

## Insect Pests of Agroforestry Leguminous Trees in India

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**Abstract :** This paper attempts to document the recorded arthropod pest species associated with leguminous agroforestry trees in India. The list also covers casual feeders. The compilation, from various sources including published and unpublished reports, notes, and our surveys, etc., will be of immense help to ascertain about future new records.

**Key words :** Insect pests, Leguminous trees.

Agroforestry is now regarded as the only practical approach to maintain the balances and sustain productivity of agricultural ecosystems. It also augments regulatory mechanisms against the forces of degradation and biotic stresses. In the arid agricultural ecosystem, particularly, agroforestry is the key for sustainable development (Barara and Verma, 1995). In such a set up, deep rooted and nitrogen fixing leguminous trees have special significance from the point of view of relative success, multipurpose utility and compatibility with the components of arable farming. Although entomological investigations in India started with forest entomology, yet the information on pest problems of leguminous tree species suitable for agroforestry is not available in consolidated form.

There is an urgent need for better comprehension of the pests of forest trees under agro-ecosystem with regard to changes in their economic status, the priorities of management in the agricultural set up and to formulate appropriate cost-feasible management strategies. Only some earlier reports (Beeson, 1941; Mathur and Singh, 1960; Mathur, 1964) enlist information about insect pests of forest trees but information generated thereafter is mostly scattered.

The coverage of pest fauna of arid regions, in particular is poor in most of the reports. Some reports are available on the insects associated with *P. cineraria* (Verma, 1985), *Acacia nilotica* (Pillai and Gopi, 1990; Satya Vir and Jindal, 1994), *Albizia lebbek* (Pillai *et al.*, 1991), *Acacia tortilis* (Singh and Bhandari, 1987), *Tamarindus indica* (Singh and Ahmed, 1989), *Leucaena leucocephala* (Thakur and Pillai, 1985) and *Cassia fistula* (Joshi *et al.*, 1992). Casual coverage is also done on general pest problems of forest trees (Pandey and Faruqui, 1994) and storage pests (Singh and Bhandari, 1988). This paper attempts to document the insects and other arthropod pests of leguminous trees in India. The listing is based upon field surveys and observations in the arid regions of western and southern Rajasthan, Gujarat and parts of Madhya Pradesh and the review of literature.

### Material and Methods

Field observations and notes during several surveys and visits to areas in western and southern Rajasthan, Bhuj and Panch Mahal districts of Gujarat and parts of Madhya Pradesh around Indore and Ujjain were utilized to augment the review of available litera-

ture on pest problems of 17 leguminous tree species in India, viz., *Acacia albida*, *A. auriculiformis*, *Acacia bivenosa*, *Acacia catechu*, *Acacia nilotica*, *Acacia senegal*, *Acacia tortilis*, *Albizia lebbek*, *Cassia fistula*, *Cassia siamea*, *Dalbergia sissoo*, *Delonix regia*, *Leucaena leucocephala*, *Pongamia glabra*, *Prosopis cineraria*, *Prosopis juliflora*, and *Tamarindus indica*

### Results and Discussion

The annotated list of insect and mite pests of important leguminous agroforestry trees is presented in Table 1. Most of the pests recorded happen to be minor incidental pests except the defoliators, gall forming insects, bruchids and wood borers. Termites, root grubs and orthopterans become serious pests at nursery or establishment stage. Psyllids pose particular threat to the establishment of *Leucaena leucocephala* and the gall former insects acquire considerable significance in *Prosopis cineraria*, the pods being an important source of human food in the arid regions. The pest interaction with hosts as well as the environment tends to be a key factor in the success of agroforestry systems, particularly in the arid set up where perennial nature of the system lends support to the perennation and host cross over to a multitude of pest fauna in an otherwise harsh environment. This interaction tends to be more pronounced and perceptible in silvo-pasture systems where the micro-environmental set up tends to offer favorable niches stretching over larger part of the year. Only a brief overview of the important pests involved with various leguminous tree components of the agroforestry is given hereunder.

