

**INSECT PESTS OF IMPORTANT TREES
SPECIES IN SOUTH INDIA AND THEIR
MANAGEMENT INFORMATION**



Mylabris pustulata Thunberg

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Preface

Insect pests routinely infest the trees and have an important role in forest dynamics. Occasionally, insect populations grow rapidly to damaging proportions and major pest outbreaks occur. These events can have catastrophic impacts leading to the complete destruction of large areas of natural and/or planted forests, to loss or reduction of vital forest ecosystem functions and to considerable economic losses. In developing countries and countries in transition, severe pest outbreaks may compromise national economics, undermine local livelihoods and threaten food security.

The effective management of natural forest and plantation depends on their early detection. All investigations should begin with the initial discovery and recognition of symptoms in the field. To improve awareness, action must be taken to train people who work directly with trees in the recognition and interpretation of symptoms. A broadening of visual skills in the initial assessment of pest infestation is urgently needed to improve the early detection and timely management of problems.

Sometimes the knowledge that a problem is not serious will suffice and will avoid expensive and unnecessary treatments. Similarly, the recognition that a symptom is of a previously unknown type will help to identify a new problem at an early stage and may prevent significant losses.

This manual aims to provide basic information on insect pests of important tree species in South India. It will also help people/foresters make visual assessments of pest problems and to provide a preliminary diagnosis. It will help readers to recognize symptoms of insect infestation, to distinguish this from normal events that signal a temporary decline, and to improve their skills in making the vital preliminary diagnosis. This is an important and neglected capability that will often be sufficient for formulating a simple plan to contain insect pest or for deciding alternatively that no action is necessary.

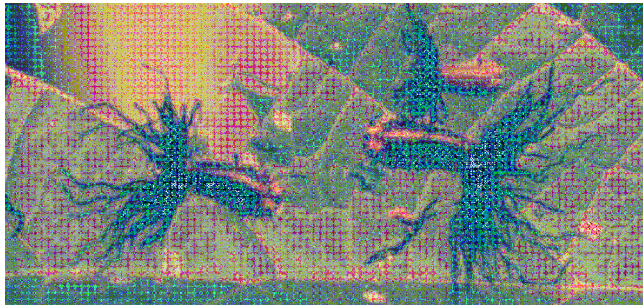
AUTHORS

Tree species	:	<i>Gmelina arborea</i> (Roxb.)
Insect species	:	<i>Calopepla leayana</i> Latr .
Order	:	Coleoptera
Family	:	Chrysomelidae
Hosts	:	<i>Gmelian arborea</i> (Roxb.)
Life history	:	Beetle hibernates during winter. Beetles become active with the arrival of the monsoon rains in April and May. Gravid female lays lemon yellow eggs vertically in clusters of 10-100 eggs in a frothy secretion to form a dome shaped ootheca on undersurface of leaves. Each leaf bears 4-5 ootheca. Incubation period varies from 6-11 days. Five larval instars. Total feeding life of larva varies from 17-19 days. Pupal period 6-8 days. The insects go through 3 complete generation in a year. This pest is active during mid of March to mid of November.
Damage Symptoms	& :	Defoliation. The larvae and adults start feeding voraciously, skeletonising the leaf completely leaving midrib.
Control measures	:	Endosulfan, a broad-spectrum insecticide and synthetic pyrethroids, which have a quick knock down property like cypermethrin and deltamethrin are very effective against defoliator. Spraying of neem seed kerner extract like Neemazal at 5% (5ml/liter) or neem oil at 2 % (2ml/liter) sticking agent (Khadi bar soap at 3gm/lite of suspension) thrice at 15 days interval can be used to check the damage. Spraying of entomogenous fungus <i>Beauveria bassiana</i> at 5gms/liter of water ticking agent twice at 15 days interval suppress <i>C. leayana</i> .

***Calopepla leayana* Adult**



***Calopepla leayana* Larvae feeding on leaf**



- Tree species : *Gmelina arborea* (Roxb.)
- Insect species : *Alcidodes ludificator* Marshall
- Order : Coleoptera
- Family : Curculioniidae
- Hosts : *Gmelina arborea* (Roxb.)
- Life history : *Alcidodes ludificator* is a small weevil 5-8 mm long, dark brown in colour and with a few light coloured bands on its elytra, the hard wing coverings. The beetles of this family have a very diagnostic character-head with a long snout. The insect is found clasping the growing points of main or side branches or petioles of usually younger leaves. This beetle has a habit of falling down to the ground and feigning dead at the slightest jerk to their roosting site. The pest is prevalent during rainy season, May/June to Sept./ Oct. Adults gnaw into the growing points, tender branches, and leaf petioles, making a series of pits into them laterally. A range of 6-21 weevils can be observed in a plant. Beetles lay eggs into them, especially on main growing points and branches.
- Damage & Symptoms : Beetles feed on the soft pith excavated from the pits made. Symptoms of early attack show wilted top leaves and growing point. Some days later damaged leaves and tips dry up and become brown, which can be spotted from a distance. Growth in the case of young trees in the field is severely stunted.
- Control measures : Application of quality neem cake at 10kg a hectare as basal application to reduce the weevil.

Infected plant



- Tree species : *Gmelina arborea* (Roxb.)
- Insect species : *Prioptera punctipennis* Vagener
- Order : Coleoptera
- Family : Chrysomelidae
- Hosts : *Gmelina arborea* (Roxb.)
- Life history : A brown with two black spotted tortoise / chrysomelidae beetle is known to defoliate *Gmelina arborea* in association with another major chrysomelid pest, *Caloeppla leayana*.. The beetle lays eggs in covered masses on the foliage of the host plant in April by the adult population. Incubation period is of six days. Larval and pupal period are 16-19 and 5days respectively. There are several generations in a year. The last generation pupates in November with pupal period of 12- 14 days.
- Damage & Symptoms : Defoliation. The larvae and adults start feeding voraciously, defoliating the leaf completely.
- Control measures : Foliar spray of vermiwash with water in 1:1 ratio or it may be diluted with 10 per cent cow's urine four times at weekly intervals can be effective against *Prioptera*.

Prioptera punctipennis Adult



- Tree species : *Gmelina arborea* (Roxb.)
- Insect species : *Ectropis bhurmita* (Walker)
- Order : Lepidoptera
- Family : Geometridae
- Hosts : *Gmelina arborea* (Roxb.)
- Life history : It is widely distributed in India. The looper larva (about 3cm long) is of variable colouration but grayish green with brownish dots and lines. It is an open feeder on the foliage of the host plants, devouring young leaves almost entirely and skeletonizing the leaves. It is also known to gnaw the bark of young twigs when leaves become scarce. Pupation occurs in soil. There are several generations during a year in India, with a minimum life cycle of about a month, occurring during south- west monsoons. The larva of this moth is polyphagous on the foliage of several dicotyledonous trees, and recorded hosts in India include *Aleurites montana*, *Bombax malabaricum*, *Dalbergia latifolia*, *Grevillea robusta*, *Schleichera oleosa*, *Shorea robusta*, *Syzygium cumini*, *Taxodium distichum*, *Tectona grandis* and *Terminalia tomentosa* in various parts of its range.
- Damage & Symptoms : Defoliation. The larvae and adults start feeding voraciously, defoliating the leaf completely.
- Control measures : Endosulfan, a broad-spectrum insecticide and synthetic pyrethroids, which have a quick knock down property like cypermethrin and deltamethrin are very effective against defoliator.

Ectropis bhurmita Adult



Tree species	:	<i>Gmelina arborea</i> (Roxb.)
Insect species	:	<i>Tingis beelsoni</i> Drake
Order	:	Homoptera
Family	:	Tingidae
Hosts	:	<i>Gmelina arborea</i> (Roxb.)
Life history	:	This small dark black tinged bugs occurs in eastern India. The bugs breeds gregariously in leaves and soft shoots of <i>Gmelina arborea</i> . Both nymphs and adult of the lace bug feed almost entirely at the base of leaf blade on the under surface or at the axils. The leaf lamina becomes spotted with brownish patches near the base. The leaf ultimately withers and fall, leading to complete defoliation of the host plant. Generally only the young <i>Gmelina</i> plantation of 1-2 years age are attacked, through the plants remains susceptible upto pole stage.
Damage Symptoms	&	Sap sucker. Aggregate in large numbers on stem and branches and feed gregariously at the base of the leaf blade and sucking sap from larger veins ultimately leaves become spotted, discoloured and wither. Eventually shoots die back.
Control measures	:	Spraying the mixture of insecticide and fungicides (0.02% of Monochrotophos and 01.% of carbandazim) control the damage.

