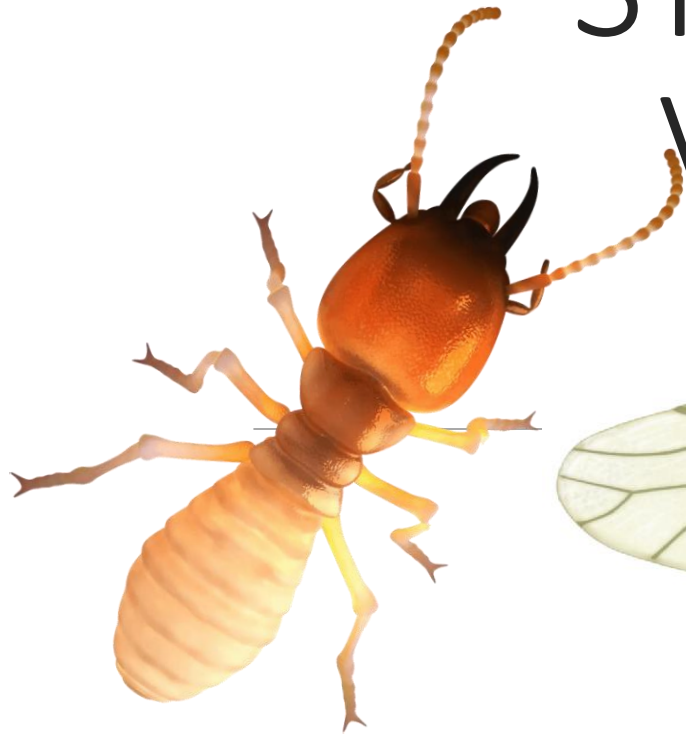


# IDENTIFICATION OF TYPICAL SYMPTOMS OF DAMAGE BY VARIOUS PHYTOPHAGOUS INSECTS



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# Introduction

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- Insects inflict injury to plant either directly or indirectly to secure food. Almost all portions of plant viz., roots, stem, bark, leaves, buds, flowers and fruits are attacked.
- The study of signs/ symptoms exhibited by different parts of the plant due to the damage caused by the insect pests is known as symptomatology.
- Based on the nature and symptoms of damage, insects can be classified into different groups as mentioned here.

# 1. STEM BORERS

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- Larvae enter into the stem/ tillers and feed on internal contents. As a result, damaged part is cut off from the main plant and affected part wilts, dries up and exhibits symptoms like dead heart/ white ear/ bunchy top.
- e.g. stem borers of paddy, millets, sugarcane and brinjal, *etc.*



## 2. SHOOT BORERS

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- Larvae attack tender shoots and bore inside during the vegetative stage of crop growth and cause wilting, drooping of terminal plant part (Dead heart) which later dries up.
- e.g. shoot borers of brinjal, bhendi, cotton, castor, shoot fly of sorghum and black gram stem fly.



### 3. DEFOLIATORS/ SKELETONIZERS

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- Larvae feed on the leaves completely leaving only midrib/ veins or scrape the chlorophyll content of leaves or cause numerous holes.
- e.g. castor semilooper, red headed hairy caterpillar, bihar hairy caterpillar, snake gourd semilooper, ash weevils, tobacco caterpillar, brinjal epilachna beetle.

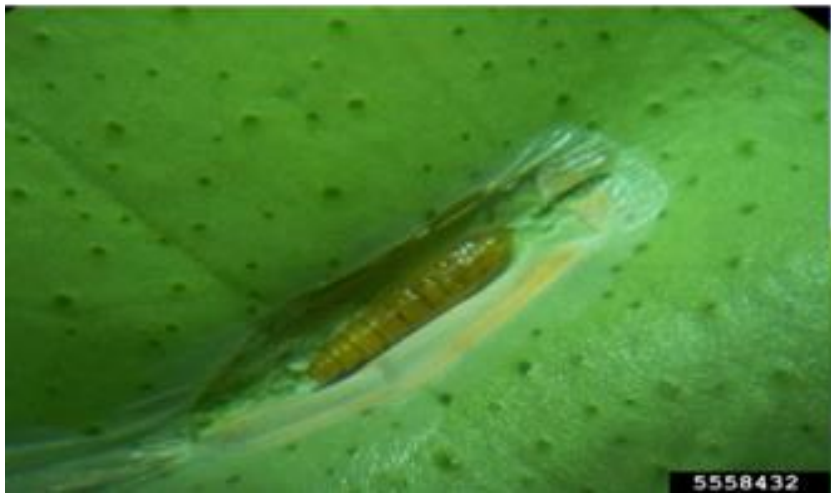




## 4. LEAF MINERS

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- Larvae mine leaves/ leaflets between the epidermal layers and feed on greenish matter, resulting in the appearance of translucent white patches/ zig-zag galleries on leaves.
- e.g. leaf miners of citrus, cashew.



# 5. LEAF WEBBERS

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- Larvae web leaves/ leaflets by means of silken threads and feed on the chlorophyll content by remaining within the web.
- Often faecal pellets/ frass are found within the web.
- e.g. leaf webbers on gingelly, ground nut, sapota, mango and cashew shoot webber.