#### Coleoptera

The attack of scarabaeid beetles poses a great menace to establishing trees particular-

ly during the rainy season when large number of them hover and settle on the trees to feed and completely denude them by defoliation. This results in great hindrance to the proper growth and establishment of young saplings. Preference of *Prosopis cineraria* over all other host plants by *Holotrichia consanguinea* is well known and is of much concern in the arid western Rajasthan with already meagre resources of nutritive forage.

The leaf beetles and other foliage feeders do not pose much problem of management, except for young plants and nursery. Most of the management problems lie with the buprestid and cerambycid stem and shoot borers. Larvae of the cerambycid *Celosternum scabrator* bore the roots of *P. cineraria* (Pandey and Faruqi, 1994). These insects also attack *A. nilotica* and other species. Some anthribiid fruit or pod borers also attack the leguminous trees but the bruchids, especially *Caryedon serratus*, are important field and storage pests in a large number of host trees. Bostrichiid borers on dead wood and felled trees, sawn timber, etc., need better management practices to keep the damage to the minimum.

#### Diptera

The gall forming cecidomyiids are most important of the insects affecting growth and pod production in *P. cineraria*. The significance of galls is further increased by the fact that several other fauna of Hymenoptera and pyralid Lepidoptera take shelter and breed in there. *Lobopteromyia* spp. severely inhibit pod formation in *Prosopis* spp.

#### Hemiptera

A host of sap sucking insects find food and shelter on leguminous tree species, particularly *Prosopis* spp. The most abundant of these are the whiteflies, membracids, mealy

Table 1. Insects pests of agroforestry leguminous trees in India

Family	Scientific Name	Common name	Status <sup>1</sup>	Remarks <sup>2</sup>
<b>COLEOPTERA</b>				
Anobiidae	<i>Lasioderma serricorne</i> Fabricius	Tobacco beetle	?	st
Anthribidae	<i>Alphitobius laevigatus</i> (Fabr.)	Fungus weevil	m	17 bore fruits
	<i>Araecerus fasciculatus</i>	Seed weevil	m	On 13
	<i>A. suturalis</i> Boheman	Fungus weevil	m	st
	<i>Uloma</i> sp.	Fungus weevil	m	st
Bostrichiidae	<i>Calopertha truncatula</i> Lesne	-	m	Timber pest
	<i>Enneadesmus forficula</i>	-	m	Timber pest
	<i>Sinoxylon crassum crassum</i> Lesne	Wood borer	m	Dead wood
	<i>S. crassum dekkanense</i> Lesne	Wood borer	s	Dead wood 1,4,5,7
	<i>S. indicus</i> Lesne	Wood borer	m	Dead wood
	<i>S. anale</i> Lesne		s	Dead wood
	<i>S. pugnax</i>		m	Dead wood
Bruchidae	<i>Bruchidius albizae</i> sp. nova	Bruchidae	s	st seeds/pods
	<i>B. andrewesi</i> Pic.	Bruchidae	?	st seeds/pods
	<i>B. minutus</i> F.	Bruchidae	?	st seeds/pods
	<i>B. pygomaculatus</i> sp. nova	Bruchidae	?	st seeds/pods
	<i>B. uberatus</i> Fahx.	Bruchidae	?	st seeds/pods
	<i>B.</i> sp.	Bruchidae	?	st seeds/pods
	<i>Bruchus bilineatopygus</i> Pic.		?	st seeds/pods
	<i>Callosobruchus chinensis</i> Linn.	Pulse weevil	m	Stored seed pest
	<i>C. maculatus</i> Fab.	Pulse weevil	m	Stored seed pest
	<i>Caryedon acaciae</i> Gyll.	Seed beetle	ms	
	<i>C. gonagra</i> (= <i>serratus</i> )	Seed beetle	s	Field & storage pest
	<i>C. prosopidis</i> sp. nova	Seed beetle	ms	Field & storage pest
Buprestidae	<i>Acmaeodera aurifera</i> Laporte & Gory	Metallic wood borer	m	Timber: 4,5,7
	<i>Agrilus</i> sp.	Metallic wood borer		
	<i>Anthaxia</i> sp.	Metallic wood borer		
	<i>Chrysobothris parvipunctata</i>	Metallic wood borer		
Cerambycidae	<i>Celosterna scabratior</i> (Fabricius)	Bark Girdler	s	Larvae root feeders
	<i>Stromatium barbatum</i> Fabricius	Stem tunneler	ms	-
Chrysomelidae	<i>Calpepla leayana</i> Latreille	Gamhar defoliator	s	
	<i>Clytria succincta</i> Lacordaire	Leaf beetle	ms	On 15 only
	<i>Diapromorpha turcica</i> (Fabr.)	Leaf nibbler	m	Occasional pest
Curculionidae	<i>Amblyrhinus poricollis</i> Boheman	Leaf weevil	m	Foliar pest
	<i>Apoderus sissoo</i>	Leaf rolling weevil	ms	On 11
	<i>Calandra linearis</i> Herbst.			
	<i>Cyrtozemia cognata</i> Marshall	Black weevil	?	

