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Field Insect Pests of Rohida (*Tecomella undulata*) in Arid Zones of Rajasthan

S.K. Verma and Satya Vir
Central Arid Zone Research Institute, Jodhpur 342 003, India

Abstract : Insects associated with *Tecomella undulata* in arid zones of Rajasthan have been listed and briefly discussed. *Ptialus tecomella* (Cioniindae, Curculioniodae: Coleoptera) and *Stegnatophora* sp. (Cosmopterygidae : Lepidoptera) are the key pests on established trees, whereas, *Nadiasa siva* (Lasiocampidae: Lepidoptera), *Odontotermes obesus* (Termitidae: Isoptera) and *Holotrichia consanguinea* Bl. (Melolonthidae: Coleoptera) are the key pests in nursery. *Exorista* sp. (Tachinidae: Diptera) is the major regulatory factor determining incidence and damage by *Ptialus tecomella*.

Key words : *Tecomella undulata*, insects, pests.

'Rohida', the Marwar teak or desert teak [*Tecomella undulata* Sm. (Seem), Family Bignoniaceae] is the most important timber tree of the arid zones of India. The ever increasing demand for its celebrated timber on the one hand, and a very slow rate of growth of the tree on the other, have resulted in a low and dwindling population of this valuable resource of the arid ecosystem. The foliar growth and flowering start from the month of September and continue up to February or March. During this period, several foliar pests and insect visitors are observed on the flowers. The spreading bushy habit of the trees does not afford an ideal shelter for insect fauna during the hot summer months. In the rainy season, many polyphagous pests happen to establish on 'Rohida' trees and saplings. The period of vegetative growth, coinciding with the cold winters, in the face of diminishing vegetation after the recession of the meagre monsoon, attracts many foliar pests to sustain themselves on this tree. Paradoxically, very few reports are available on the insect pests attacking this economically important tree, the extent of damage caused by them and their management. Vir *et al.* (1994) reported the stem borer, *Stegnatophora* sp., the leaf skeletonizer *Ptialus tecomella,* and the flower aphid, *Aphis craccivora,* as the pests of significance on this timber tree. This paper presents the information gathered through field observations and a few earlier reports (Beeson, 1941; Bhasin and Roonwal, 1958).

Material and Methods

With a view to document the range of insects associated with this species of great economic importance, surveys and fauna collections were initiated in 1987 in the districts of Barmer, Bikaner, Jaisalmer and Jodhpur in different periods of the years. To determine the various insect fauna associated with the plants, laboratory rearings were done, wherever necessary.

Results and Discussion

Amongst injurious insects, the most important one is the leaf skeletonizer weevil. Severe damage is done to the foliage by its lustrous slimy grubs, which occur in large numbers, especially during December to February.

Pests of establishing saplings

Termites are the most important pests causing poor stand in nurseries and are the major cause of plant mortality in silviculture. Several species of termites are known to attack the forestry plants in their early periods of establishment. The grubs of *Holotrichia consanguinea* Blanchard and other melolonthid and rutelid beetles attack roots of established saplings in certain endemic pockets. Adults and nymphs of the field cricket, *Gryllus viator,* and the domestic cricket, *G. domesticus*, have been observed to cause substantial damage to germinating seeds in nursery beds under humid

conditions. *Chrotogonus trachypterus* occasionally attacks young seedlings, but no substantial damage is caused to *T. undulata.* During rainy season, armyworms (*Spodoptera* spp.) and hairy caterpillars (mostly *Amsacta moorei*, sometimes *Euproctis* spp.) occur. In certain years, *Nadiasa siva,* which prefers acacias and *Prosopis* spp., appears in large numbers also attacks *Tecomella undulata.* The caterpillars appear during August and cause severe damage upto October. Grown up saplings usually survive the damage, but younger ones are at times completely denuded by 4 - 5 caterpillars on a single plant. The pupation takes place in cocoons formed on the twigs and there are at least two distinct generations of the pest. November onwards, cutworms (*Agrotis ipsiolon* and *A. spinifera*) sometimes attack the young saplings. The cutworms, *Agrotis spinifera, A. ipsilon*, have occasionally been observed on young saplings but with no substantial damage.

Weevils, particularly *Myllocerus* spp., inflict substantial injury to new foliage of saplings. The peak period of activity is August - September. During winters, adults of *Amblyrrhinus poricollis* take over but after February, with the appearance of the grubs of *Ptialus tecomella*, weevils are seldom seen.

