

## Insects Associated with Kumat (*Acacia senegal* Willd) in the Arid Regions of Western Rajasthan

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**Abstract:** The insect spectrum of *Acacia senegal* in the arid tracts encompassed 22 species of pestiferous insects, 15 species of flower visitors, 3 species of parasites and 7 species of predators (including 4 spider species). Important injurious insects were *Oxycarenum* sp., *Holotrichia* sp., bruchids and *Acameoderma aurifera*. The flower visitors included *Apis florea*, *Halictus* sp., *Camponotus* sp. and *Xylocopa* sp. The parasites were of Hymenopterous lineage, while the predators were of Acarine and Coleopterous origin.

**Key words:** Kumat, insects, arid regions, predators.

Kumat (*Acacia senegal* Willd) is a multipurpose thorny deciduous tree of the desert. Its wood is a good source of fuel, while its pods are used as vegetable and the leaves for feed. It yields gum of high medicinal value. It is an extremely hardy species and resistant to drought. Besides Africa and Arabia, this plant is distributed in the hilly and plain tracts in Aravalli and western Rajasthan (Bhandari, 1978). Bhasin and Roonwal (1954) had listed six coleopterous wood borers namely, *Enneadesmus forficula*, *Sinoxylon anale*, *S. indicum*, *S. punnax*, *Hypoerschus indicum* and *Stromatium barbatum*, and one lepidopterous pest (*Azanius uranus*) found on *Acacia senegal*. The wood borer, *Colosterna scabrator*, has been reported by Bhandari and Kumar (1993) to be a major pest of *Acacia* plantations. Although, insects constitute a major biotic stress for this multipurpose tree in the arid areas, yet very little is known about the insects associated with *A. senegal* in the arid regions (Bhasin and Roonwal,

1954; Parihar and Kampantzev, 1997). An attempt has been made to update the present level of information.

### Material and Methods

The observations were recorded at the Central Research Farm of the Institute. Three desertic districts of western Rajasthan, viz., Barmer, Bikaner and Jaisalmer were surveyed and insect fauna on randomly selected plants (131), both in grown period as well as in flowering seasons, were recorded. Insect collections were made along with 14 infested samples with details of locations. Whenever required, the immature insects were reared to adults in the laboratory. Forty insect specimens were got identified by comparing with the authentic insect collection, whereas, 23 species were got identified through the International Institute of Entomology, London.

### Results and Discussion

A total of 23 insect pests were observed on these plantations which are classified

Table 1. Injurious insects recorded on *Acacia senegal* in the arid and semi-arid regions of Rajasthan

	Order/Family/Insect	Common name	Nature of injury	Injury rating
1.	<b>COLEOPTERA</b>			
1.1	Bostrychidae			
	<i>Sinoxylon anale</i> Les.	Ghoon borer	Larvae bore in sapwood	Moderate
1.2	Bruchidae			
	<i>Bruchidius andrewesi</i> Pic	Seed weevil	Attack harvested pods and seeds	Heavy
	<i>Bruchus bilineatopygus</i> Pic	Seed weevil	Attack pods and seeds on ground	Heavy
	<i>Caryedon serratus</i> Oliver	Seed weevil	Attack pods and seeds on ground	Heavy
1.3	Buprestidae			
	<i>Acmaeodera aurifera</i> Cast & Gory	Wood borer	Larvae make galleries in sapwood	Heavy
	<i>Agrilus</i> sp.	Wood borer	Make tunnels in cambium	Mild
	<i>Chrysobothris parvipunctata</i> Oban	Sapwood borer	Larvae make tunnels in sapwood	Moderate
1.4	Cerambycidae			
	<i>Derolus volvulus</i> F	Stem borer	Tunnel bark, bore in heartwood	Moderate
1.5	Chrysomelidae			
	<i>Clytra succincta</i> Lacordire	Leaf beetle	Nibble leaves	Mild
	Curculionidae			
	<i>Cyrtozemia cognata</i> Marshall	Moong weevil	Make holes in leaves	Mild
	<i>Cyrtozemia dispar</i>	Moong weevil	Make holes in leaves	Mild
	<i>Myllocerus discolor</i> Marshall	Grey weevil	Eats away leaf margins	Mild
1.6	Melolonthidae			
	<i>Lachnosterna consanguinea</i> Blanch	Chafer beetle	Defoliator	Heavy
2.	<b>HETEROPTERA</b>			
2.1	Coreidae			
	<i>Nemausus</i> sp.	Leaf footed bug	Nymphs and adults feed on pods	Mild
2.2	Lygaeidae			
	<i>Oxycarenus</i> sp.	Dusky cotton bug	Suck sap from immature seeds	Heavy