(Contd.)

Family	Scientific Name	Common Name	Status <sup>1</sup>	Remarks <sup>2</sup>
	<i>Dereodius denticollis</i> Boheman	Defoliator	s	In nursery & young trees
	<i>Hypolixus truncatulus</i> Fabricius	Defoliator	ms	
	<i>Myllocerus blandus</i> Faust.	Gray weevil	m	Adults nibble leaves
	<i>M. cardoni</i> Marshall	Gray weevil	m	Adults nibble leaves
	<i>M. dentifera</i> (F.)	Gray weevil	m	Adults nibble leaves
	<i>M. discolor</i> var. <i>uniformis</i> (Boh.)	Gray weevil	ms	Adults nibble leaves
	<i>M. laetivirens</i> Marshall	Little Gray weevil	m	Adults nibble leaves
	<i>M. undecimpustulatus maculosus</i> Desb.	Gray weevil	ms	Adults nibble leaves
Dermestidae	<i>Anthrenus aegyptiaca</i> Pic.		?	
	<i>Pharadonoma nobile</i> Reitter		?	
	<i>Trogoderma granarium</i> (Everts)	Khapra beetle	?	Dead-wood
Lyctidae	<i>Lyctus africanus</i> Lesne	Timber tunneler	ms	7
Meloidae	<i>Cyaneolytta acteon</i> (Lap.)	Blister beetle	m	Nr 15,16 in nursery
Melolonthidae	<i>Anomala bengalensis</i> Blanchard	Chafer beetles	ms	Defoliate leaves
	<i>Aserica</i> sp.	Chafer beetles	m	Defoliate leaves
	<i>A. dorsalis</i> F.	Chafer beetles	m	Defoliate leaves
	<i>A. elata</i>	Chafer beetles	m	Defoliate leaves
	<i>Holotrichia consanguinea</i> Blanchard	Chafer beetles	s	Defoliate leaves
	<i>H. fissa</i>	Chafer beetles	m	Defoliate leaves
	<i>H. rustica</i> Burm.	Chafer beetles	ms	Defoliate leaves
	<i>H. serrata</i> F.	Chafer beetles	s	Defoliate leaves
	<i>Schizonycha ruficollis</i> F.	Chafer beetles	m	Defoliate leaves
	<i>Serica assamensis</i> Br.	Chafer beetles	m	Defoliate leaves
Rutelidae	<i>Adoretus lasiopygus</i> Bm	Chafer beetles	m	Defoliate leaves
	<i>Maladera</i> (= <i>Autoserica</i> ) <i>assamensis</i> Br.	Chafer beetles	m	Defoliate leaves
	<i>M. insanabilis</i> Br.	Chafer beetles	ms	Defoliate leaves
	<i>M. nathani</i> Frey	Chafer beetles	m	Defoliate leaves
	<i>Rhinyptia equeviceps</i> (= <i>laeviceps</i> ) Arrows	Chafer beetles	ms	Defoliate leaves of saplings
	<i>R. meridionalis</i> Arrow	Chafer beetles	m	
<b>DIPTERA</b>				
Cecidomyiidae	<i>Lobopteromyia prosopidis</i> (Mani) (= <i>Contarinia prosopidis</i> Mani)	Gall midge	s	12,13,15,16
	<i>L. bivalviae</i>	Gall midge	ms	
	<i>L. ramchandrani</i>	Gall midge	ms	On 1,4,5,6,
	<i>Lasioptera</i> sp.	Gall midge	ms	On 14
Otitidae	<i>Physiphora aenea</i> Fabr.	-	?	
	<i>P. clausa</i> Macquart	-	?	
	<i>P. demandata</i> Fabr.-	-	?	

