Bull. zool. Surv. India, 8 (1-3) : 165-175, 1987

INSECTS ASSOCIATED WITH SOME WEEDS IN SOUTH INDIA

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ABSTRACT

An inventory of insect pests of twelve species of weeds, common in cultivated field in and around Madras is presented. Main characteristics of the pests as well as host plants, life cycles and population trends etc. of the pests and insect-weed relationships are briefly outlined.

The problem of weeds in cultivated field is well known. According to a reliable estimate weeds account for 11.3% of the lose of potential production in Asia. The lose is in yield and quality ; weeds also increase the cost of cultivation. Some weeds act as alternate host plant for insect pests and plant pathogens. Many weeds either do not yield to chemicals or against which use of chemicals is too expensive or impracticable specially when the cultivated crop is also in the field. However, the use of phytophagous insects have been strikingly successful in controlling some of the world's worst weeds, such as prickly pear, *Opuntia* spp. in Australia by the moth *Cactoblastis cactorum* (Berg.) (Dodd, 1959), Kalmath weed, *Hypericum perforatum* L. in U.S.A. by the beetle *Chrysolina quadrigemina* Suffrian (Holloway, 1964 ; Huffaker and Kennett, 1959). A good deal of information is available on the biological control of weeds in developed countries e.g. Batra, 1979 ; Bendixen, 1981 ; Bess and Huffaker, 1951 ; King, 1966 ; Kumar jayaraj and Muthukrishnan, 1979 ; Mc Fadyen, 1979 ; Miller, 1936 ; Palel *et al* 1964 ; Robbins *et al* 1942 ; Simmonds, 1982 ; Tillyard, 1930 ; Verma *et al* 1978 and Vogt, 1960. Basic information such as the natural enemies of weeds, their taxonomy, feeding habits and biology is essential in selecting the best insect agent for biological control of the weed. With this in view an attempt has been made to list natural insect pests of weeds in cultivated fields in South India. Various groups of insect pests of weeds with their main characteristics, seasonal life cycles and the insect-weed relationship are briefly outlined. Considerable attention has been paid in India to pest of crops, but very little

is known about the natural enemies of weeds.

Some of the common weeds in South India includes *Cleome viscosa* Linn., *Gynandropsis pentaphylla* Dc., *Euphorbia hirta* Linn., *Leucas aspera* Spreng., *Amaranthus spinosus* Linn., *Digera arvensis* Forsk., *Cyperus rotundus* Linn., *Echinochloa crusgallai* Beaur., *Eclipta alba* Hassk., *Croton sparsiflorus* Morong., *Cassia occidentalis* Linn., *Ludwigia parviflora* Roxb. *Trianthema portulacastrum* Linn., *Centella asiatica* Urban, *Oldenlandia umbellata*, *Grangea maderaspatana* Poir., *Lactuca runcinata* Dc., *Sonchus oleraceus* Linn., *Heliotropium indicum* Linn., *Solanum xanthocarpum* Schard & Wendl., *Datura fastuosa* Linn., etc. (Tadulingam and Venkatanarayana, G., 1955, Barnes, D.E. and Chandapillai, M.M., 1972).

Surveys were conducted at regular intervals in cultivated fields in and around Madras for an inventory of insects infesting some of the common weeds. All weeds have been numbered with Roman and insect pests with Arabic numbers.

I **Cleome Viscosa** Linn.

Family : CAPPARIDACEAE

(Hindi : Hulhul ; Tamil : Manja Kadugu ; Malayalam : Nai Kadugu ; Telugu : Kukka vaminta).

Herbaceous annual, erect, 30-90 cm. high ; stems grooved, densely clothed with glandular and simple stickly hairs. Fruit is a lean capsule 5-7.5 cm. long. The plant is easily distinguished by its viscid hairs, 3-5 foliolate leaves, glandular sessile ovary and the yellow flowers. It has a saltish bitter taste and a strong odour.

1. **Phyllotreta chotanica** Duvr.

Tiny beetle, 2 mm long, shiny dark brown to black ; antennae extend a little beyond the middle of elytra ; first segment long, thickened and club-shaped ; second shorter than first ; third slightly longer than second ; last five segments slightly thickened ; prothorax broader than long ; scutellum small, triangular.

The flea beetles are by far the most important pest of *Cleome viscosa*. The adult beetles cause severe injury to the plant by eating off the leaves and flower buds, resulting in small rounded or irregular holes in the leaves and buds. Heavy feeding on the foliage retards growth of the plants. As many as 40-45 adult beetles were found feeding on a plant in May-August.

The Beetles jump readily when approached. The hind coxae are distinctly enlarged and thickened. They attack young plants as soon as they come up and the damage continues for some time.

Distribution : This species is previously recorded from Darjeeling.

2. **Acrosternum graminea** Fabr.

(Hemiptera : Pentatomidae)

Yellowish-green stink bugs, 7-9 mm long ; thickly punctate ; apex of scutellum with two small whitish spots ; antennae greenish.

Adults and nymphs cause injury to the plant by sucking on stems, leaves, flower buds and pods. They congregate on the plant in large numbers and suck the sap, stunting the plants and destroying developing seeds. 20-24 adult bugs may be found on a plant during peak activity (September-November). The most important damage is caused by puncturing the pods and seeds. The pods become crocked and when seriously infested,

only bear a few underdeveloped, shrivelled seeds.