# 6. LEAF FOLDERS

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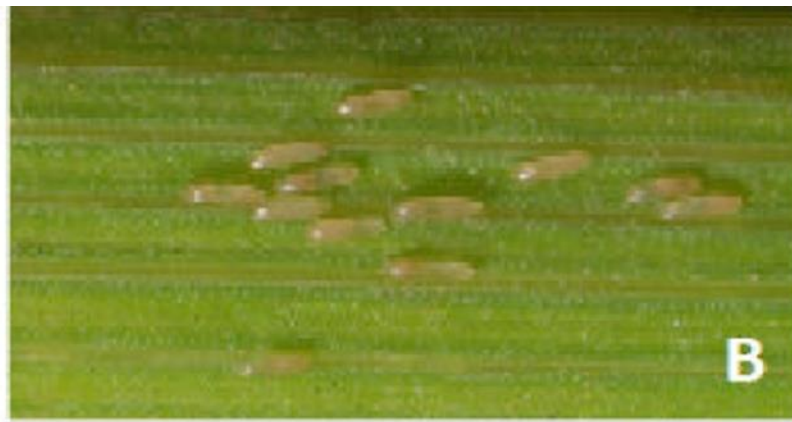
- Larvae fold leaves from tip to base/ longitudinally/ margin to margin there by giving appearance of a fold/ roll.
- e.g. rice leaf folder, cotton leaf folder.



# 7. GALL MAKERS

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- Larvae feeding inside the stem/ tiller/ leaf/ flower bud, stimulates excessive growth of cells at the affected portion and distorts normal growth. It results in malformation of plant parts, exhibiting gall formation.
- e.g. paddy gall midge, tobacco stem borer, cotton stem weevil, mango inflorescence midge, chilli midge etc.



## 8. POD/ CAPSULE BORERS/ BOLL WORMS

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- During the reproductive stage of crop, larva enter into the pods, capsules and feed on the seeds/ lint exhibiting symptoms like webbed condition of pods/ bolls or web few pods/ capsules with frass and excreta or holes of different sizes and shapes/ damaged tissues (chilli)/ lint (cotton).
- e.g. spotted pod borer, capsule borers of castor and gingelly, red gram pod fly, tobacco caterpillar, gram caterpillar, pink boll worm etc.





# 9. FRUIT BORERS

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- Larvae enter into the tender fruits and feed on fresh matter/ pulp and plug the larval burrow with excreta.
- e.g. fruit borer of brinjal/ bhendi/ tomato, mango stone weevil, cashew, apple and nut borer.



# 10. BARK BORERS

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- Larvae remain in a small tunnel at the axils of branches, under the bark, constructing galleries of frassy web on the stem and near bark/ angles of branches and move about, conceal inside the silken gallery and feed on the bark by scraping.
- e.g. bark eating caterpillars of citrus, mango, guava, casuarinas etc.



# 11. TREE BORERS

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- Larvae bore deep into the tree trunk, make the tunnels in zig-zag manner and feed on inner tissues, arresting translocation of sap to top portions of tree, there by the trees exhibit symptoms like yellowing, withering of leaves, drying of twigs or complete drying of tree.
- Sometimes, gummy material oozes from the affected portion on the tree trunk.
- e.g. tree borers of mango, cashew, coconut red palm weevil etc.



# MANGO STEM BORER DAMAGE SYMPTOM

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# 12. ROOT FEEDERS

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- Larvae feed on root/ root nodules or nymphs and adults suck sap from the roots resulting in stunted growth/ poor tillering/ drying of plants in isolated patches.
- e.g. white grubs, termites, rice root weevil and ragi root aphid.



# 13. FROM FRUITS

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- Holes, plugged with excreta/ forming necrotic patches/ rotting on fruit.
- e.g. fruit flies, fruit sucking moths.



# 14. SEED FEEDERS (STORED GRAIN PESTS)

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- Larvae feed on stored seeds either as internal/ external feeders/ by webbing the food particles.
- e.g. rice weevil, red rust flour beetle, rice moth etc



# 15. SAP FEEDERS (From grains)

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- Nymphs and adults suck juice from developing ovaries/ milky grains resulting in the formation of shriveled/ chaffy grains.
- e.g: rice gundhy bug, sorghum earhead bug, sorghum midge.



# 16. SAP FEEDERS (From plant parts)

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- Nymphs and adults suck sap from the base of the plant/ leaves/ tender terminal plant parts/ flowers, thereby affect the vigour and growth of the plants.
- Different insects exhibit different symptoms. In case of severe infestation, sooty mould develops on the plant parts covered with honey dew excreted by insects while feeding.



<b>SYMPTOMS</b>	<b>EXAMPLE</b>
1. Hopper burn, complete drying of leaves and plants in patches, giving scorched appearance.	Paddy brown planthopper, white backed plant hopper, paddy leafhopper
2. Curling of leaf margins/ mottling/ necrotic patches.	cotton leafhopper
3. Upward curling of leaves.	chilli thrips
4. Downward curling of leaves/ elongation of petioles of older leaves/ reduction in leaf size and clustering at tip of branch/ brittleness.	chilli white mites
5. Leaf drying from top to bottom.	onion thrips
6. White/ yellow blotches on upper surface of leaves.	mites on castor/ coconut/ bhendi.
7. Reduced vigour/ sooty mould/ square/ flower drop.	whiteflies on cotton
8. Yellowing/ crinkling of leaves.	thrips on ground nut, pulses
9.Reduced vigour/ stunted growth/ yellowing/ sooty mould.	aphids



**THANK YOU**

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