Tingis beelsoni on host leaf



Tingis beelsoni Adult bug



Tree species	:	<i>Gmelina arborea</i> (Roxb.)
Insect species	:	<i>Eupterote geminate</i> Wlk.
Order	:	Lepidoptera
Family	:	Euptroptidae
Hosts	:	<i>Gmelina arborea</i> (Roxb.)
Life history	:	It is widely distributed in India. It feeds on the foliage of the host plants, devouring young leaves almost entirely and skeletonizing the leaves. It is also known to gnaw the bark of young twigs when leaves become scarce. Pupation occurs in soil. There are several generations during a year. The larva of this moth is polyphagous on the foliage of several trees.
Damage Symptoms	&	Defoliation. The larvae and adults start feeding voraciously, defoliating the leaf completely.
Control measures	:	Endosulfan, a broad-spectrum insecticide and synthetic pyrethroids, which have a quick knock down property like cypermethrin and deltamethrin are very effective against defoliator.

Eupterote geminate On *Gmelina arborea* bark and leaf (Roxb.)



Eupterote geminate Wlk. Adult moth



- Tree species : Bamboo
- Insect species : *Pyrausta coclesalis* Wlk.
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Dendrocalamus strictus*, *D. giganteus*,
Bambusa nutans, *B. vulgaris*,
Cephalostachym pergracile.
- Life history : It is one of the most important pests in bamboo nurseries. There are 7-8 larvae instars. The light green larvae feed in groups for the first two instars and individually after the third instar. After consuming about half of the leaf tissues, they give up the old leaf cases and make new ones. From the sixth instar onwards, they change cases almost every day. Feeding begins in the upper crown and move downwards. Larval stage varies from 18 to 36 days. When fully grown, the larvae pupate in cocoons made between the rolled leaves
- Damage & Symptoms : The damage is caused by larvae, which tie leaves together as leaf cases and feed on the upper tissues of the leaves. The overwintering larvae undergo hibernation from the end of the September to beginning of May and pupate for 10 to 15 days.
- Control measures : Application of 0.2% Fenitrothion or 1 % Carbaryl in water is effective for the control of this pest. Entomopathogenic fungi namely, *M. anisopliae* and *B. bassiana* spore suspension at the concentration of 1×10^7 spores/ml should be sprayed if population is about 20 individuals of I-VII instar larvae.

Pyrausta coclesalis infected leaf



Pyrausta coclesalis Adult



- Tree species : Bamboo
- Insect species : *Algedonia bambucivora* Moore
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Dendrocalamus strictus*, *D. giganteus*,
Bambusa nutans, *B. vulgaris*,
- Life history : It is one of the most important pests in bamboo nurseries. The species is distributed throughout the Indian sub continent and South – East- Asia. In India, it is a common pest of *Dendrocalamus strictus*, *D. giganteus*, *Bambusa nutans*, *B. vulgaris*, *Cephalostachym pergracile*.
- Damage & Symptoms : The lesser leaf roller. It is also a pest of bamboos. Larvae are injurious leaf roller of *B. nutans*, *D. giganteus*, *D. strictus*, and *B vulgaris* particularly during July to October. The smooth naked pinkish larvae feed inside the rolled leaves of the host and eventually they pupate inside the leaf roll. There are four generations in a year.
- Control measures : Applying of 0.2% Fenitrothion or 1 % Carbaryl in water gives effective control.

Algedonia bambucivora Adult



Algedonia bambucivora Pupae on host leaves



- Tree species : Bamboo
- Insect species : *Massepha absolutalis* Wlk.
- Order : Lepidoptera
- Family : Notodontidae
- Hosts : *Dendrocalamus strictus*
- Life history : The pest is fairly abundant in the monsoon and passes the winter in the larval stage inside a boat-shaped case made of leaves. Moths emerge only in the following spring
- Damage & Symptoms : This insect feeds on *D. strictus* in association with *P. coclesalis* and *Algedonia bambucivora* .
- Control measures : The larvae is parasitized by some species of *Chelonus*, *Brachymeria* and *Tetrastichus*

Massepha absolutalis Larva



Tree species	:	Bamboo
Insect species	:	<i>Hieroglyphus banian</i> Fabricius
Order	:	Orthoptera
Family	:	Acrididae
Hosts	:	<i>Dendrocalamus strictus</i>
Life history	:	The adult is 35-52 mm long and light green in colour. There are five prominent sulci on the protergum of the adult. There is one generation per year, and eggs overwinter in capsule in the soil from August to April. Nymphs hatch in April and May, and there are six or seven instars. Nymphs are not very active and feed in groups on small bamboo plants and some grass at the first instar and then, move on to bigger plants. Adults emerge during June-August.
Damage Symptoms	&	They frequently affect <i>Dendrocalamus strictus</i> . They are green and brown in colour. The adults of <i>H. banian</i> lay eggs in the soil in November and hatch during June and July. They are serious defoliator of bamboos.
Control measures	:	Dusting hoppers and adults with 5% Carbaryl gives effective control. In addition, light trap collection gives good number of reduction in population of grasshoppers.

Hieroglyphus banian on host leaf



- Tree species : Bamboo
- Insect species : *Eucyrtus concinus* (Haan)
- Order : Orthoptera
- Family : Gryllidae
- Hosts : *Dendrocalamus strictus*, *Bambusa nutans*
- Life history : Small green gryllids lay eggs in leaf sheaths of bamboo leaves in series of rows. Eggs hatch within a week. There are four to five nymphal instars. Life cycle completes within a month.
- Damage & Symptoms : They frequently affect *Dendrocalamus strictus*. They are green and brown in colour. The adults of *H. banyan* lay eggs in the soil in November and hatch during June and July. They are serious defoliator of bamboos.
- Control measures : Dusting hoppers and adults with 5% Carbaryl gives effective control. In addition, light trap collection gives good number of reduction in population of grasshoppers.

Eucyrtus concinus on bamboo leaf



Eucyrtus concinus infested plant



- Tree species : Bamboo
- Insect species : *Oregma bambusae* Buchet
- Order : Homoptera
- Family : Aphidae
- Hosts : *Dendrocalamus strictus*, *D. giganteus*,
Bambusa nutans, *B. tulda*, *B. vulgaris*,
- Life history : It is one the serious pests of bamboos. The aphids have been recorded from 16 species of bamboos.
- Damage & Symptoms : Nymphs and adults feed on bamboo shoots by sucking sap. The wingless sapsucker depends for its dispersal and migration on mechanical means such as strong breeze and oscillations of bamboos, or on birds and terrestrial animals. The dispersed adults settle down on new shoots by piercing the tissues. Subsequently through rapid multiplication, cluster formation takes places around the mother aphid and the whole shoot gets covered. In heavy outbreaks, aphids usually cover the entire shoots. A large population of aphids caused the plants to be smothered with a black fungus which grows on grows on the honeydew secreted by the aphid. Infestation by this aphids caused yellowing of leaves.
- Control measures : Kerosene oil in soap emulsion can be used as control measure. Foliar spray of 0.04 % Demacron or Rogor and 0.02% Fenetrothion is effective to control the pest. *Scymnus sp* predator on bamboo aphids can be used for the management of Aphids

Oregma bambusae infection on bamboo leaf



- Tree species : Bamboo
- Insect species : *Notobiyus meleagris* Fabricius
- Order : Hemiptera
- Family : Coreidae
- Hosts : *Dendrocalamus* spp.
- Life history : It prefers sympodia bamboos and prefers *Dendrocalamus* spp. There are five generations per year. Adults will undergo diapause during winter season. Eggs are deposited on shoot sheath and arranged in rows.
- Damage & Symptoms : Adults and nymphs feed mostly on shoots at 1 -2 m high and emit strong repellent odour when disturbed. Some birds, spiders and wasps are found preying on nymphs and adults.
- Control measures : Application of 0.2% Fenitrothion or 1 % Carbaryl in water is effective for the control of this pest. Entomopathogenic fungus, *B. bassiana* spore suspension at the concentration of 1×10^7 spores/ml should be sprayed to control this pest.

