

## Lecture No 27

### PESTS OF ONION, GARLIC, TURMERIC AND GINGER

#### I. PEST OF ONION

Among the pests attacking onion, onion thrips requires attention as it is the most destructive. Onion maggot under North Indian conditions and earwig under South Indian conditions gain importance occasionally.

Major pests			
Onion thrips	<i>Thrips tabaci</i>	Thysanoptera	Thripidae
Onion maggot	<i>Delia antiqua</i>	Anthomyiidae	Diptera
Earwig	<i>Anisolabis stali</i>	Forficulidae	Dermaptera
Potential major pests			
Tobacco caterpillar	<i>Spodoptera litura</i>	Noctuidae	Lepidoptera
Cutworm	<i>Agrotis ipsilon</i>	Noctuidae	Lepidoptera

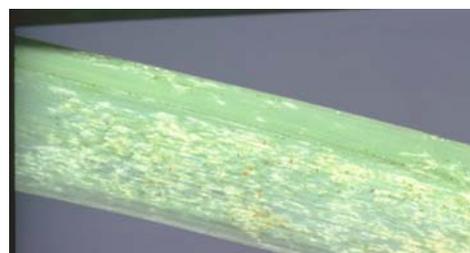
#### 1. Onion thrips: *Thrips tabaci* (Thysanoptera: Thripidae)

**Distribution and status:** Found world-wide and is found throughout India as a major pest of onion and garlic (*Allium fistulosum*).

**Host range:** Onion, garlic, cotton (*Gossypium spp.*), cabbage, cauliflower, potato, tobacco, tomato, cucumber (*Cucumis sativus* L.), brinjal, tea, pear, pine apple, chillies, tomato, radish, grapes etc.

#### Damage symptoms

Adults as well as by nymphs lacerate the leaf tissue and feed on the plant juice. The insects are just visible to the unaided eye and are seen moving briskly on the flowers and leaves of onion and garlic plants. They usually congregate at the base of a leaf or in the flower. Leaves of attacked plants turn silvery white, curl, wrinkle and gradually dry from tip downwards. The plants do not form bulbs nor do the flowers set seed. Leaf tip discoloration and drying is the main symptom.



## Bionomics

The adults are slender, yellowish brown and measure about 1 mm in length. Males wingless; females have long, narrow strap-like wings. Nymphs resemble the adults in shape and colour but are wingless and slightly smaller. This pest is active throughout the year and breeds on onion and garlic from November to May, migrates to cotton and other summer host plants and breeds till September. In October, it is found on cabbage and cauliflower. The adult female lives for 2-4 weeks and lays 50-60 kidney-shaped eggs singly in slits made in leaf tissue with its sharp ovipositors. Egg period 4-9 days. Nymphs pass through four stages and are full-fed in 4-6 days, after which they descend to the ground and pupate at a depth of about 25 mm. The pre-pupal and pupal stages last 1-2 and 2-4 days, respectively. Several generations are completed in a year.



## Management

- Grow resistant varieties viz., White Persian, Grano, Sweet Spanish and Crystal Wax.
- Use neem coated urea to reduce the infestation of the pest.
- Install sky blue colour sticky traps @ 25/ha
- Spray 625 ml of malathion 50 EC or methy demeton 25 EC or dimethoate 30 EC or monocrothos 36 SL 500 ml- 750 ml in 500 - 750 L of water per ha as soon as the pest appears. A waiting period of 7 days should be observed, before harvest.
- Conserve predators like *Scymnus nubilis*, *Orius albidipenis*, *Chrysopa* sp, and predatory thrips vis., *Aelothrips collartris*

## 2. Onion Maggot: *Delia antiqua* (Anthomyiidae: Diptera)

**Distribution and status:** Widely distributed in France, Germany, Canada, USA, Japan, erstwhile USSR and England. This pest also attacks onions in northern India.

**Host range:** Onion and garlic

### Damage symptoms

The maggots bore into the bulbs, causing the plants to become flabby and yellowish. It causes withering in the field and rotting in storage. Damage leads to the invasion of *Bacillus carolovor* which causes soft rot of onion



### Bionomics

The flies are slender, greyish, large-winged. The maggots are small, white and about 8 mm. in length. The female lays elongate, white eggs near the base of the plant, in cracks in the soil. The eggs hatch in 2-7 days. The maggots crawl up, enter the leaf sheath and reach the bulb. They feed there and become full-grown in 2-3 weeks. The maggots then crawl out of the bulb and pupate in the soil. After 2-3 weeks, the adults emerge and start the new generation. In the third generation, the pest often attacks the onions shortly before the harvest. It initiates the process of rotting of the onions in storage.