Pests on established trees

Termites as a group form the only subterranean pests causing damage to underground and aboveground woody biomass of the *Tecomella* trees. Peculiarly, *Psammotermes rajasthanicus* has been claimed to be the only species (Anonymous, 1993) attacking established trees of *T. undulata* but other species, chiefly *Odontotermes obesus,* also attack. Scarab beetles (the melolonthid, *H. consanguinea* and the rutelid, *Autoserica nathani*) do feed on *T. undulata* foliage but their preference for other trees (*Ziziphus* and *Prosopis* spp.) is well established. Cowbugs are the most important sap suckers causing a decline in young trees.

Since November 1989, severe infestation of 'Rohida' foliage by the grubs of *Ptialus tecomella* has been observed in the western Rajasthan. The damage has been especially severe in the command areas of Indira Gandhi Canal. The pest severely skeletonizes the foliage by feeding on the upper surface of the foliage. The infestation is at its peak during November to February. As many as 5 grubs could be observed on a single leaf and under heavy infestation, leaves without damage are rare. The overall growth and vigor of the plants are seriously affected. Grubs usually did not occur after February, except in 1992, when these could be seen up to March.

The pest attacks plants of any age but prefers 3-month to one-year-old saplings. During the period of incidence, grubs of various stages occur on the same twigs and leaves, suggesting a long oviposition period and several overlapping generations.

Grubs are mostly ocher-yellow to yellowish brown, lustrous with slimy secretions. A grub usually remains confined to one leaf and takes 10 to 21 days to become fully grown. Before pupation, the grubs secrete a dirty white, hard, spheroid cocoon taking 1-2 days pre-pupal time. Pupation in the field takes place in the soil or under plant debris but in the laboratory, cocoons were formed on the foliage. Pupal period was for 7 to 11 days. The grubs have been observed to be predated upon by *Coccinella septempunctata* and *Brumus suturalis* in plantations around Jhalamund at Jodhpur. There has been a general decline in the incidence of the pest after a severe outbreak in 1989, due probably to biocontrol agents including larval pathogens. In 1990-91, there was very heavy parasitization of the pest (80% of the field collected grubs) by a tachinid, *Exorista* sp. The pest appears to be spared by other predatory fauna like birds. The sun birds, very active during October to February around Jodhpur, and which enthusiastically feed on pyraustid caterpillars on moringa (*Murraya koenigii*), did not feed on the grubs of *Ptialus tecomella.*

The cosmopterygid caterpillar, *Stegmatophora* sp., is a serious borer pest of old plantations of *Tecomella undulata.* The peak of the pest

Table 1. Insects associated with Tecomella undulata in arid zones of western Rajasthan (Grouped into orders)

Family	Name	Common name	*Status	Remarks
		COLEOPTERA		
Bostrychidae	*Sinoxylon crassum dekkanense* Lesner	Wood borer	m	Attacks dead wood
Bruchidae	*Bruchidius* sp.	Bruchid	ms	Storage pest : seeds
	Caryedon (=Bruchus) gonagra	"	ms	Field & storage pest
Curculionidae	*Amblyrrhinus poricollis* Boh.	Leaf weevil	m	Foliar pest
	Myllocerus disclor			
	Myllocerus laetivirens Marshall	Little weevil	m	
	Myllocerus maculosus Desbrochers	Grey weevil	m	Foliar pest
(Cioniinae)	*Ptialus tecomella*	Leaf skeletoner	s	
Coccinellidae	*Brumus suturalis*	–	–	Beneficial : predator
	Coccinella septempunctata	–	–	Beneficial : predator
	Scymnus nubilus Muls.	Coccinellid	–	Beneficial : predator
Histeridae	*Teretrius moguli*	Steel beetle	–	Beneficial : predator
Melolonthidae	*Holotrichia consanguinea* Blanchard	Chafer beetle	s	Foliar pest
Osmomatidae	*Melambia cardoni*	–	–	Beneficial : predator
Rutelidae	*Autoserica nathani* Frey	–	m	Foliar pest
		DIPTERA		
Tachinidae	*Exorista* sp.	Tachinid fly	–	Beneficial : parasite
		HEMIPTERA		
Aphididae	*Aphis craccivora* Koch.	Groundnut aphid	ms	
Lygaeidae	*Nemausus* sp.	–	m	On trees and pods
	Tilledonops bimaculatus	–	–	Beneficial : predator
Cercopidae	*Poophilus costalis* Walker	Spittle bug	m	On nursery saplings
Membracidae	*Oxyrhachis tarandus* Fb.	Cowbug	ms	On shoots
		HYMENOPTERA		
Apidae	*Apis florea* Fabricius	Honey bees	–	Beneficial : pollinator
	Apis indica (F.)	"	–	Beneficial : pollinator
Formicidae	*Camponotus compressus* (F.)	Ants	–	Encourage cowbugs
Halictidae	*Nomioides* spp.	Social bees	–	Visitors
		ISOPTERA		
Termitidae	*Odontotermes obesus* Rambur	Termites	s	In Nursery plants
	Psaminotermes rajasthanicus	Termites	m	On standing trees
		LEPIDOPTERA		
Arctiidae	*Amsacta moorei* Butler	Red hairy caterpillar	ms	Pest in nursery
Noctuidae	*Agrotis ipsilon* (Hufnagel)	Cut worm	m	Pest in nursery
	Agrotis spinifera Hubner			
	Mythimna separata Walker	Army worm	ms	Pest in nursery
Lasiocampidae	*Nadiasa (=Taragama) siva* Lefroy	–	s	Defoliator Jul.-Sept.
Lymantriidae	*Euproctis lunata* Walker	Hairy caterpillar	m	Occasional pest
	Euproctis fraterna Cramer	Hairy caterpillar	m	Occasional pest
Cosmopterygidae	*Stegmetophora* spp.	Shoot borer	s	
Yponomeutidae	*Atteva fabriciella* Swederus	–	m	Defoliator Aug.–Oct.
		ORTHOPTERA		
Gryllidae	*Gryllus domesticus*	House cricket	m	On germinating seeds
	Gryllus gryllus	Field cricket	m	On germinating seeds
Pyrgomorphidae	*Chrotogonus trachypterus* (Bl.)	Surface grasshopper	ms	On germinating seeds
		THYSANOPTERA		
Phlaeothripidae	*Haplothrips* nr *eragrostidis*	Priesner Thrips	m	On inflorescence