Notobius meleagris Adult



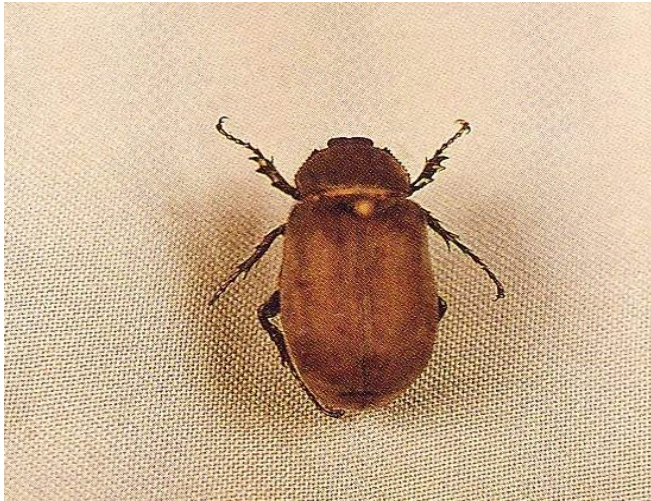
Tree species	:	Bamboo
Insect species	:	<i>Oligia vulgaris</i> Butler
Order	:	Lepidoptera
Family	:	Noctuidae
Hosts	:	<i>Dendrocalamus strictus</i> , <i>D. giganteus</i> , <i>Bambusa nutans</i> , <i>B. vulgaris</i> ,
Life history	:	There are six larval instars and pupate inside the shoot or dropped into the soil and pupate. Pupal period lasts for about 3-4 weeks. Adult moths are active at night, with strong phototaxis.
Damage Symptoms	&	This is shooting boring Noctuid. Larvae are light purple in colour. There is one generation per year. Young larvae feed on wild grass as intermediate hosts. When bamboo shoots are available, the larvae mine into the shoots and feed inside and make tunnels running in different directions. It can be identified by feeding holes on sheaths.
Control measures	:	Light trapping adults and removal of damaged shoots can keep population under control.

Oligia vulgaris Moth



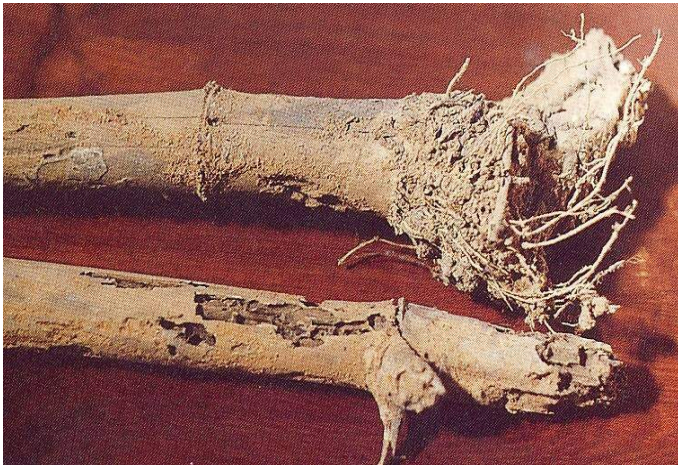
- Tree species : Bamboo
- Insect species : *Holotrichia consanguinea* Blanchard
- Order : Coleoptera
- Family : Scarabaeidae
- Hosts : *Bambusa nutans*, *B. bamboos*
- Life history : The beetle lays egg in soil. Freshly hatched larvae are creamy white. Pupation occurs in soil adult beetles emerge during pre monsoon rains.
- Damage & Symptoms : It has been reported as minor pest attacking rhizomes of *Bambusa bambos*, *B. nutans* etc. The beetle lays egg in soil. Freshly hatched larvae feed on the roots and rhizomes of bamboo.
- Control measures : Mechanical control measure was suggested. spray host trees with *Carbaryl* 0.2 % or *Chlorpyrifos* 0.2% with the onset of monsoon and the spraying within 2-3 days after receipt of first showers

Holotrichia consanguinea beetle



- Tree species : Bamboo
- Insect species : *Odontotermes microdentatus* Roonwal and Sen-Sarma and *O. obesus* Rambur
- Order : Isoptera
- Family : Termitidae
- Hosts : *Dendrocalamus strictus*, *D. giganteus*, *Bambusa nutans*, *B. vulgaris*,
- Life history :
- Damage & Symptoms : Only a very few species of termites are known to attack on the root system bamboo in nurseries. Of these *Odontotermes microdentatus* and *O. obesus* are two mound building important pests. They attack on the roots of germinating seedlings and rhizomes of bamboos. The damaged occurred below the ground level.
- Control measures : Application of soil insecticides such as 50 ml aldrin 30EC or 75ml of Chlorpyrifos 20EC, @ 5 litres / square metre on to the surface of the nursery bed area, gives adequate protection to nursery seedlings not only against termites but also against other soil insect pests. Commercially available neem seed kernel extract (Neemazal – F) should be prepared at the concentration of 0.007% and sprayed in the field for 50% mortality.

***Odontotermes microdentatus* and *O. obesus*
infestation on bamboo**



Tree species	:	<i>Tectona grandis</i> L. f
Insect species	:	<i>Eutectona machaeralis</i> Walker 1859
Order	:	Lepidoptera
Family	:	Pyralidae
Hosts	:	<i>Tectona grandis</i>
Life history	:	Female moths lays an average of 250 eggs singly on ventral side of the leaves. There are 5 larval instars. The larvae consume whole green matter of the leaf leaving the vein network intact thereby skeletonizing the leaf. Pupation takes place within white oval shaped flat cocoon on green or fallen dry teak leaves. Total developmental period is one month.
Damage Symptoms	&	<i>Eutectona machaeralis</i> is a major pest of teak. Complete defoliation by the pests results in more or less leaflessness during most of the growing period. Outbreaks of this species occur in most years with exceptionally heavy build-up in some years. Although the insect is present throughout the year, outbreaks develop towards the end of the growing season before normal leaf shedding
Control measures	:	Fresh leaf extracts of <i>Calotropis procera</i> , <i>Datura metal</i> and <i>Azadirachta indica</i> were found to be most effective against teak skeletonizer. It can be controlled by quinalphos 25 EC 0.05% spray.

Eutectona machaeralis infected teak leaves



- Tree species : *Tectona grandis* L. f
- Insect species : *Hyblaea puera* (Cramer, 1777)
- Order : Lepidoptera
- Family : Hyblaeidae
- Hosts : *Tectona grandis*, *Alstonia scholaris*; *Callicarpa* spp.; *Pterocarpus macrocarpus*
- Life history : Eggs are laid on tender new leaves, placed singly near the veins. They are oval, flat, and white . About 500 eggs are laid per female. Larvae hatch in about 2 days. There are five larval instars. The first and second instars mainly feed on the leaf surface. Third instar, the larva cuts out a leaf flap, folds it over, fastens it with silk, and feeds from within. The entire leaf, excluding the major veins of tender leaves, is eaten. The larval period lasts 10-12 days. The mature larvae descend to the ground on silken threads and pupate under a thin layer of leaf litter or soil. The average pupal period lasts six to eight days.
- Damage & Symptoms : *H. puera* is a serious pest to *T. grandis*, causes considerable loss in increment and quality. The larvae create shelters for themselves by cutting pieces of leaves and rolling them together. They come out of the shelters to feed by night. Initially, the larvae defoliate seedlings and considerable defoliation of young trees, 2-5 years old, in the plantations. Periodic outbreaks occur in March-April and September-October. The larvae pupate on the leaves by curling the leaf tips over their body.
- Control measures : The nurseries are to be dusted with 10 % BHC powder at short intervals during an outbreak