Contd. ....

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	Order/Family/Insect	Common name	Nature of injury	Injury rating
2.3	Membracidae			
	<i>Oxyhachis tarandus</i> Fab	Cowbug	Feeds on leaves and tender parts	Mild
3	<b>ISOPTERA</b>			
3.1	Termitidae			
	<i>Microtermes mycophagus</i> Dexn	Termite	Damage roots	Heavy
	<i>Odontotermes latiguloides</i> R & V	Termite	Damage roots	Moderate
4.	<b>LEPIDOPTERA</b>			
4.1	Lasiocampidae			
	<i>Streblote siva</i> Lef.	Handsome moth	Larvae defoliators	Mild
5.	<b>ORTHOPTERA</b>			
5.1	Pyrgomorphidae			
	<i>Chrotogonus trachypterus</i> Blanch	Surface grasshopper	Eats leaf margins of seedlings	Mild
	<i>Brachytrypus orientalis</i> Burn	Field cricket	Eats tender shoots of seedlings	Mild
6.	<b>THYSANOPTERA</b>			
6.1	Thripidae			
	<i>Florthrips traegardhi</i> Trybon	Flower thrip	Lacerate flowers and young leaves	Moderate
	<i>Scirtothrips antilope</i> Priesner	Flower thrip	Lacerate flowers and young leaves	Mild

as pests of seedlings and saplings (7), pests of growing plants as defoliators (3), sap suckers (4), wood borers (5), subterranean (1) and pests of seeds (3).

#### *Pests of seedlings and saplings*

Seedlings in the nursery and the newly transplanted saplings in the field were prone to the attack by insect pests (Table 1). Defoliators like grass hoppers, crickets and the coleopterans were more active during the monsoon season, while the soil dwelling insects like termites abounded in the dry periods. The most common grass hopper causing defoliation was *Chrotogonus*,

*trachypterus*. The curculionids, *Cyrtozemia cognata*, *C. dispar* and *Mylocerus discolor* caused leaf injury by making holes and dry cutting at edges. The termite causing injury to young plants were *Microtermes obesi* and *Odontotermes latiguloides*. Heavy mortality to seedlings due to termite attack has been reported by Kaul and Chitnis (1954). Nymphs and adults of the cricket, *Brachytrypus orientalis*, damaged the tap root of the saplings.

#### *Pests of grown up plants*

*Defoliators*: Relatively fewer defoliators were encountered on *A. senegal* plants in

Table 2. Flower visiting insects recorded on *Acacia senegal* in the arid and semi-arid regions of Rajasthan

Order/Family/Insect	Common name	Foraging activity		Appearance		
		Pollen	Nector	1990	1991	
COLEOPTERA	Buprestidae					
	<i>Anthaxia</i> sp.	Stem beetle	+	-	-	+
DIPTERA	Muscidae					
	<i>Musca domestica</i> Linn	House fly	+	+	+	+
	<i>Musca sorbens</i> Wied	Bush fly	+	+	+	-
	Otitidae					
	<i>Physiphora clause</i> Mac	Slender fly	+	-	+	-
HYMEHOP- TERA	Anthophoridae					
	<i>Braunsapis mixta</i> Smith	Cuckoo bee	+	+	-	+
	<i>Delta</i> sp.	Solitary wasp	+	+	+	-
	<i>Xylocopa</i> sp.	Carpenter bee	+	+	+	+
	Apidae					
	<i>Apis florea</i> F	Small bee	+	+	+	+
	Eulophidae					
	<i>Chrysonotomyi</i> sp.	Chalcid	+	-	+	+
	Formicidae					
	<i>Camponotus</i> sp.	Big ant	-	+	+	-
	Halictidae					
	<i>Halictus</i> sp.	Solitary bee	+	+	+	-
	<i>Nomiodes cerea</i> Nurse	Solitary bee	+	+	+	-
	<i>Nomioides punjabensis</i> Cameron	Solitary bee	+	+	+	-
	<i>Nomioides variegata</i> Olivier	Solitary bee	+	+	-	+
LEPIDOPTERA	Lycaenidae					
	<i>Ascalenia</i> sp.	Blue butterfly	-	+	-	+