*m = minor, ms = moderately severe, s = severe.

activity is during March - April and again during July - November. The larvae make tunnels of 7 to 27 mm length in young branches and retard the plant growth. Laboratory rearings from field collected infested material indicated four successful generations of the pest. The moths preferred young branches (1.4 to 3.2 cm diameter) for egg laying. Incubation period of eggs was 4 to 9 days (*Ca* 5.2 days) during February - March and 4 to 7 days (*Ca* 4.7 days) during August - September. Newly hatched larvae bore into the shoots and feed on central xylem tissues for 15 to 22 days (*Ca* 20.5 days) during February - March and 21.2 days during August- September. Larvae preferred branches of 1.4 to 3.2 cm diameter and the larval tunneling varied from 7 to 27 mm within the branches of 1.4 to 4.5 cm diameter. Infestation by the stem borer is believed to severely retard the plant growth. Interestingly, the pest did not infest the central shoot or the plants of age less than six months. The pest appeared to be incapable of causing plant mortality by infestation. The moths emerge after a pupal period of 5 to 8 days. Adults in captivity, without provision of food, live for 3 to 5 days.

Oxyrhachis tarandus is a very common pest on several tree hosts. In arid zones, it is sustained mostly by *Prosopis juliflora.* It has been earlier reported on *Acacia* spp., *Albizzia lebbek and P. cineraria* (Singh and Bhandari, 1987, 1988). The nymphs of the membracid were observed to be predated by *Coccinella septempunctata.*

On flowers, *Aphis craccivora* and *Haplothrips eragrostidis* are observed at most places but rarely become serious. Aphids sometimes colonize intensely to damage the infested flowers completely. Several insect visitors, including bee species, *Apis florea* and *A. indica,* are believed to help pollination, although it has not been clearly demonstrated. Coccinellid beetles predate upon the aphids. The young and developing pods harbour the lygaeid bugs *Nemausus* sp. and *Tilledonops bimaculatus* are predatory bugs on these phytophagous bugs.

The steel beetles, *Teretrius moguli*, predate upon the grubs of *Sinoxylon crassum dekkanense,* which attack dead wood on the tree.

The bark eating caterpillar, *Indarbela quadrinotata,* is commonly found attacking various arid zone trees but on *T. undulata*, its occurrence is not certain and thus *T. undulata* does not appear to be a host for this pest. Some more pests on *T. undulata* have been observed but could not be determined for want of adults as the rearings failed.

Storage pests

Seed pods, if stored as such, get heavily infested with *Stegobium* sp. In certain areas, spider beetles attack the stacked pods but these appear only in old stocks (2 years storage). More commonly, the seeds extracted from the pods are stored and bruchids *Bruchidius* sp. commonly infest. Pods in the field are largely infested with *Bruchus gonagra* (5 to 19%) but this bruchid prefers other legumes like *Tamarindus indica, Albizzia lebbek and Acacia senegal.* Bruchids, once established in the field, often go unnoticed and the seeds in stores, if not examined periodically, may suffer substantial losses. Infested seeds become useless as they do not germinate.

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