Hyblaea puera Adult



Hyblaea puera infected leaf



Hyblaea puera larva



Tree species	:	<i>Tectona grandis</i> L. f
Insect species	:	<i>Xyleutes ceramica</i> Walker
Order	:	Lepidoptera
Family	:	Cossidae
Hosts	:	<i>Tectona grandis</i> , <i>Callicarpa</i> spp.; <i>Clerodendrum</i> spp.; <i>Gmelina</i> spp.; <i>Erythrina</i> spp.; <i>Sesbania</i> spp.; <i>Spathodea</i> spp.; <i>Duabanga</i> spp.
Life history	:	Moth lays thousand soft eggs in the crevices of bark. Incubation period is 10 days. Larval period takes 4 months. Pupation takes 3-4 weeks.
Damage & Symptoms	:	This species of moth is considered by some as “teak’s worst and least understood pest”. The larvae of this moth bore into the heartwood of teak where it causes significant damage. It is known to feed on species of <i>Callicarpa</i> , <i>Clerodendrum</i> , <i>Gmelina</i> , <i>Tectona</i> (Verbenaceae), <i>Erythrina</i> , <i>Sesbania</i> (Leguminosae), <i>Spathodea</i> (Bignoniaceae), and <i>Duabanga</i> (Sonneratiaceae)
Control measures	:	Application of 0.2% quinalphos at the site of infection after removing the frass is highly effective

Xyleutes ceramica Moth



Tree species	:	<i>Tectona grandis</i> L. f
Insect species	:	<i>Zeuzera coffeae</i> Nietner, 1861
Order	:	Lepidoptera
Family	:	Cossidae
Hosts	:	<i>Tectona grandis</i> , <i>Coffea</i> spp.; <i>Eucalyptus deglupta</i> ; <i>Terminalia brassii</i> ; <i>Acalypha</i> spp.; <i>Psidium</i> spp.; <i>Crataegus</i> spp.; <i>Citrus</i> spp.; <i>Theobroma</i> spp.; <i>Casuarina</i> spp
Life history	:	Reddish yellow eggs laid in strings on the bark. Incubation period is 10 days. Larvae spin a shelter network of silk. . Larval period is 60-120 days. Pupal period lasts for 3 weeks. The moth is white with pairs of small black dots on the thorax.
Damage Symptoms	&	Larval wood moths tunnel the heartwood of living trees. They create large holes in the timber which degrades its value. The development from an egg to an adult can take several years during which the larvae create a J-shaped tunnel of very large diameter. The large holes usually cause smaller trees to become more susceptible to wind damage. Adult wood moths are some of the largest and heaviest moths in the world with a body weight up to 25 grams. Cossids are not common and are usually considered minor pests but their damage is usually discovered in the saw mill.
Control measures	:	Application of 0.2% quinalphos at the site of infection after removing the frass is highly effective.

Zeuzera coffeae infecting the host leaf



Zeuzera coffeae larva



Zeuzera coffeae Moth



- Tree species : *Tectona grandis* L. f
- Insect species : *Dihammus cervinus*
Acalolepta cervina (Hope)
- Order : Coleoptera
- Family : Cerambycidae
- Hosts : *Tectona grandis*
- Life history : One femal lays 60 eggs . Incubation period is 5 days. Larval period lasts for 3 months. Pupal period is 14-19 days. Emergence of adults is during April.
- Damage & Symptoms : Adults feed on the bark of teak saplings 2-8 years old and lay eggs on the stem beneath the bark, near ground level. Feeding and tunnelling by larvae causes formation of a bulging canker all around the stem at which point the saplings may break.
- Control measures : The grubs feed on roots in the nursery. Apply phorate 10 G or carbofuran 3G @ two teaspoon full mixed with fine sand

Dihammus cervinus , *Acalolepta cervina* Adult



- Tree species : *Tectona grandis* L. f
- Insect species : *Alcidodes crassus* Poscoe.
- Order : Coleoptera
- Family : Curculionidae
- Hosts : *Tectona grandis*, *Gmelina arborea*
- Life history : Eggs laid in April onwards. Life cycle completed within 6-9 weeks.
- Damage & Symptoms : *Alcidodes ludificator* feeds on the twigs and leaves (midribs) of teak. It is a small beetle that lays eggs in galleries made in the green shoot of seedlings in nurseries causing dieback or death of seedlings.
- Control measures : Clear felling of all badly affected trees, extraction of all trees with low infestation during routine a silvicultural thinning and 30 percent enforcing measures to prevent mechanical injuries to the trees.

Alcidodes crassus adult beetles



- Tree species : *Tectona grandis* L. f
- Insect species : *Dichocrocis punctiferalis* (Guenée)
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Tectona grandis*
- Life history : Eggs are laid in spring. The larva varies in colour from reddish to greenish with black head.. Pupation occur in silk cocoon and moth emerges during July.
- Damage & Symptoms : *Dichocrocis punctiferalis* is a main pest of flowering shoots and young fruits of teak.
- Control measures : Application of 0.2% quinalphos at the site of infection after removing the frass is highly effective.

Dichocrocis punctiferalis Larvae



Dichocrocis punctiferalis Adult



- Tree species : *Tectona grandis* L. f
- Insect species : *Hypsipyla robusta* Moore
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Tectona grandis*, *Cedrella* spp.; *Chukrasia tabularis*; *Khaya* spp.; *Swietenia mahogani*; *Swietenia macrophylla*
- Life history : Female lays 400-600 eggs. Larvae feed on all parts. Life cycle lasts for 24-29 days. (egg 4-5, larval 1 days pupa 8-12 days. Moth appears in the month of March.
- Damage & Symptoms : *Hypsipyla robusta* caterpillars bore into the tips and shoots of several species of high quality timber species. They feed on a range of plants in Meliaceae and Verbenaceae including *Swietenia macrophylla*, *Toona ciliata*, *Cedrella* spp. and *Tectona* spp. The caterpillars destroy the apical shoot causing the tree to form many side branches and frequently a deformed trunk. This leads to a decreased value of the timber. This species mainly attacks trees in high light areas, hence the biggest effects are observed in young planted forests, particularly those planted with a single species. Young understorey trees in naturally regenerating forests suffer far less damage. Plantings of mahogany have been almost completely abandoned in some areas because of the damage caused by this insect.
- Control measures : Application of 0.5% quinalphos at the site of infection after removing the frass is highly effective.

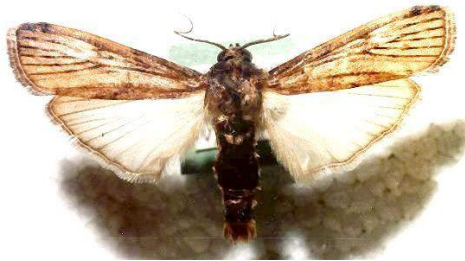
Hypsipyla robusta Adult



Hypsipyla robusta Larvae

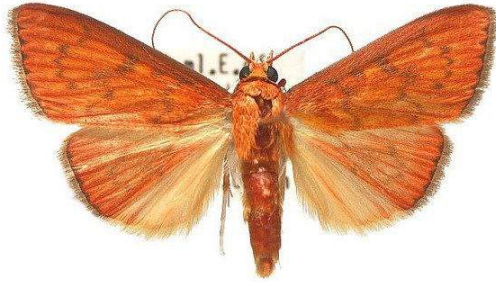


Hypsipyla robusta Moth



- Tree species : *Tectona grandis* L. f
- Insect species : *Paliga damastesalis* Walker
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Tectona grandis*
- Life history :
- Damage & Symptoms : *Paliga damastesalis* is a pest of teak in native plantations. It has been suggested that species identified as *Eutectona machaeralis* but are actually *P. damastesalis*
- Control measures : When the tops of young trees are killed, they are cut down to ground level to get a single leading shoot to grow into a good bole. The nurseries are to be dusted with 10 % BHC powder at short intervals during an outbreak

Paliga damastesalis Adult



- Tree species : *Tectona grandis* L. f
- Insect species : *Phassus signifier* Walk.
- Order : Lepidoptera
- Family : Hepialidae
- Hosts : *Tectona grandis*
- Life history : Eggs are laid in large numbers. Life cycle is annual. Adults emerge during May and June.
- Damage & Symptoms : *Phassus signifier* is a large caterpillar that feeds on teak saplings. They make a tunnel in the central pith and emerge at night to feed on the bark under a cover of mat of frass, silk and wood dust. Such feeding causes a canker to form at which point the stem may break.
- Control measures : Application of 0.2% quinalphos at the site of infection after removing the frass is highly effective.