### Management

Grow *Allium fistulosum* as it is more tolerant than *A. cepa*. Apply 10 kg of carbaryl 4G or phorate IOG to the soil followed by light irrigation.

Spray methy demeton 25 EC or dimethaote 30 EC 1.0 L in 500 – 750 L of water per ha.

### 3. Earwig: *Anisolabis stali* (Forficulidae: Demaptera)

**Distribution and status:** Throughout India

**Host range:** Onion, garlic, cabbage, cotton, sorghum and groundnut

**Damage symptoms:** Nymphs bore into the bulb and make cavities which lead to withering of

plants.

**Bionomics:** Adult is brown to black with forceps like caudal cerci and white jointed legs. Adult female lays 21-139 eggs, egg period 14 days. Nymphs white in the early stage turn brown in the later stage, nymphal period 50 -54 days.

**Management:** Refer Groundnut

**4. Tobacco caterpillar: *Spodoptera litura* (Noctuidae:Lepidoptera)**

Refer cotton

**5. Cutworm: *Agrotis ipsilon* (Noctuidae:Lepidoptera)**

Refer potato

## II. PEST OF TURMERIC AND GINGER

Major pests				
1.	Shoot borer	<i>Conogethes punctiferalis</i>	Pyraustidae	Lepidoptera
2.	Rhizome scale	<i>Aspidiotus hartii</i>	Diaspididae	Hemiptera
3.	Skipper Butterfly	<i>Udaspes folus</i>	Hesperiidae	Lepidoptera
4.	Rhizome maggot	<i>Formosina flavipes</i>	Chloropidae	Diptera
5.	Bihar Hairy Caterpillar	<i>Spilosoma obliqua</i>	Arctiidae	Lepidoptera
6.	Thrips	<i>Panchaetothrips indicus</i>	Thripidae	Thysanoptera
	<b>Minor Pests on turmeric</b>			
7.	Flea beetle	<i>Lema praeusta</i>	Chrysomelidae	Coleoptera
8.	Turmeric scale	<i>Aspidiotus cucumae</i>	Diaspididae	Hemiptera
9.	Banana lacewing bug	<i>Stephanitis typicus</i>	Tingidae	Hemiptera
10.	Leaf thrips	<i>Anaphothrips sudanensis</i> <i>Asprothrips indicus</i> <i>Panchaetothrips indicus</i>	Thripidae	Thysanoptera
	<b>Minor pests on ginger</b>			
	Leaf miner	<i>Acrocercops irradians</i>	Gracillariidae	Lepidoptera
	Weevil	<i>Hedychrous rufofasciatus</i>	Curculionidae	Coleoptera

### 1. Shoot borer: *Conogethes punctiferalis* (Pyraustidae: Lepidoptera)

The caterpillar enters into the aerial stem killing the central shoot which results in the appearance of 'dead heart'. For details on the bionomics and management refer castor.



### 2. Rhizome scale: *Aspidiotus hartii* (Diaspididae: Hemiptera)

**Distribution and status:** India, West Africa and West Indies

**Host range:** Turmeric and ginger

#### Damage symptoms

Both nymphs and adults infest rhizomes both in field and storage. The infested plants

become weak, pale and withered in the field that results in shrivelling of rhizomes and buds.

### Bionomics

Scales are minute, circular, light brownish to grey with a thin pale membrane. It reproduces either ovovivparously or parthenogenetically Female lays about 100 oval, yellowish eggs under the scale. Egg period one day, nymphal period 30 days. Adult is yellow to deep yellow in colour.



### Management

- i. Apply well rotten sheep manure / poultry manure in two splits @ 10 tons/ha, first before planting and the second at the time of earthing up.
- ii. Drench soil with dimethoate 30 EC or phosalone 35 EC @ 2 ml/L of water
- iii. Soak seed rhizomes, in insecticide solution of either dimethoate 30 EC or phosalone 1.5 ml/L or monocrotophos 36 WSC 1.5 ml/L or dichlorvos 0.5 ml/L for 15 min. for storing.