(Contd.)

Family	Scientific Name	Common Name	Status <sup>1</sup>	Remarks <sup>2</sup>
<b>HEMIPTERA</b>				
Aleyrodidae	<i>Acaudaleyrodes</i> sp.	Whiteflies	ms	On most spp.
	<i>Aleurocybotus indicus</i>	Whiteflies	m	
	<i>Aleurodidus diptercus</i>	Whiteflies	m	
	<i>Parabemisia myriciae</i>	Whiteflies	m	
Aphididae	<i>Aphis craccivora</i> Koch.	Groundnut aphid	ms	5
	<i>Toxoptera aurantii</i> (Fonscolombe)	Citrus aphid	m	5
Aphrophoridae	<i>Clovio puncta</i> Walker	Spittle bug	m	
	<i>Poophilus costalis</i> Walker	Spittle bug	m	On nursery saplings
Asterolecanidae	<i>Anomalococcus indicus</i>	Pit scale	m	On 5
	<i>Asterolecanium</i> sp.	Pit scale	m	On 16
	<i>Lecanium oleae</i> Bernard	Pit scale	m	On 16 pods
Cicadellidae	<i>Idiocerus</i> sp.	Jassid	ms	Nursery pest
	<i>Macropsis</i> sp.	Jassid	ms	Nursery pest
	<i>Neodartus acocephalooides</i> Melichar	Jassid	ms	On 12
Coccidae	<i>Cardiococcus castilleae</i> (Green)	Soft scale	?	
	<i>Howasdia biclavis</i> (Comstock)	Soft scale	m	On 16
	<i>Inglisia bivalvata</i> Green	Soft scale	m	On 13
	<i>Saisetia oleae</i> Bernard	Soft scale	m	
	<i>Unaspis articolor</i> (Green)	Soft scale	m	
Coreidae	<i>Clavigralla gibbosa</i> Spinola	Pod bug	m	
	<i>Doclera levan</i> Dist.		m	
	<i>Homoeocerus</i> (= <i>Tangus</i> ) <i>signatus</i>		m	On 5,15 in nursery
	<i>Nemausus</i> sp.	Pod bug		On 15 leaves and pods
	<i>Omanocoris versicolor</i> Hers.		ms	5
Corimelaenidae	<i>Coptosoma cribraria</i> (F.)	Negro bug	m	On 13
Diaspididae	<i>Aonidiella orientalis</i> (Newstead)	Oriental yellow scale	m	On 11
	<i>Aspidiotus destructor</i> Sign.	Hard Scale	?	On 17
	<i>A. tamarindus</i> Green	Tamarind hard scale	ms	On 17
	<i>A. transparens</i> (Green)			
	<i>Chionaspis acuminata</i> Green			
	<i>Hemiberlesia lataniae</i> (Signoret)		m	5,16
	(= <i>Aspidiotus lataniae</i> )			
	<i>Pinnaaspis minor</i> Green	Scale		
	<i>Pinnaaspis strachani</i> (Cooley)	Scale	m	On 16
	<i>P. temporaria</i> Ferris	Scale	m	
Eurybrachidae	<i>Eurybrachys tomentosus</i> F.	Sandal leafhopper	m	Occasional pest
Lacciferidae	<i>Laccifer lacca</i> Kerr.	Lac insect	m	
Lygaeidae	<i>Oxycaraenus</i> sp.	Seed bug		
	<i>Spilostethus pandurus</i> (= <i>civillis</i> ) Wolff.			Milkweed bugm
	(= <i>Lygaeus pandurus</i> , <i>L. civilis</i> , <i>L. militaris</i> )			

(Contd.)