Phassus signifera Moth



Tree species	:	<i>Leucaena leucocephala</i> (Lam.) de Wit.
Insect species	:	Psyllid <i>Heteropsylla cubana</i> Crawford
Order	:	Homoptera
Family	:	Psyllidae
Hosts	:	<i>Leucaena leucocephala</i> (Lam.) de Wit
Life history	:	The adult psyllid is difficult to see with the naked eye and is about 2 mm long and yellow in colour. Eggs are laid between new leaves on young shoot tips. It takes 10-20 days to go from egg to adult stage. The insect is common on the young growth leucaena trees where the eggs, wingless nymphs and winged adults often occur together.
Damage Symptoms	&	: Because of the difficulty of detecting this insect with the naked eye, its presence may not be noticed until damage is evident. Adults and nymphs inflict injury to leucaena plants by de-sapping young shoots, leaves and flowering structures. This can cause wilting of foliage, especially the new shoots and, complete defoliation of susceptible leucaena varieties. In severe cases, plants die.
Control measures	:	<i>Menochilus sexmaculatus</i> , a coccinellid predator is found to be effective on <i>Leucaena</i> psyllid, <i>Heteropsylla cubana</i>

***Heteropsylla cubana* infected leaves**



Adult Psyllid



***Heteropsylla cubana* infestation**



- Tree species : *Pterocarpus marsupium* Roxburgh
- Insect species : *Neolithocolletis pentadesma* Meyrick
- Order : Lepidoptera
- Family : Gracillariidae
- Hosts : *Pterocarpus marsupium* Roxburgh
- Life history :
- Damage & Symptoms : Leaf miner ,*Neolithocolletis pentadesma* is a species of leaf miner that causes repeated outbreaks on *Pterocarpus marsupium*. Severe attacks result in premature shedding of leaves.
- Control measures : The natural enemies included an egg predator (larva of Coniopterygidae), larval predators (ants and larvae of Chrysopidae) and several species of parasitoids of the family Eulophidae.

Neolithocolletis pentadesma infestation
on
Pterocarpus marsupium



- Tree species : *Albizia odoratissima* (L.f.) Benth.
- Insect species : *Striglina scitaria* Walker
- Order : Lepidoptera
- Family : Thyrididae
- Hosts : *Albizia odoratissima*, *Terminalia*, *Dalbergia*
- Life history : Larvae are stout, thick and yellowish in colour with black head. Adult moth is orange in colour
- Damage & Symptoms : Larvae folds leaf lets and feed from within. Some times nearby leaflets are also webbed together as a shelter while feeding.
- Control measures : 0.05% monocrotophos or 0.076% dichlorvos spray may give good result.

Adult of *Striglina scitaris*



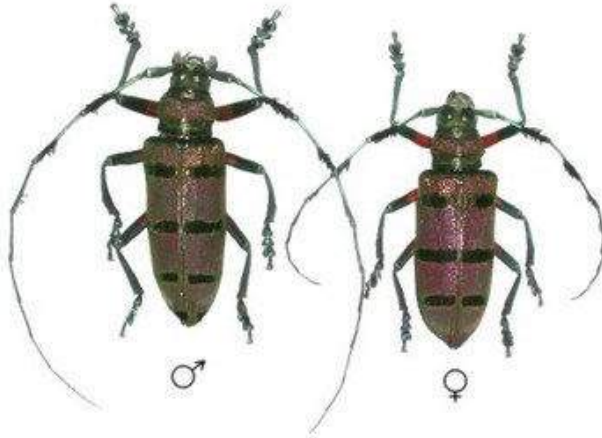
- Tree species : *Albizia odoratissima* (L.f.) Benth.
- Insect species : *Psylla oblonga* Mill
- Order : Homoptera
- Family : Psyllidae
- Hosts : *Albizia, Bauhinia* etc.,
- Life history : A female lay 1500 eggs, egg hatch in 3-5 days, nymphal period lasts for 10-30 days. There are 11 generations in a year
- Damage & Symptoms : A psyllid is a most serious problem lending epicarmic shoot formation and stunting and seedling die back.
- Control measures : Fomnightly application of 0.05% of Nuvacron (Monocrotophos) effectively control this pest.

***Psylla oblonga* Adult**



- Tree species : *Albizia odoratissima* (L.f.) Benth.
- Insect species : *Diastocera wallichii* (Hope)
- Order : Coleoptera
- Family : Cermbycidae
- Hosts : *Albizia odoratissima*
- Life history :
- Damage & Symptoms : The beetle feeds on young shoots gnawing the bark.. It is a dull metallic bluish or bronzy green above and brilliant red below, the elytran with a round spot and two transverse band of velvety black, the antenna with muffs of long silky black pubescence.
- Control measures : Application of phorate granules found effective against this beetles.

Adult beetles of *Diastocera wallichii*



- Tree species : *Syzygium cuminii* Skeels
- Insect species : *Milionia basalis* Walk.
- Order : Lepidoptera
- Family : Geometridae
- Hosts : *Syzygium cuminii*
- Life history : Oviposition is on the foliage of the host plant. The larva has a prominent orange head and anal region, the rest of the body is bluish black with two broad lateral bands of orange and several dorsal and ventral white longitudinal lines that interact with reticulate transverse boxes of white on each segment. The spiracles appear as dark dots within the orange bands. The mature larva lowers itself on a thread from the tree to the ground where it pupates about 5cm deep in the soil. The moth can establish in plantations of these in the lowlands.
- Damage & Symptoms : Larvae feed on leaves and most damages occur in young plantation .
- Control measures : The egg parasitoid *Trichogramma minutus* found very effective.

Milionia basalis Adult



- Tree species : *Mitragyna speciosa* Korth
- Insect species : *Spodoptera litura* (F.)
- Order : Lepidoptera
- Family : Nctuidae
- Hosts : More than 120 species
- Life history : It lays 300-1000 eggs. Larval period is 14-21 days with 5 larval instars. Pupal period is one week. Adult femal lays eggs after two days of emergence.
- Damage & Symptoms : Defoliator. This pest feeds primarily on leaves.
- Control measures : Pheromone baited traps and light traps are widely used. Spodptera NPV is very effective against this pest.

Spodoptera litura Adult



Spodoptera litura Larva



- Tree species : *Dolichandrone crisper* Seem
- Insect species : *Eoreuma loftini* Dyar
- Order : Lepidoptera
- Family : Pyralidae
- Hosts : *Dolichandrone* and sugarcane
- Life history : The eggs are laid in masses of 5-100, Larvae are also cream in colour with four parallel purple- red lines along the body. The head capsule is orange-brown. Larvae undergo 5-6 molts. Pupae are about 2 cm long and are orange- brown with small tubercles (projections) at the posterior of the abdomen. The moth is about 1.25-2.0 cm long and creamy white.
- Damage & Symptoms : Eggs can be detected on the underside of the leaves, mainly dry ones. Adult emergence holes can also be seen on infested stalks. Infested plants suffer poor growth and their leaves turn yellow. Heavily infested plants ultimately die, and evidence of larval feeding can be seen on the stalks.
- Control measures : Confirm® (tebufenozide), an insect growth regulator (IGR), is currently the only insecticide widely used against *E. loftini*. Good irrigation is a very important farming practice to minimize the chances of adults. *Pheromone traps* are baited with a synthetic female sex pheromone lure helps to collect and kill the female adults.

Eoreuma loftini moth



- Tree species : *Melia dubia* Cav.
- Insect species : *Pulvinaria maxima* Green
- Order : Hemiptera
- Family : Coccidae
- Hosts : *Melia dubia*
- Life history : The female is 8-9 mm long with soft and leathery body. The adult insect is a dark brown with white waxy bloom. A large egg mass 15-16 mm long is produced containing 600-900 eggs. Hatching takes about 2 weeks. Winged males fully developed in about 5 weeks. Life cycle takes 6-8 weeks. Six generations may occur in a year.
- Damage & Symptoms : It is a serious pest of neem. An infested tree in an advanced stage of attack is recognized by the thick coating of white mealy patches, the egg sacs on the foliage, shoots and bark.
- Control measures : Spraying of Monocrotophos (0.0.2%) is found to be very effective to control the pest in the nurseries and plantations.

