

## Managing *Thrips tabaci* – a pest of national significance

**Onion thrips (*Thrips tabaci*) is a global pest with increasing concern especially in onion and garlic production. It increases tremendously under hot and dry conditions. In general, onion thrips have 6-10 generations in one season and its life-cycle ranges from 20 to 35 days, depending on temperature fluctuation. Combination factors like shorter generation time and reduction of mortality through rains might be the possible reasons for its outbreak. Though, chemical control still remains as the miracle weapon to manage this pest, it is not devoid of harmful impact on human health and environment. Hence, integrated pest management is crucial.**

**O**NION thrips (*Thrips tabaci*) is the well-known pest of onion throughout the world. Almost all types of vegetables, including weeds are affected by this pest, but onion and garlic are crops that are damaged most. Besides, it is cosmopolitan in nature, polyphagous, transmits plant pathogens, have high reproductive rate (more generations at high temperatures), asexual mode of reproduction (parthenogenesis), high survival *via* cryptic (nonfeeding prepupa) instars and develop insecticide resistance. Hence, thrips become a global pest with increasing concern in commercial onion.

### Distribution

Onion thrips is thought to have originated from Mediterranean region but have gradually spread throughout the world. In India, *T. tabaci* is a pest of national significance widely distributed in all onion-growing regions. This pest is active throughout the year and breeds on onion and garlic from November to May. Later on, migrates to alternate summer host plants including weeds.

### Factors Favouring Thrips Population

Hot and dry weather favours thrips population and the severity of thrips injury to onion. The possible reason is likely a combination of factors such as shorter generation time and a reduction in mortality from rain and other plant pathogens. Heavy rains washes off the pest from plants. Moreover, water deficit stress may affect the nutritional quality of plants and also

increases the attractiveness of these water stressed plants to thrips.

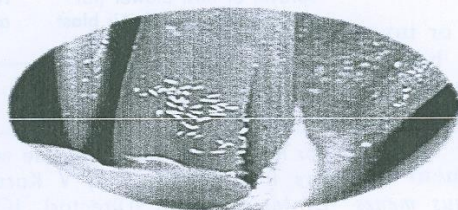
### Bionomics of Pest

Life cycle of onion thrips comprises 4 immature stages. On an average, duration of the life cycle from egg to adults takes 10-30 days depending on the temperature. Egg incubation period is 4-9 days; larval duration is about 5-8 days and pupal period is 3-10 days. The adults are slender, yellowish brown and measure about 1 mm in length. Males are wingless while females are alate having long narrow fringed wings. Nymphs resemble the adults but are wingless and slightly smaller. They are white to pale yellow in colour, elongate, slender body. Nymphs pass through two instars before pupation that are active and feeding stages. Thereafter, they descend to the ground and pupate at a depth of about 25 mm. 3<sup>rd</sup> and 4<sup>th</sup> instars are inactive, non-feeding stages called pre-pupa and pupa respectively. Pupa are pale yellow to brown and stouter than nymphs. The adult female lives for 2-4 weeks and lays 50-60 kidney-shaped eggs (approximately 0.2 mm length) singly in slits made in leaf tissue with its sharp ovipositors.

### Life-cycle

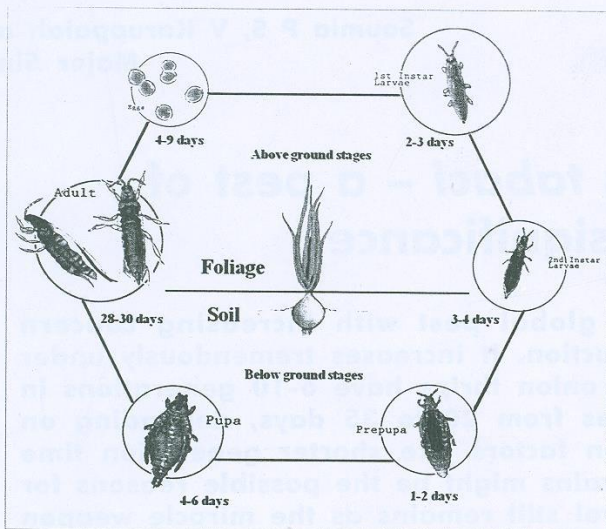
### Damage symptom

Both nymphs and adults attack all stages of onion plant. They puncture the leaves and stem of the host plant and suck the exuding sap. In the initial phase of attack, leaves show spotted appearance and later on appear as silvery