Family	Scientific Name	Common Name	Status <sup>1</sup>	Remarks <sup>2</sup>
Margarodidae	<i>Perisopneumon tamarinda</i> (Green)	Mealy bug	s	On 17
	<i>Drosicha stebbinghi</i>	Mango mealy bug	s	On 17
	<i>Drosichiella tamarindus</i> Green	Tamarind mealy bug	ms	On 17
Membracidae	<i>Leptocentrus obliquus</i> Walker	Cow bugs	m	
	<i>Otinotus oneratus</i> Walker	Cow bugs		
	<i>Oxyrhachis rufescens</i>	Cow bugs	ms	
	<i>O. tarandus</i> Walker	Cow bugs	ms	On all spp.
Miridae	<i>Campyloma</i> sp.			
Pentatomidae	<i>Cyclopelta siccifolia</i> Westwood	Stink bug	m	On 14
	<i>Halys dentatus</i> Fab.			
	<i>Megymenum brevicornis</i> Fabr.			
Pseudococcidae	<i>Cardiococcus castilloae</i> Green			
	<i>Ferrisia virgata</i> Cockerel	Mealy bug	ms	13
	<i>Nipaeococcus viridis</i> (Newstead)			
	<i>Planococcus lilacinus</i> (Cockerel)			
	<i>Pseudococcus corymbatus</i> Gren			
Pyrrhocoridae	<i>Rastrococcus iceryoides</i> Green	Mealy bug	ms	8,10
	<i>Dysdercus cingulatus</i> Fab.	Red cotton bug	m	14
Psyllidae	<i>Acizia indica</i> Heslop-Harrison	Psyllid	ms	8,10
	<i>Psylla hyalina</i> Mathur	Psyllid	ms	8,10
	<i>Heteropsylla cubana</i> Crawford	Subabool psylla	s	Pandey
Scutelleridae	<i>Chrysocoris purpureus</i> Westwood			Nursery/young tree pest

## HYMENOPTERA

Eulophidae	<i>Pediobopsis</i> sp.	Gall insect	ms	
Eurytomidae	<i>Eurytoma tomentosa</i>	Gall wasps	ms	
Formicidae	<i>Camponotus compressus</i> (F.)	Ants	-	Encourage cow bugs
Megachilidae	<i>Megachile</i> sp.	Leaf cutting bees	m	8,9,11,14

## ISOPTERA

Termitidae	<i>Amitermes belli</i> Desn.	Termites	ms	
	<i>Anacanthotermes macrocephalus</i> Desn.		ms	
	<i>Eremotermes</i> sp.			
	<i>Microcerotermes tenuignathus</i> Holmgren		ms	Nursery seedlings
	<i>Microtermes mycophagus</i>	Termites	ms	
	<i>M. obesi</i>			
	<i>Odontotermes bellahunisensis</i> H. & H.		ms	
	<i>O. brunneus</i> Hegen		ms	
	<i>O. feae</i> (Wasmann)		ms	
	<i>O. gurdaspurensis</i> Holmgren		ms	
<i>O. horni</i> (Wasmann)		ms		

(Contd.)