Pulvinaria maxima on host plant



- Tree species : *Anthocephalus cadamba* (Roxb.)
- Insect species : *Lymantria mathura* Moore
- Order : Lepidoptera
- Family : Lymantriidae
- Hosts : *Anthocephalus cadamba*
- Life history : First-instar larvae began to hatch in late May, and adult emergence was usually observed from mid-August to mid-September. The female usually laid eggs in crevices of tree trunks
- Damage & Symptoms : *L. Mathura* is one of the most important defoliators of deciduous trees. Its outbreaks usually occur over large areas and often result in complete defoliation of forests. Pest damage does not usually kill trees but lead to significant loss of vigour. During outbreaks, pest populations may reach more than 1000 caterpillars per tree. Furthermore, outbreaks of *L. Mathura* are also very often followed by outbreaks of wood borers (*Scolytidae*, *Cerambycidae* and others). These pests are able to kill trees which are heavily stressed by *L. mathura*
- Control measures : *Cotesia melanoscellus* [*C. melanoscela*] was the dominant larval parasitoid. The highest parasitism of 28.6% by *Brachymeria lasus* was recorded from the pupal collection with total parasitism of 48.1% in 1992. Combined mortality due to NPV and fungus (*Beauveria* sp.) was up to 60.3%. Young instar larvae (1st to 3rd) were mainly killed by the pathogen, indicating transovarial infection in the host

Lymantria mathura adults



Tree species	:	<i>Aquilaria malaccensis</i> Lamk
Insect species	:	<i>Heortia vitessoides</i> (Moore)
Order	:	Lepidoptera
Family	:	<i>Pyralidae</i>
Hosts	:	<i>Aquilaria malaccensis</i> Lamk
Life history	:	The caterpillars of this species are pale green with a broad knobby black line along each side. Their head is brown. The caterpillars drop on silk threads if disturbed. When mature, the caterpillars descend and pupate in the soil. The adults have a striking pattern on the forewings of black on pale yellow. The hindwings are white with a broad black margin. The moths have a yellow and black banded abdomen.. The eggs are yellowish-green, and are flattened. They are laid in an overlapping cluster, like tiles on a roof.
Damage Symptoms	&	The pest being active from March to mid-November, has seven to eight overlapping generations in year. There are five larval instars. The caterpillars live in a group in a shelter made by joining a number of leaves together with silk. Pupation takes place below soil surface. In severe infestation, the pest completely denuded the leaves
Control measures	:	Control of the pest has being attempted using the entomopatogenic fungus <i>Beauveria bassiana</i> .

Heortia vitessoides infested host



Heortia vitessoides larvae

Heortia vitessoides
Adult



Tree species	:	<i>Aquilaria malaccensis</i> Lamk
Insect species	:	<i>Zeuzera conferta</i> Walker
Order	:	Lepidoptera
Family	:	Cossidae
Hosts	:	<i>Aquilaria malaccensis</i>
Life history	:	In the male the forewings have the black spots strongest on the veins rather than between them, and there is a distinctly more opaque white zone, free of black spots, at the end of the cell. In the female there are more typical transverse black striae, but again a zone free of black spots at the end of the cell.
Damage Symptoms	&	The stem borer is recognized as a pest of the mangroves.
Control measures	:	No control is needed and is beneficial

***Zeuzera conferta* larva tunneling the host**



***Zeuzera conferta* infected tree**

Tree species	:	<i>Emblca officinalis</i> Gaertn.
Insect species	:	<i>Betouosa stylophora</i> Swinhoe
Order	:	Lepidoptera
Family	:	Thyrididae
Hosts	:	<i>Emblca officinalis</i>
Life history	:	The larva, a hairy caterpillar remains concealed below the leaves. It is bright
Damage Symptoms	&	The emerged larvae of apical twig gall maker [<i>Betouosa stylophora</i> Swinhoe (Thyrididae: Lepidoptera)] penetrate into the new growth of twigs which result into a gall which resembles like "Snake chamber's flute" at the apices of growing twigs. The infestation adversely affected the growth of twigs. The infestation commenced from first fortnight of June and continued till the end of December. Damage intensity due to <i>B. stylophora</i> is relatively high during second fortnight of July to first fortnight of November.
Control measures	:	Cut the infected apices and give a prophylactic spray of systemic insecticide like rogor 0.03%

***Betusa stylophora* infected host**



***Betusa stylophora* on bark**



***Betusa stylophora* gall**

- Tree species : *Emblica officinalis* Gaertn.
- Insect species : *Nipaecoccus vastator* Maskell
- Order : Homoptera
- Family : Pseudococcidae
- Hosts : *Emblica officinalis*
- Life history : The mealybug colonizes on the host's branches, twigs, shoots, leaves, flower buds and fruits, and feed on roots. From these parts, the mealybug sucks up the plant sap, causing curling and dwarfing of the terminal growth, abortion of flowers, and yellowing of leaves and dropping of fruits
- Damage & Symptoms : Infests leaves and tender shoots. It is found active throughout year, the peak being June and November.
- Control measures : Dimethoate 30 EC, Confidor 17.8 SL, and Profenofos 50 EC were found highly effective

Nipaecoccus vastator infestation on *Emblica officinalis*



- Tree species : *Emblica officinalis* Gaertn.
- Insect species : *Cerciaphis emblica* Patel and Kulkarni
- Order : Homoptera
- Family : Aphididae
- Hosts : *Emblica, Areca, Tamarindus, Jatropha*
- Life history :
- Damage & Symptoms : They are seen as large colonies on the midrib of the compound leaves and tender shoots. The population of aphids initiates from April, then increase gradually during May and June and show peak activity during June.
- Control measures : Dimethoate 30 EC, Confidor 17.8 SL, and Profenofos 50 EC were found highly effective at 0.06, 0.036, and 0.1 per cent concentration .

Cerciaphis emblica* infestation on *Emblica officinalis



- Tree species : *Santalum album* L.
- Insect species : *Zeuzera coffeae* Nietner
- Order : Lepidoptera
- Family : Cossidae
- Hosts : *Santalum.*, *Tectona*, *Swietenia*, *Grevillea*,
Casuarina etc
- Life history : Both wings in the male have the spaces between the veins filled with a regular array of fine but rather weak black striae. In the female the striae are more definite, more regular than in *conferta*, but do not extend right up to the veins in each space; there is a characteristic large black spot in the forewing cell.
- Damage & Symptoms : Larval wood moths tunnel the heartwood of living trees. They create large holes in the timber which degrades its value. The development from an egg to an adult can take several years during which the larvae create a J-shaped tunnel of very large diameter. The large holes usually cause smaller trees to become more susceptible to wind damage. Adult wood moths are some of the largest and heaviest moths in the world with a body weight up to 25 grams. Cossids are not common and are usually considered minor pests but their damage is usually discovered in the saw mill.
- Control measures : Introduction of insecticide into the tunnel and blocking the hole with paradichlorobenzene.

Zeuzera coffeae infestation



Zeuzera coffeae infected stem



- Tree species : *Pongamia pinnata* (L.) Pierre
- Insect species : *Acrocercops* sp. Leaf miner
- Order : Lepidoptera
- Family : Gracillariidae
- Hosts : *Pongamia pinnata*
- Life history : The larva is a leaf minor and cause white blotches on Pongamia leaf. The larva lives between the two epidermal layers of the leaf inside the blotches. 5-8 blotches can be located in a single leaf. Adult is a minute moth and silvery grey in colour.
- Damage & Symptoms : Leaf mining by the larvae causes white blotches. Premature shedding of the leaves, slow or stunted growth, loss of leaves, partial or complete drying of seedlings.
- Control measures : 0.06% of dimethote or 0.05% of monocrotophos can be given as a prophylactic spray soon after the rain.