+ Present, - Absent.

the arid and semi-arid regions. Among the chaferes, *Holotrichia consanguinea* was the most common beetle inflicting injury to the foliage. The period of activity was restricted to the first few showers during the monsoon. Another beetle devouring leaves occasionally was the chrysomelid, *Cytra succincta*. The damage, however, was rather insignificant. Gregarious caterpillars of the handsome moth, *Streblote siva*, fed

on the leaves and made cocoons on the petioles.

*Sap suckers*: The sucking insects attacked leaves, tender parts of shoots and the pods. The nymphs and adults of the membracid, *Oxyrachis tarandus*, sucked sap from buds and leaves. The peak period of activity was August-September. The other host plants for this insect in the arid and

semi-arid regions were reported to be *Prosopis cineraria* and *Acacia tortilis* (Singh and Bhandari, 1987; Parihar, 1993). The coreid bug, *Nemausus* sp., were found feeding on the early maturing pods. Both nymphs and adults sucked sap from the seeds inside, which often failed to ripen. Schaefer (1980) recorded this insect affecting seed pods of *Acacia caffra*. The lygaeid, *Oxycarenus* sp., also attacked the pods. Eggs were laid on the green pods from which nymphs hatched, growing to adulthood while feeding thereon. Continuous feeding resulted in withering and drying up of the pods. Peak activity was observed in September. The thrips, *Florithrips fraegardhi* and *Scirtothrips antilope*, were observed feeding floral parts in the months of August and September. However, there did not appear to be any appreciable loss due to thrips.

**Wood borers:** By far, the most important pest on *A. senegal* belonged to this category. The cerambycid, *Derolus volvolus*, mostly attacked the trunk, grooving 25 to 30 cm long larval tunnels in the live wood. The tunnels did not contain any grassy material inside. Adult beetles from the resting pupae emerged between May and August. The other host plants for this insect, as mentioned by Beeson (1941), include *Albizia lebbek*, *Shorea robusta* and *Ziziphus* sp. The Buprestid, *Acmaeodera aurifera*, whose larvae bored between bark and sapwood surface was another important borer. Severely infested shoots bore many crossed and interlaced galleries. Adult emergence commenced around the month of August. Singh and Bhandari (1987) reported this insect from *Acacia tortilis*, while Parihar (1993) found it in-

festing the dead branches of *Prosopis cineraria* in the same locations as for the present studies.

The bostrychid, *Sinoxylon anale*, with a wide host range, attacked weaker or dying plants in the larval stage, turning the wood into a fine dust. A few adults were observed on the green twigs. The other bostrychids infesting the plant were *Agilus* sp. and *Chrysobothris parvipunctata*.

**Subterranean pests:** During the dry season the termite galleries were seen on the bark of almost all grown up plants. However, not many plants succumbed to their attack. The termite colonies originated at the base of the trunk, at times penetrating into the wood, but restricting to the bark of the trunk. The trunks of a few dying plants were seen filled with soil as a result of the termite activities. The species responsible for damage was identified as being *Odontotermes latiguloides*.

**Pests of seeds:** Bruchids were the most prominent as seed destroyers. Three species, viz., *Bruchidius andrewesi*, *Bruchus bilineatopygus* and *Caryedon serratus*, were observed as the destroyers of seeds at various stages of growth and storage. *B. andrewesi* was seen attacking pods. It also attacked seeds of *A. tortilis*, *A. lebbek* and *P. cineraria*. The other two bruchids also enjoyed a wide range of host plants in the arid and semi-arid regions. In the infested stored seeds, the percentage of damage was the highest due to *Caryedon serratus* (43%), followed by *Bruchus bilineatopygus* (13.2%) and *Bruchidius andrewesi* (12.9%).