Family	Scientific Name	Common Name	Stauts <sup>1</sup>	Remarks <sup>2</sup>
	<i>O. kushwahi</i>	Termites	ms	
	<i>O. latiguloides</i> Roonwal & Verma	Termites	ms	
	<i>O. obesus</i> Rambur	Termites	m	Nursery, standing trees
	<i>Psammotermes rajasthanicus</i> Roonwal & Bose		ms	
	<i>Trinervitermes flecheri</i> Chatt. & Thak.		ms	
LEPIDOPTERA				
Arctiidae	<i>Amsacta moorei</i> Butler	Red hairy caterpillar	ms	Nursery pest
	<i>A. albistriga</i> Moore			
Cosmopterygidae	<i>Ascalenia</i> sp.			Ex-galls 15,16
	<i>Ithome lassula</i> Hodges		m	13 flowers
Gelechiidae	<i>Anarsia triaenota</i> Meyrick		m	Ex-galls 15
Geometridae	<i>Tephрина pulinda</i> (Walker)	Defoliator	s	Epidemic in Tamilnadu
	<i>Thalassodes quadrari</i> Guenee			
Gracillariidae	<i>Acrocercops caerulea</i> Meyrick		ms	
	<i>Oecadarchis</i> sp.			In tamarind fruits
Hesperiidae	<i>Pelopidas mathias</i> (Fab.)	Rice skipper	m	On 16
Hyblaeidae	<i>Hyblaea puera</i> Cramer	Teak defoliators		
Lasiocampidae	<i>Nadiasa</i> (= <i>Taragama</i> ) <i>siva</i> Lefroy	Black Hairy caterpillars		1-5,15,16,17
	<i>Beralade similis</i> Walker	Brown Hairy caterpillar	ms	4,7
Lyonetidae	<i>Decadarchis</i> sp.	Tamarind fruit borer	m	17
Limacodidae	<i>Thosea asperiens</i> Walker	Slug caterpillar	m	On most spp.
Lycaenidae	<i>Azanus ubaldus</i> (Cramer)	Defoliator	m	In nursery/young trees
	<i>Virachola isocrates</i> (Fabr.)	Anar butterfly	m	On 17 fruits
Lymantriidae	<i>Euproctis lunata</i> Walker	Hairy caterpillar	m	Occasional pest
	<i>Euproctis fraterna</i> Cramer			
	<i>E. scintillans</i> Walker			
Metarbelidae	<i>Indarbela quadrinotata</i> Walker	Bark caterpillar	ms	5,6,7
Noctuidae	<i>Agrotis ipsilon</i> (Hfn.)	Gram cutworm	ms	Nursery pest
	<i>A. spinifera</i> Hubner	Cutworm	ms	Nursery pest
	<i>Eublemma angulifera</i> Moore			5,11,15,16 inflorescence
	<i>Heliothis armigera</i> Hubner	Tomato fruit borer	m	11
	<i>Laphygma exigua</i> Hubner	Lucerne caterpillar	ms	Nursery pest
	<i>Mythimna separata</i> Walker	Army worm	ms	Nursery pest
	<i>Ophiusa</i> (= <i>Achaea</i> ) <i>janata</i> (Linn.)	Castor semilooper	ms	
	<i>Pleocoptera reflexa</i> Guenee	Sheesham defoliator	s	11

(Contd.)

Family	Scientific Name	Common Name	Status <sup>1</sup>	Remarks <sup>2</sup>
	<i>Selepa celtis</i> (Moore)	Defoliator	m	Nursery pest
	<i>Spodoptera litura</i> (Fabr.)	Tobacco caterpillar	m	
Notodontidae	<i>Neostaurops alternus</i> Walker	Crab caterpillar	m	
Oecophoridae	<i>Tonica niviferana</i>	Shoot tunneler	s	2
Pieridae	<i>Catopsila crocale</i> Cram.	Pierid butterfly	s	9
	<i>Catopsila pomona</i> (Fabr.)	Pierid butterfly	ms	9
	<i>Eurema blanda silhetana</i>		ms	8,9,12
	<i>E. hecabae</i>		ms	8,9,12
Psychrididae	<i>Chalcidodes viorea</i> Hampson	Bagworm	m	
	<i>Cryptothelia crameri</i> Westwood	Bagworm	m	7
	<i>Pteroma plagiophleps</i> Hampson	Bagworm	ms	1-7,12,17
Pyralididae	<i>Aphomia gularis</i> Zell.		m	16 fruit pulp
	<i>Assura albicostalis</i> Walker	Gall moth	?	15 floral & shoot galls
	<i>Dichocrocis punctiferalis</i> (Guen.)	Castor capsule borer	m	16 fruit borer
	<i>Hapalia machaeralis</i> Walker	Teak defoliator	s	-
	<i>Microthrix omichleuta</i> Meyrick	Pod borer	ms	5
	<i>Nephopteryx rhodosalis</i> Hampson	-	ms	9
	<i>Trachylepidia fracticassella</i> Ragonot			Amaltas borers
Tinaeidae	<i>Ereunetis seminivora</i>	Clothes moth	ms	9 pods
	<i>Leucoptera sphaemograpta</i>	Clothes moth	?	11
	<i>Spatularia mimosae</i> Stainton		ms	5, <i>Cassia</i> spp.
Tortricidae (= Eucosmidae)	<i>Cryptophlebia</i> (= <i>Argyroplex</i> ) <i>jillepida</i> (But.)	Pod borer	m	5,9,16
	<i>C. ombrodelta</i> Lower	-	?	
	<i>Cydia</i> (= <i>Laspeyresia</i> ) <i>malesana</i> (Meyrick)		ms	On <i>Cassia</i> spp.
	<i>Cydia palamedes</i> (Meyrick)	Bud borer	m	On <i>Caesalpinia</i> spp.
	<i>Eucosma lioplintha</i> Meyrick	-	m	Ex-galls 15,16
Yponomeutidae	<i>Atava fabriciella</i> Swederus	-	m	
<b>ORTHOPTERA</b>				
Acrididae	<i>Acrida exaltata</i> (= <i>lugubris</i> ) (Wlk.)	-	m	5 nursery
	<i>Anacridium rubrispinus</i>	-	m	
	<i>Hieroglyphus banian</i> Fabr.	Rice grasshopper		
	<i>Hieroglyphus nigrorepleus</i> Bol.	Rice grasshopper		
	<i>Neoerthacris simulans</i> (Bol.)	-	m	On <i>Cassia auriculata</i>
	<i>Orthacris ruficornis</i> Bolivar	-	s	5 young trees
	<i>Poeciloceris pictus</i> (Fabr.)	Ak grasshopper	m	3Nr, 6, 12Nr, 15
	<i>Schistocerca gregaria</i> Forsk.	Desert locust	s	Swarms settle