Leaf miner infestation *Pongamia pinnata*



Tree species	:	<i>Pongamia pinnata</i> (L.) Pierre
Insect species	:	<i>Parnara mathias</i> (Fabricius)
Order	:	Lepidoptera
Family	:	Hesperiidae
Hosts	:	<i>Pongamia pinnata</i>
Life history	:	Incidence of this caterpillar is usually found when the seedlings put forth new tender leaves after a rain. The larva is dark brown or black in colour. Larva is thick, stout and characterized by a prominent head capsule. Adult is dark brown butterfly with two white spots on the fore-wings. It is popularly known as skipper butterfly.
Damage Symptoms	&	Defoliation occurs. Larva folds the leaves fastening the edges together with the help of silken threads produced by it and feeds from the edges. Generally a single larva is found in one fold. Newly emerged larvae feed on the tender leaves. Older leaves depend on mature leaves also. Feeding by the larvae and adults as well as the egg laying behaviour of the adults cause drying of the growing apical stem region resulting in development of branching, partial or complete drying of seedlings.
Control measures	:	0.05% monocrotophos spray or 0.076% dichlorvos.

Adult—*Parnara mathias*



- Tree species : *EUCALYPTUS*
- Insect species : *Leptocybe invasa* Fisher & LaSalle
- Order : Hymenoptera
- Family : Eulophidae
- Hosts : *EUCALYPTUS*
- Life history : An invasive eulophid wasp species. Adult female oviposits in young meristems, which include midribs of juvenile leaves. Oviposition scars are visible on both sides of the midribs, particularly on tender leaves. As the egg hatches, the larvae develops inside the plant tissue within the larval chamber, deriving its nutrition from the surrounding plant tissue. Characteristically cylindrical galls develop on either young stems or petioles or midribs. Mature galls are usually deep pink or red. Pupation also occurs within galls and adult wasps emerge by cutting a hole through the gall wall. Thelytokous reproduction .
- Damage & Symptoms : Gall formation occurs. Infested growing shoot terminals and midribs enlarge in thickness and leaves present a contorted appearance. New leaves appearing from the gall infested shoot terminals are stunted. As adults emerge, shoot terminals and leaves become dry, resulting in retarded growth, poor stem form and loss of vigour in susceptible eucalyptus clones and seedlings.
- Control measures : Continuous monitoring, pruning and destruction of affected shoots in nursery seedlings and saplings in plantations may contain the problem. Planting of gall resistant hybrids or clones or progenies of Eucalyptus will reduce pest incidence.

***Leptocybe invasa* infestation in eucalyptus**



Adult—*Leptocybe invasa*

- Tree species : *Ailanthus excelsa* Roxb
- Insect species : *Atteva fabriciella* Swed.
- Order : Lepidoptera
- Family : Yponomeutidae
- Hosts : Ailanthus
- Life history : Larvae are dark brown and web around the tender leaves of the terminal portion of the seedling. Adult is a small moth with light orange forewings having white dots and hind wings with yellowish colour.
- Damage & Symptoms : The larvae web around the tender leaves and feed from within. They also bore into the soft tissue of the terminal growing shoot tips. Partial or complete damage to the terminal buds resulting in slow growth of seedling and development of branching.
- Control measures : 5% tobacco extract and 2% pungam oil can be sprayed alternatively in a gap of 15-20 days. 0.05% monocrotophos spray or 0.076% dichlorvos.

***Atteva fabriciella* infection on Ailanthus**



***Atteva fabriciella*—Larvae**



***Atteva fabriciella*—Adult**



- Tree species : *Ailanthus excelsa* Roxb
- Insect species : *Eligma narcissus* Cramer
- Order : Lepidoptera
- Family : Noctuidae
- Hosts : *Ailanthus malabaricus*, *Ailanthus triphysa*
- Life history : The larvae, a hairy caterpillar remains concealed below the leaves. It is bright yellow in colour with black bands which become more prominent as it grows. Pupation occurs in a boat shape pupal case attached on the stem of *Ailanthus* seedlings. Adult is brightly coloured moth with dark brown and bluish fore wings and orange hind wings having black borders.
- Damage & Symptoms : Larvae are voracious feeders and defoliate the nursery bed. Complete defoliation of seedlings result in slow or retarded seedling growth.
- Control measures : 5% tobacco extract and 2% pungam oil can be sprayed alternatively in a gap of 15-20 days. 0.05% monocrotophos spray or 0.076% dichlorvos.

Adult - *Eligma narcissus*



Larva - *Eligma narcissus*



- Tree species : *Wrightia tinctoria* Roxb
- Insect species : *Pygopsila tyres*
- Order : Lepidoptea
- Family : Pyraustidae
- Hosts :
- Life history : Early stage larvae are pale yellowish or whitish in colour with a prominent whiteband on dorsal side from head to posterior region. Early stage larvae occur freely on the tender leaves of the shoot tip whereas the late stage larva fold leaves and remain within. Adult moth dark brown in colour with prominent white spots all over wings and body.
- Damage & Symptoms : Early stage larva scrape off leaf tissues on the tender emerging young leaves at the shoot tip resulting in black necrotized patches over the tender leaves. Late stage larvae feed on mature leaves. Defoliation of young growing shoot tip result in drying of growing shoot tip and development of side branches.
- Control measures : 2% neem oil emulsion can be sprayed on young growing shoot tips to deter larva. 0.05% monocrotophos or 0.076% dichlorvos can be sprayed during severe infestation.

- Tree species : *Cassia fistula* L.
- Insect species : *Catopsilia crocale* Cramer
- Order : Lepidoptera
- Family : Pieridae
- Hosts : *Cassia siamea*
- Life history : Green sluggish larvae, with black bands running on lateral sides of the body. Adult is pale yellow actively flying butterfly.
- Damage & Symptoms : Larva defoliates the seedlings. Loss of leaves and apical growth of shoot tip occurs.
- Control measures : 0.05% monocrotophos or 0.075% dichlorvos spray can be given.

Catopsilia crocale—Adult female



Catopsilia crocale—Larva



Tree species	:	<i>Mimusops elengi</i> L.
Insect species	:	<i>Nephoteryx eugraphella</i> Ragonot
Order	:	Lepidoptera
Family	:	Phycitidae
Hosts	:	<i>Manilkara sapota</i> and <i>M.hexandra</i>
Life history	:	Larvae is light green in colour. It folds the leaf with silk thread and feed on leaf by scraping the tissues. Usually one larva resides in a leaf fold and drives away other larvae entering the leaf fold. However, in the terminal shoot region many larvae settle down each selecting one leaf. The dried terminal leaves webbed together by the larvae of <i>N.eugraphella</i> could be easily identified in the nursery beds. Pupation occurs in between the dried leaves at the shoot tip. Adult is dull brown moth.
Damage Symptoms	&	The larva folds and webs a single tender leaf and scraps the tissue from inside leaving the membranous cuticular layer. As they finish feeding one leaf, they web together nearby leaves and feed on them. Webbing and feeding by the larva at the terminal shoot tip region leads to damage and drying up of the growing tip.
Control measures	:	0.06% dimethoate or 0.01% imidacloprid or 0.076% dichlorvos can be sprayed.

Nephoteryx eugraphella—Adult



- Tree species : *Delonix regia* Boj. ex Hook.) Raf.
- Insect species : *Ascotis selenaria* Denis & Schiffermüller
- Order : Lepidoptera
- Family : Geometridae
- Hosts : *Prosopis juliflora*, *Peltophorum ferruginium*,
Terminalia sp.
- Life history : Larvae are dull green or dark brown looper with marking over the body. Adult is a grey moth with black dots over the wings.
- Damage & Symptoms : Defoliation by larvae. Young tender leaves and growing shoot tips are fed by the larvae. Loss of leaves and stunted growth of seedlings.
- Control measures : Spray of 0.05% monocrotophos or 0.076% dichlorvos

Ascotis selenaria—Adult



Ascotis selenaria—Larva



Tree species : *Casuarinia equisetifolia*
Insect species : *Indarbela tetraonis* Moore
Order : Lepidoptera
Family : Coccidae
Hosts : *Emblia officinalis*, *Casuarinia*
Life history :
Damage & Symptoms : It damages stem and branches of grown up trees by eating barkAffected
Control measures : portion should be cleared of frass and a few drops of kerosene should be applied in holes to keep this in control

Casuarinia equisetifolia infested with
Narabala tetraonis



- Tree species : *Casuarina equestifolia* L.
- Insect species : *Ferrisia virgata* Cockerell
- Order : Hemiptera
- Family : Pseudococcidae
- Hosts : *Casuarina equestifolia*
- Life history : Small oval shaped scales with white waxy fibre like secretions attach to the body. Groups of scale insect can be seen attached to the needles.
- Damage & Symptoms : Feeds on sap. Partial or complete wilting and dieback of infested seedlings.
- Control measures : Spray of 0.06% dimethoate or 0.05% methyl demeton can control the pest.