### 3. Skipper Butterfly: *Udaspes folus* (Hesperiidae: Lepidoptera)



**Distribution and status:** Throughout India. Very common pest.

**Host range:** Turmeric, ginger, arrow root, cardamom and wild lily.

**Damage symptoms:**

Larvae webs leaves with silken threads, fold the leaves into a tubular form and feed on them

**Bionomics:** The adult is a brownish-black butterfly with 8 white spots on forewings and one large patch on hindwing. The full-grown larva is dark-green and measures 36 mm in length. A female lays about 50 eggs on underside of the leaves which hatch in 3-4 days. The larva undergoes 5 instars during 12-21 days and pupates in leaf-fold for 6-7 days. The smooth green colour larva with a black head pupates in December and emerges only in March. Longevity of males and females are 4 and 67 days respectively. The insect is present in abundance during August to October.

**Management**

- Hand pick and destroy the caterpillars
- Apply carbaryl 50 WP 1.0 kg or malathion 50 EC 1.0 L in 500 -750 L of water per ha.

**4. Rhizome maggot:** *Formosina flavipes*, *Chalcidomyia atricornis* (Chloropidae: Diptera), *Eumerus albifrons* (Syrphidae: Diptera), *Mimegralla coeruleifrons* (Micropezidae: Diptera), *Calobata* sp (Micropezidae: Diptera), *Celyphus* sp (Celyphidae: Diptera)

**Distribution and status**

*Formosina flavipes*, *Chalcidomyia atricornis* - Found on turmeric and ginger in South India

*Eumerus albifrons*, *Mimegralla coeruleifrons* - Found on ginger in Karantaka

*Celyplius* sp – Found on ginger in Kerala and Uttar Pradesh

**Host range:** Turmeric and ginger

**Damage symptoms**

Rhizomes and roots are tunneled extensively by the maggots resulting in rotting of rhizomes.

**Management:**

- Avoid using seed material from the infested fields.
- Spray methyl parathion 50 EC or dimethoate 500 ml in 500 -750 L water per ha
- Soak seed rhizomes, in insecticide solution of either dimethoate 30 EC or phosalone 1.5 ml/L or monocrotophos 36 WSC 1.5 ml/L or dichlorvos 0.5 ml/L for 15 min. for storing

**5. Thrips:** *Panchaetothrips indicus* (Thripidae: Thysanoptera)

This is confined to South India. Due to laceration nymphs and adults leaves become

rolled up, turn pale and gradually dry-up. Adult is with fringed wings. Spray dimethoate 30 EC 500 – 750 ml in 500 -750 L water per ha to control the thrips.

**6. Bihar Hairy Caterpillar: *Spilosoma obliqua* (Arctiidae: Lepidoptera)**

This pest damages the turmeric plants extensively in Bihar and Bengal States. For details on the bionomics and management refer sunflower

**Minor Pests of Turmeric**

**Flea Beetle: *Lema praeusta* (Chrysomelidae: Coleoptera)**

Both adults and grubs feed on leaf. These are recorded in Orissa and Kerala. *L. praeusta* are observed to feed on leaves of cucurbits and sorghum in fields. Adult lay eggs singly on leaves. Incubation period is 8-10 days. Grub feeds on leaf tissue for 10-12 days and pupates in the soil. Adults emerge out form pupa, which lasts for 15-25 days. Adults are active during day time and feed on leaves. Longevity of the adults is 43-60 days.

**Turmeric scale: *Aspidiotus curcumae* (Hemiptera: Diaspididae)**

**Banana lacewing-bug: *Stephanitis typicus* (Tingidae: Hemiptera)**

**Refer Banana**

**Leaf thrips: *Anaphothrips sudanensis*, *Asprothrips indicus* (Thripidae: Thysanoptera)**

**Minor Pests of Ginger**

**Leaf miner: *Acrocercops irradians* (Gracillariidae: Lepidoptera)**

**Weevil: *Hedychrous rufofasciatus* (Curculionidae: Coleoptera)**

### III. Pest of coriander

Major pest			
Cotton Whitefly	<i>Bemisia tabaci</i>	Aleyrodidae	Hemiptera
Minor pests			
Aphid	<i>Hyadophis coriandri</i>	Aphididae	Hemiptera
Pentatomid bug	<i>Agonoscelis nubila</i>	Pentatomidae	Hemiptera
Indigo caterpillar	<i>Spodoptera exigua</i>	Noctuidae	Lepidoptera

The important pest of coriander is only whitefly.