Thrips on neck region of onion plant





Damaged on leaves with silvery patches

patches. As infestation progress, damaged tissues coalesces exhibiting blast like appearance. The tip of the leaf gets dried and eventually falls. Tiny black "tar" spots of thrips excrement are evident on leaves with heavy feeding injury. Severe infestation may result in reduced photosynthetic activity leading to premature senescence as well as distorted and undersized bulbs. Besides, it also act as a vector for viral disease like Iris Yellow Spot Virus (IYSV).

### Integrated Pest Management

Control of onion thrips is very difficult due to its small size and cryptic habits. Hence, integrated approach needs to be followed. Blue pan water / yellow sticky traps installed @ 4-5 traps/acre at 15 cm above the canopy for monitoring thrips.

#### Cultural control

Field sanitation by removal of weeds and destruction of culls of onion and garlic to reduce thrips population buildup.

Avoid successive planting/mono-cropping of onion and garlic or alternate host. Crop rotation with non hosts minimizes the chance pest carryover.

Adjust the transplanting dates, so as to create asynchrony between the susceptible crop stage and peak pest infestation. For example: transplant onion crop between 15 September -15 October to avoid thrips and diseases.

Use of reflective plastic (silver colour) and aluminium painted black mulches repel the thrips in seed crop.

**Physical control:** Plant 2 rows of maize or inner row wheat and outer row maize as barrier surrounding onion crop (250 sq. m) at least 30 days prior to onion transplanting. Blocks migration of adult thrips up to 80%.

**Biological control:** Conserve and augment the natural enemies likes parasitoid: *Ceranisus menes* (nymphs) and predators: predatory thrips (*Aeolothrips fasciatus*), coccinellids (*Cheilomenes sexmaculata*), and

spiders etc.

**Chemical control:** Seedlings roots are dipped in a solution of 0.1% Carbendazim + 0.025% Carbosulfan, for two hours to reduce the incidence of fungal diseases and thrips damage till 30-40 days in the main field. Spray insecticides when thrips population crosses ETL of 30 thrips/plant. Insecticides recommended are Carbosulfan @ 2ml/l (0.2%) or Fipronil @ 1ml/l (0.1%) and Profenophos 1ml/l (0.1%). Need based foliar application of insecticide sprays from 30 days after planting at 10-15 days interval. Add a spreader or sticker (0.5-1.0%) to spray fluid for retention and spread of insecticide on erect leaves of onion. Avoid using same insecticide repeatedly.

### Precautions

Do's	Don'ts
Deep summer ploughing is to be done during the months of May and June for at least 2-3 weeks.	Do not plant or irrigate the field after ploughing, at least for 2-3 weeks, to allow desiccation of weed's bulbs and/or rhizomes of perennial weeds
Adopt crop rotation	Avoid mono-cropping
Apply short persistent pesticides to avoid pesticide residue in the soil and produce	Do not apply pesticides during preceding 7 days before harvest
Apply insecticides at recommended dose and dilution only. Add a spreader or sticker (0.5-1.0%) to spray fluid for better retention on the crop	Avoid repeated use of same insecticides
Use either lever operated knapsack sprayer (for bigger droplets) or Motorized knapsack sprayer or mist blower (for smaller droplets) or Air blast nozzle	Do not spray insecticides on hot sunny day or strong windy condition; or just before the rains and after the rains; or against windy direction

For further interaction, please write to:

Drs P S Soumia and V Karuppaiah (Scientists) and Dr Major Singh (Director), ICAR-Directorate of Onion and Garlic Research, Rajgurunagar 410 505, Pune, Maharashtra.