(Contd.)

Family	Scientific Name	Common Name	Status <sup>1</sup>	Remarks <sup>2</sup>
Gryllidae	<i>Brachytrypes erythrocephala</i>	Cricket	ms	10
	<i>B. humeralis</i>	Cricket	ms	10
	<i>B. portentosus</i>	Cricket		10
	<i>Gryllotalpa africana</i>	Cricket		10
	<i>Gryllus</i> spp.	Crickets	m	Seedling pests
	<i>Liogryllus bimaculatus</i> DeG.	Field cricket	m	Occasional nursery pest
Pyrgomorphidae	<i>Chrotogonus trachypterus</i> Blanchard	Surface grasshopper	ms	Occasional nursery pest
Tettigonidae	<i>Holochlora indica</i> Kirby	Tettigonid grasshopper	ms	15
	<i>Latana inflata</i> Brunn.	Tettigonid grasshopper	m	15
	<i>Thomasiniana salvedorae</i>	Tettigonid grasshopper		

## THYSANOPTERA

Pripidaeothripidae	<i>Haplothrips ceylonicus</i> Schmutz	Thrips	m	
	<i>Haplothrips</i> nr <i>eragrostidis</i> Priesner	Thrips	m	Inflorescence
	<i>Dolichothrips</i> sp.	Thrips	m	
Thripidae	<i>Frankliniella schultzei</i> Trybon	Thrips	m	15
	<i>Ramaswamiahiella subnudata</i>	Yellow thrips	m	
	<i>Scirtothrips dorsalis</i> Hood	Chillies thrips	m	9,10,11,12,15,16
	<i>Thrips flavus</i> Schrank			

## MITES

Eriophyidae	<i>Eriophyes prosopidis</i> Saksena	Leaf mites	m	14
	<i>E. prosopidis</i>	-	ms	14 leaves
Tetranychidae	<i>Tetranychus neocaledonicus</i> Andrè	Vegetable mite	ms	

<sup>1</sup>m = minor, ms = moderately severe, s = severe pest, ? = pest status doubtful or not known

<sup>2</sup>Numbers relate to specific host species recorded: Nr- New record, st- storage pest

1- <i>Acacia albida</i>	2- <i>Acacia auriculiformis</i>	3- <i>Acacia bivenosa</i>
4- <i>Acacia catechu</i>	5- <i>Acacia nilotica</i>	6- <i>Acacia senegal</i>
7- <i>Acacia tortilis</i>	8- <i>Albizia lebbek</i>	9- <i>Cassia fistula</i>
10- <i>Cassia siamea</i>	11- <i>Dalbergia sissoo</i>	12- <i>Delonix regia</i>
13- <i>Leucaena leucocephala</i>	14- <i>Pongamia glabra</i>	15- <i>Prosopis cineraria</i>
16- <i>P. juliflora</i>	17- <i>Tamarindus indica</i>	

bugs, soft and hard scales, and pod and seed bugs. None of these, however, appear to be so serious as the psyllids in *Leucaena* sp. Despite their large populations, whiteflies and membracids usually do not pose any serious threat to establishing trees. However, the vigour of the plants is greatly reduced by their attack. Pandey and Faruqui (1994) reported *Drosicha mangiferae* as a defoliator of *Dalbergia sissoo*.