#### 1. Cotton Whitefly: *Bemisia tabaci* (Hemiptera: Aleyrodidae)

The nymphs suck sap of the plants and adversely affect their growth. For bionomics and management.

Refer cotton

Other pests which are found on coriander plants are

#### 2. Aphid: *Hyadophis coriandri* (Hemiptera: Aphididae)

Both nymphs and adults congregate colonise on ventral surface of leaves and suck cell sap. Due to copious production of honey dew, leaves give a glistening appearance in the beginning, but later covered with sooty mould fungus. Nymphs and adults are yellowish green. A single female produces 40 to 50 young ones and they take 8 to 12 days to mature. Life cycle is completed in 14 to 21 days during summer and 6 weeks in winter.

#### 3. Pentatomid bug: *Agonoscelis nubila* (Hemiptera: Pentatomidae)

Adult and nymphs suck the sap from leaves and stem. Heavily infested plants show stunting. Adults are yellowish. Life cycle is completed in 40 to 60 days. Spray dimethoate or quinalphos 1.5 ml/L

#### 4. Indigo caterpillar: *Spodoptera exigua* (Lepidoptera: Noctuidae)

Refer Jute or linseed

## Pest of Curry leaf

Major pest			
Psyllid bug	<i>Diaphorina citri</i>	Psyllidae	Hemiptera
Citrus butterfly	<i>Papilio demoleus</i>	Papilionidae	Lepidoptera
Bark borer	<i>Indarbela tetraonis</i>	Metarbelidae	Lepidoptera
Citrus black fly	<i>Aleurocanthus woglumi</i>	Aleyrodidae	Hemiptera
Leaf roller	<i>Tonica zizyphi</i>	Oecophoridae	Lepidoptera

### Psyllid bug: *Diaphorina citri* (Psyllidae: Hemiptera)

The tender shoot is often severely attacked by the psyllids

### Citrus butterfly: *Papilio demoleus* (Papilionidae: Lepidoptera)

The leaves are eaten commonly by the caterpillars.

### Leaf roller: *Tonica zizyphi* (Oecophoridae: Lepidoptera)

The larvae sometimes roll the leaflets in large numbers and cause appreciable damage.

### Bark borer: *Indarbela tetraonis* (Metarbelidae: Lepidoptera)

### Citrus black fly: *Aleurocanthus woglumi* (Aleyrodidae: Hemiptera)

Refer citrus for more information on the distribution, host range, bionomics, damage and management for the above mentioned pests of curry leaf.

**Question paper on onion, garlic and turmeric**

1.	Pseudostem with bore holes plugged with excreta, dead heart, panicles and spikes dry-up above the point of infestation in ginger and turmeric ----- <b>Shoot borer</b> <b><i>Conogethes punctiferalis</i></b>	
2.	Rhizomes and roots tunnelled extensively by the maggots resulting in rotting of rhizome due to	
	a. <b>Rhizome maggot</b>	b. Shoot borer
	c. Rhizome scale	d. Thrips
3.	<i>Formosina flavipes</i> belongs to the family Chloropidae -Say <b>True</b> or False	
4.	Ginger plants become withered in the field and rhizomes rot in storage due to scale - Say <b>true</b> or False	
5.	Scientific name of turmeric rhizome scale is ----- <b><i>Aspidiotus hartii</i></b>	
6.	Turmeric leaves become rolled up, turn pale and gradually dry-up due to----- <b>Thrips <i>Panchaetothrips indicus</i></b>	
7.	Turmeric rhizome scale belongs to family	
	a. Coccidae	b. Pseudococidae
	c. <b>Diaspididae</b>	d. Tingidae
8.	Well rotten sheep manure / poultry manure can be applied for the management of _____ <b>Rhizome scale</b>	
9.	Garlic is relatively more tolerant than onion to <i>Thrips tabaci</i> – Say <b>true</b> or false	
10.	Rolling of turmeric and ginger leaves is caused by _____ Turmeric skipper <i>Udaspes folus</i>	
11.	Discolouration of onion leaves with pale tips and drying form tip downwards is due to <b>onion thrips/onion maggot</b>	
12.	Psyllid <i>Diaphorina citri</i> is common to citrus and curry leaves Say <b>true/ false</b>	
13.	Indigo caterpillar is <i>Spodoptera litura</i> / <b><i>Spodopera exigua</i></b>	