**Flower visitors:** Of the 15 diurnal insect species observed on the flowers of *A. senegal*

Table 3. Parasites recorded on the pests of *Acacia senegal* in the arid regions of western Rajasthan

Parasite species	Host species
Order HYMENOPTERA	COLEOPTERA
Family Braconidae	Buprestidae
<i>Bracon</i> sp.	<i>Acmaeodera aurifera</i> Cast & Gory
Family Pteromalidae	Cerambycidae
<i>Norbanus</i> sp.	<i>Derolus volvulus</i> F
Family Stephamidae	Buprestidae
<i>Neostephagus</i> sp.	<i>Acmaeodera aurifera</i> C & G

during 1990 and 1991 (Table 2), 10 were hymenopterans, 3 dipterans and one each of Lepidopteran and coleopteran. The activity of all insects was, however, not regular, with some species appearing in one season, while the others in another blossom. The peak activity of most insect species was recorded in the morning hours. The regular hymenopterous visitors to flowers included *Apis florea*, *Halictus* sp. and *Xylocopa* sp. The bees and wasps visiting flowers for pollen and nectar appeared to be better carriers of the former. Parihar and Satyavir (1993) found the body movements of bees on *P. cineraria* to contribute towards greater pollination efficiency. Except the butterflies, the movement of rest of the insects on flowers for nectar collection did not seem to be contributing much towards pollen transfer.

**Parasitic insects:** A few parasitic insects have been recovered from the larval tunnels along with their host insects (Table 3). Three hymenopterous species, viz., *Bracon* sp., *Norbanus* sp. and *Neostephagus* sp., have been collected from the natural abodes

of *Acmaeodera aurifera*, *Derolus volvulus* and *Acmaeodera* sp., respectively.

**Predatory insects:** During the course of investigations, a number of predatory insects were encountered on various pest insects associated with *A. senegal* (Table 4). *Sinoxylon anale* (Bostrychidae) was being predated over by two types of beetles, viz., *Teretrium mogul* (Histeridae) and *Tillodenops bimaculata* (Cleridae). The buprestid, *Chrysobothris parvipunctata*, was found to be predated over by a colydid, identified as *Pseudobothrideres neglectus*. Four spider species were suspected as preying over different types of pest species. *Araneus* sp. (Araneidae) was collected from *Caryedon seratus* beetles, while *Cheirocanthium* sp. (Clubionidae) from another

Table 4. Predators recorded on the pests of *A. senegal*

Predator species	Host species
Family: Araneidae	Bruchidae
<i>Araneus</i> sp.	<i>Caryedon seratus</i>
Family: Cleridae	Bostrychidae
<i>Tillodenops bimaculata</i>	<i>Sinoxylon anale</i> Les Schrl
Farm: Cleridae	Bostrychidae
<i>Tillodenops bimaculata</i>	<i>Sinoxylon anale</i> Les Schrl
Family: Clubionidae	Bruchidae
<i>Cheirocanthium</i> sp.	<i>Bruchidius</i> sp. Alydidae
<i>Clubiona</i> sp.	<i>Nemausus</i> sp.
Farm: Colydidae	Buprestidae
<i>Pseudobothrideres neglectus</i> Gr.	<i>Chrysobothris parvipunctata</i> Oban
Family: Histeridae	Bostrychidae
<i>Teretrium mogul</i> Lewis	<i>Sinoxylon anale</i> Les
Family: Salticidae	Lygaeidae
<i>Thyene</i> sp.	<i>Oxycarenus</i> sp.

bruchid, *Bruchidius* sp. Another clubionid, *Clubiona* sp., was recovered from an alydid, *Nemausus* sp. From among the colony of the lygaeid bugs *Oxycarenus* sp., a salticid spider, *Thyene* sp. was collected.

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