*Isoptera*

Termites are general feeders and one may record any prevalent species feeding on some host plant or tree. Still specific reports of *Odontotermes obesus* on *Delonix regia* and *Prosopis cineraria*, *Microcerotermes mycophagus* (Desneux) on *Parkinsonia aculeata*, *Odontotermes latiguloides* on *Acacia tortilis*, *Microtermes laxmi* on *Prosopis juliflora* and

*O. bellahunisensis* on *Albizia lebbek*, etc. are there. The damage of termites is naturally high in felled trees and field stored timber. Thakur (1993) reported *Heterotermes malabaricus* Holm. & Holm., *Microtermes obesi*, *O. bellahunisensis*, *O. distans*, *O. latiguloides* Roonwal & Verma, *O. bellahunisensis*, *O. obesus* Rambur, *O. indicus*, etc., as specific pests of timber.

#### Lepidoptera

Much damage is caused by lepidopteran defoliators and borers. The damage tends to be severe only in nursery and young plantations. Cutworms and rainy season hairy caterpillars or armyworms cause concern and need to be managed for the trees to establish well. Pandey and Faruqui (1994) reported 10-30% defoliation of *Albizia lebbek* by *Eurema hecabae*, *E. blanda silhetana* and *Laodemia strigvenata*. They also mentioned *Pelopidas* (= *Parnara*) *mathias* as a defoliator on *P. juliflora* and *Taragama* (= *Nadiasa*) *dorsalis* was reported to be a serious defoliator of *P. cineraria*. However, most defoliators seldom necessitate control measures on established leguminous trees. *Taragama siva* is regarded as a serious polyphagous defoliator of several tree species, especially *Acacia* and *Prosopis* spp. It is but a poor competitor and practically no control measures are required on plants over 5 years of age.

Noctuid caterpillars are general leaf feeders and seldom cause alarming damage. However, *Spodoptera litura* is peculiarly reported to cut terminal shoots of *A. nilotica* like a cutworm (Pillai and Gopi, 1990). *Selepa*, a pest on *Emblia officinalis* is reported to attack leguminous trees as well. Pyralids like *Assura albicostalis* are reported to be pod gall forming insects in *Prosopis juliflora* (Pandey and Faruqui, 1992) and *P. cineraria* (Parihar, 1994) but this is not fully ascertained. Gall formation can not be attributed to all gall dwelling species. *Tonica niviferana* is

reported to cause 90% damage in *A. auriculiformis* but tortricids usually occur only as minor pests. The yponomeutid *Attava fabriciella* is a minor defoliator during August - October on many tree species but seldom assumes any serious status.

Cultural operations give lasting management of important pests like Sheesham defoliator (Mathur, 1964). Biological control methods, adjunct with proper silvicultural practices' afford a satisfactory and effective management of defoliators

#### Orthoptera

Next to termites, orthopteran pests like crickets, surface and other grasshoppers constitute an important group of polyphagous pests inflicting substantial damage to nursery and young plantations. The oligophagy, or restricted feeding habit, often tends to develop into polyphagy in this group of insects. The species known to be of little economic significance may acquire importance in certain pockets or years. Still the damage is of little significance in grown up plants except when epidemics occur.

#### Other groups

Thrips rarely pose a problem of management and as a group tend to be minor pests only. However, foliar mites at times multiply rapidly to cause general decline in trees and also cause foliar galls in various tree species particularly *Prosopis cineraria*. Several species of mites attack the trees but in arid zones, they are rarely a serious pest because of their preference to common non-legume hosts like neem and jujube.

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