August-September months synchronizing with the main crop.

Life cycle: The spherical, yellowish eggs are laid singly on tender parts and buds of plants. The egg period lasts for 2-4 days. Caterpillars vary in colour, initially brown and later turn greenish with darker broken lines along the side of the body. The larval period lasts for 18-25 days. Body covered with radiating hairs. At the last instar they measures about 3.7 to 5 cm in length. The full grown caterpillar pupates in the soil in an earthen cell and emerges in 16-21 days. Pupal stage lasts 7-15 days. Moth is stout, medium sized with brownish/greyish forewings with a dark cross band near outer margin and dark spots near costal margins, with a wing expansion of 3.7 cm.

Management:

- Field sanitation and roguing.
- Erecting suitable physical barriers such as nylon nets.
- Growing intercrops such as cowpea, onion, maize, coriander, urdbean in 5:1 or 4:1 ratio.
- Grow crops like sorghum or maize in 4 rows all around chilli crop as guard crop.
- Crop rotation with a non-host cereal crop, cucurbit, or cruciferous vegetable.
- Grow repellent plants like Ocimum/Basil.
- Collect and destroy the infested fruits and grown up larvae.
- Erection of bird perches for encouraging predatory birds such as king crow, mynah, and drongo etc.
- Install pheromone traps @ 4-5/acre for monitoring adult moths activity. Replace the lures with fresh lures after every 2-3 weeks.
- Use ovipositional trap crops such as 1 row of marigold after every 18 rows of chilli then collect the larvae from flowers and destroy it (marigold seedling of 45 days should be planted along with chilli transplanting).
- Release of egg parasitoid *Trichogramma pretiosum* @ 50,000 adults (in the form of parasitized egg card)/acre/week right from the start of flower initiation till the end of the crop. Tie the egg cards on the stick placed throughout the field at 4-5 m apart, in the evening, a day prior to the emergence of adult.

- Conserve parasitoids such as *Tetrastichus* spp. (egg parasitoid), *Telenomus* spp. (egg parasitoid), *Campoletis chloridae* (larval parasitoid) etc.
- Spray HaNPV at 1.5×10^{12} POB/ha along with cotton seed oil 300 g/ha to kill larvae.
- Spray *Bacillus thuringiensis* 2 g/lit.
- 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.

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.
Thiodicarb 75 % WP	2.0 g/lit.

- 4. Tobacco caterpillar, *Spodoptera litura* Fabricius (Lepidoptera: Noctuidae):** The tobacco caterpillar is found throughout the tropical and subtropical parts of the world, wide spread in India. Besides tobacco, it feeds on cotton, castor, groundnut, chilli, cabbage and various other cruciferous crops.

Nature of damage: In early stages, the caterpillars are gregarious and scrape the chlorophyll content of leaf lamina giving it a papery white appearance. Later they become voracious feeders making irregular holes on the leaves initially and later skeletonization of leaves leaving only veins and petioles followed by Heavy defoliation occurs. Larvae feed on the seeds by making irregular holes in the fruits.

Life cycle: Female lays about 300 eggs in clusters. The eggs are covered over by brown hairs and they hatch in about 3-5 days. Caterpillar measures 35-40 mm in length, when full grown. It is velvety, black with yellowish-green dorsal stripes and lateral white bands with incomplete ring-like dark band on anterior and posterior end of the body. Larvae are nocturnal in habit and remain hidden in soil, debris or canopy during day time. It passes through 6 instars. Larval stage lasts 15-30 days. Pupation takes place inside the soil. Pupal stage lasts 7-15 days. Moth is medium sized and stout bodied with forewings pale grey to dark brown in colour having wavy white crisscross markings. Hind wings are whitish with brown patches along the margin of wing. Pest breeds throughout the year. Moths are active at night. Adults live for 7-10 days. Total life cycle takes 32-60 days. There are eight generations in a year.

Management:

- Field sanitation and roguing.
- Castor can be grown as a trap crop along the field border to attract the egg laying female adult moths (collect and destroy the laid egg masses and gregarious neonates).
- Pest repellent plants: Ocimum/Basil.
- Setting up light traps for collecting adults @ 1/acre.
- Erecting of bird perches for encouraging predatory birds such as king crow, mynah etc.
- Install pheromone traps @ 4-5/acre for monitoring adult moth activity. Replace the lures with fresh lures after every 2-3 weeks.
- Spray NSKE 5 % against eggs and first instar larva.

- Spray *B. thuringiensis* @ 600-800 g or SINPV @ 1.5×10^{12} POB/ha in evening hour in 400 lit. water/acre.
- Conserve parasitoids such as *Trichogramma chilonis* (egg parasitoid), *Tetrastichus* spp. (egg parasitoid), *Telenomus* spp. (egg parasitoid), *Chelonus blackburni* (egg-larval parasitoid), *Carcelia* spp. (larval-pupal parasitoid), *Camponotus chlorideae* (larval parasitoid), *Eriborus argentiopilosus* (larval parasitoid), *Microplitis* sp. etc.
- Spray any one insecticide suggested for gram pod borer management.

5. Broad/yellow mite: *Polyphagotarsonemus latus* Banks (Acarina: Tetranychidae):

This pest of chilli that cause great losses throughout the country, more particularly in Tamil Nadu, Andhra Pradesh, Maharashtra and West Bengal. It also attacks tea and potato.

Nature of damage: Both nymphs and adults suck sap and devitalize the plant causing ‘Murda’ disease of chillies. Infestation results in typical downward curling of leaves, the affected leaves becoming inverted boat shaped, the leaves rolling down along the margin with elongation of petioles. Affected leaves turning dark green in certain cases and younger leaves at the tip of branch clustering.

Life cycle: Gravid females lay reddish, hyaline, spherical eggs in mass on under surface of leaf. Eggs hatch in 2-5 day. After hatching neonates are light brown in colour with three pairs of legs. After feeding underneath the leaf in webs, larvae become nymphs with four pairs of legs. Developmental stages include six-legged larva. Protonymph and deutonymph. Adults are red coloured, smaller in size. Females are oval, pyriform in shape, bright crimson anterior and dark purplish brown posterior. Mites spin a web of silken threads under surface of leaf. Total life cycle is completed in 10-18 days depending upon the environmental conditions.

Management:

- Chilli crop bordered by two rows of maize at every 0.5 acre area (31.2×60 sqm).
- Conserve the predators such as predatory mite (*Amblyseius ovalis*), predatory bug (*Orius* spp.), spiders etc.
- If the incidence of mites is low, spray neem seed powder extract 4% at 10 days interval.
- spray any one of the following chemicals-

Chemicals	Dose
• Chlorfenapyr 10 % SC	1.5 ml/lit.
• Diafenthiuron 50 % WP	8.0 g/10 lit.
• Fenazaquin 10 % EC	2.0 ml/lit.
• Fenpyroximate 5 % EC	1.0 ml/lit.
• Hexythiazox 5.45 % EC	8.0 ml/10 lit.
• Milbemectin 1 % EC	6.5 ml/10 lit.
• Oxydemeton –Methyl 25 % EC	2.0 ml/lit.
• Propargite 57 % EC	2.5 ml/lit.
• Spiromesifen 22.9 % SC	5.0 ml/10 lit.

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