Ferrisia virgata—infestation on
Casuarina



Ferrisia virgata



- Tree species : *Casuarina equestifolia* L.
- Insect species : *Icerya purchasi* (Maskell, 1878)
- Order : Hemiptera
- Family : Margarodidae
- Hosts : Wide host range—Citrus
- Life history : Oval shaped white cottony structured scale insect with many ridge like structures on it. The anterior end has a reddish ring like marking. They occur singly or in groups of 2 or 3 attached to the stem of the seedlings.
- Damage & Symptoms : Feeds on the plant sap. Partial or complete wilting and dieback of infested seedlings. The cottony cushion scale can severely damage trees and nursery stock. Decreased tree vitality, and defoliation result from the feeding of this scale. Most damage occurs from the feeding of the early immature stages of the scale on the leaves, where they settle in rows along the midrib and veins, and on the smaller twigs. The older nymphs continue to feed, but migrate to the larger twigs, and finally, as adults, they settle on the larger branches and trunk. Added damage can result from the accumulation of sooty mold due to the honeydew excreted by the scale
- Control measures : Spray of 0.06% dimethoate or 0.05% methyl demeton can control the pest.

Icerya purchasi infestation on *Casurina*



- Tree species : *Azadirachta indica* A.Juss
- Insect species : *Megapulvinaria maxima* Green
- Order : Hemiptera
- Family : Coccidae
- Hosts : *Azadirachta indica*
- Life history : Minute scale insect settle near the leaf veins soon after emerge from egg. Nymphs suck the plant sap. Males pupate as white spot on the leaves. Females move to the base of the stem and remain aggregated. Emerging winged minute males fly down and mate with the females. Gravid female lays 300-500 eggs. Soon after oviposition the female dies.
- Damage & Symptoms : The nymphs usually suck the sap leading to complete drying of plants.
- Control measures : Spraying of 0.06% of dimethoate or 0.05% of methyl demeton may be used. 2% neem oil spray will also give good result.



Megapulvinaria maxima Green



- Tree species : *Azadirachta indica* A.Juss
- Insect species : *Laspeyresia aurantiana* Pryer
- Order : Lepidoptera
- Family : Eucosmidae
- Hosts : *Azadirachta indica*
- Life history : Larvae are green in colour remain concealed in folded apical leaves. Adult moth yellow in colour with brown patch at the wing tip.
- Damage & Symptoms : Larvae after hatching bores into the shoot and continues this habit besides defoliating terminal leaves of seedlings. The apical growing shoot develops forked branching, complete drying of leaves.
- Control measures : 0.05% monocrotophos spray or 0.076% dichlorvas can be sprayed

Laspeyresia aurantiana



Nem infested with *Laspeyresia aurantiana*



- Tree species : *Azadirachta indica* A. Juss.
- Insect species : *Helopeltis antonii* V. Signoret
- Order : Hemiptera
- Family : Miridae
- Hosts : Cashew, Neem and Tea
- Life history : It is a slender bug 6-8 mm long, with a wide black head, red thorax, black and white abdomen and greenish brown wings; on the scutellum is a long straight knobbed erect process. The egg is provided with 2 threads strongly curved which remain exposed. 2-3 eggs are deposited together. More than 200 eggs are laid by female who lives for several weeks. The orange coloured nymphs appear in 7-10 days. The total life cycle is about 3 weeks.
- Damage & Symptoms : The neem trees (*Azadirachta indica*) are affected badly during winter. Affected trees exhibit a burnt appearance. The insect sucks the juice from the tender leaves and stem, resulting in drying up of shoots. Very often the damage is confused with drought effect.
- Control measures : .Malathion 0.1% followed by monocrotophos at 0.04%, neem oil at 2%, pinnai (*Calophyllum inophyllum*) oil at 2%, and pungam (*Pongamia pinnata*) oil at 2% sprayed twice followed by another spray 15 days later, effectively reduced numbers of the pest

Helopeltis antonii Adult



Azadirachta indica infected by *Helopeltis antonii*



- Tree species : *Albizia lebbbeck* (L.) Benth.
- Insect species : *Psylla hyaline* Mathur
- Order : Homoptera
- Family : Psyllidae
- Hosts : *Albizia lebbbeck*
- Life history : Adults are greenish yellow plant lice occurring together on tender apical leaves of seedlings. Nymphs and adults remain in between the closely apposed tender leaf lets and feed on the lower surface of the leaf.
- Damage & Symptoms : Infestation results bunchy top appearance. Infested leaves curled, wrinkled with tiny depressions developed on them. The honeydew secreted by the nymphs give sooty mold and plant will die ultimately.. It occurs during March to December.
- Control measures : Spraying of 0.06% of dimethoate or 0.05% of methyl dematon may be used.

Psylla hyaline –Adult



- Tree species : *Albizia lebbbeck* (L.) Benth.
- Insect species : *Eurema hecabe* (Linnaeus, 1758)
- Order : Lepidoptera
- Family : Pieridae
- Hosts : *Cassia, Samanea*
- Life history : Larvae are small green sluggish. Adult is brightly yellow butterfly with a black border broadening at the forewing tip.
- Damage & Symptoms : Defoliation by larvae slow down the growth and complete drying of plants. They occur during September to December.
- Control measures : 0.05% monocrotophos spray or 0.076% dichlorvas can be sprayed



Eurema hecabe –Adults



Eurema hecabe –Larva



- Tree species : *Aegle marmelos* Correa
- Insect species : *Papilio demoleus* (Linnaeus, 1758)
- Order : Lepidoptera
- Family : Papilionidae
- Hosts : *Aegle marmelos*, *Limonia acidissima*
- Life history : Larvae is black with irregular white markings at early stage and turned to green in colour. The adult has black and yellow markings on its wings. It lays single eggs on tender leaves.
- Damage & Symptoms : Larvae feed on leaves and completely defoliate leads to stunted growth, loss of apical growing shoot tip resulting drying of plant.
- Control measures : 2% neem oil spray will give good effect. 0.06% of dimethoate or 0.05% of monocrotophos spray can be given.

Papilio demoleus—Adult



Papilio demoleus—Larva



- Tree species : *Acacia nilotica* (L.) Willd. ex Delile
- Insect species : *Eumeta crameri* (Westwood)
- Order : Lepidoptera
- Family : Psychidae
- Hosts : *Tamarindus, Casuarina*
- Life history : Larva make bags made of silk like substance and other materials. Pupate inside the bag. Male adults can emerge as winged moth. Females are apodous and apterous forms.
- Damage & Symptoms : The bag worm usually strips and sapling off foliage. They prune off twigs, grwong shoots and buds for making the bags. It occurs during September and October
- Control measures : 0.05% monocrotophos ifs found effective.



Eumeta crameri—Bags



- Tree species : *Acacia nilotica* (L.) Willd. ex Delile
- Insect species : *Achaea janata* Linnaeus, 1758
- Order : Lepidoptera
- Family : Noctuidae
- Hosts : *Tamarindus*
- Life history : It is looper with dark brown in colour with black spots on either side. Adults with brownish fore wings and black hind wings with blue markings.
- Damage & Symptoms : Complete defoliation results retarded growth of seedlings.
- Control measures : 0.05% monocrotophos spray or 0.076% dichlorvas can be sprayed if severe infestation is observed.



Achaea janata—Larva



Achaea janata—Adults





<http://offices.ext.vt.edu/chesterfield/programs/anr/Newsletter>