Eggs are spherical, pale white are usually deposited upright in two or three rows at the rate of 17-24 a day on the pods or on tender leaves. Nymphs hatch from the eggs in 6-8 days and begin to feed on the plant sap. Newly hatched nymphs are gregarious and those from one egg-cluster feed close together. They feed and grow for three to four weeks, passing through five instars before they are capable of mating and laying eggs. The population of these bugs normally builds up during rainy season, reaching the peak in September-November. An entire generation may develop in a month and there are four or five generations in a year. In summer the bugs are very scarce.

The range of host plant of this bug is very wide. *Leucas aspera* Spreng. *Ocimum sanctum* Linn. (Labiatae), *Acalypha indica* L. ; *Croton sparsiflorus* Morong ; *Ricinus communis*, (Euphorbiaceae) *Gynandropsis pentaphylla* Dc. (Capparidaceae) *Oryza sativa*, *Pennisetum typhoides*, *Sorghum vulgara*, *Zea mays* (Gramineae). *Dolichos lab. lab*, *Sesbania grandiflora* are other known hosts.

Distribution : Occurs in many parts of India and Sri Lanka.

3. **Bagrada cruciferarum** Kirk.
(Hemiptera : Pentatomidae)

These black ochraceous bugs may occasionally attack the plants. They do not appear in large numbers. They suck sap from the leaves, tender shoots and pods. This pest is of minor importance to the plant. The period of activity of this bug is from October to November. Other host plants are Cabbage and other cruciferous plants.

Distribution : India and Sri Lanka.

4. **Exelastis atomosa** Wlsm.
(Lepidoptera)

This frail, very small, day active moth is a serious pest of the plant. The caterpillars bore into the green pods, devour the seeds, and hollow them out. Attacked pods ripen prematurely and turn yellow. Flower buds may also be attacked.

Eggs are laid singly on young pods and buds. The caterpillars are slender and pale green. The full grown caterpillar is about 8-10 mm long studded with short clubbed hairs and long spines. Pupation takes place in partially rolled leaves and the pupal period is about 5-7 days. The caterpillars are very destructive during July to November. Ten to twelve caterpillars were found on a plant in peak period. Other host plants : Red Grams (*Cajanus indicus*), *Dolichos lab. lab.*

Distribution : Throughout South India.

II **Gynandropsis PentaPhylla** DC.
(Family : CAPPARIDACEAE)

Hindi : Churota, Hulhul ; Tamil : Kattu Kadugu, Telugu : Vavinta, Malayalam : Karvela.

This is a familiar weed of waste land and cultivated dry lands. It is a tall freely branching annual herb. Leaves long-petioled alternate and palmately compound with five obovate leaflets. Leaf stalks and stems are covered with small, stiff hairs. Flowers are purple or white. Flowering time is June-July and October-November. Fruit is a capsule, 5-7.5 cm. long. Seeds are small, dark brown, kidneyshaped, covered with ridges of minute tubercles.

1. **Acrosternum graminea** Fabr.
(Hemiptera : Pentatomidae)

These green bugs are active during September-December. 9-12 bugs were found on a plant during this peak period. The adults and nymphs cause slight injury to the plant by sucking on stems, leaves, flower buds and pods.

2. **Crocidolomia binotalis** Zell.
(Webworm) (Lepidoptera)

This is a major pest of the plant. Its presence is indicated by loosely woven, dirty white webs enclosing the foliage on the ends of the branches. These webs contain black pellets of excrement from the worms. The fully grown caterpillars are between 13-15 mm long their colour varies from dirty white to greenish and the body is coarsely haired. There are five brown longitudianal lines on the dorsal side of the body.

The infestation starts when the plants are about to bloom. The adult moths lay the eggs on the leaves. The caterpillars feed on the terminal leaves, webbing them together. Later in the season they attack the flowers and penetrate in to the pods and feed on the developing seeds. Peak period of infestation is July-August and November-December. 12-15 caterpillars were found feeding on a plant in the peak period. It is a common pest of cultivated mustard.

III **Leucas Aspera** Spreng
(Family : LABIATAE)

Hindi : Guma ; Tamil : Thumbai ; Telugu : Thumbai ; Malayalam : Thumba.

This weed thrives best in well-drained loamy soils on bunds, in rice fields, in waste lands and along road sides. The weed springs up in large numbers in cultivated fields after the rains. They are not found in very moist places.

It is a herbaceous annual which grows up to a height of 45 cm. The stem is square in cross section, grooved on all sides and covered with coarse hairs ; leaves are simple, opposite, exstipulate and shortly stalked. The blade is linear, lanceolate, long, with or without toothed margin. Flowers are white, sessile crowded in dense axillary or terminal clusters. Bracts usually occur in three or four rows. Calyx is tubular. Fruit consists of four brown, smooth, oblong nutlets. Flowering and fruiting time is September to October.

1. **Agonoscelis** spp.
(Hemiptera : Pentatomidae)

Agnoscelis nubila Fabr., and *A. tamilandensis* Mathew attack the weed in considerable numbers.

Adult *A. nubila* Fabr. bugs are about 9-11 mm in length. The upper side of the body is reddish brown or ochraceous speckled with black markings. The head is stripped black and yillowish-brown. The body is covered with deep coarse black punctures ; connexivum is orange-yellow with black spots at the apices of the incisures. The veins of the membraneous part of the wings are stained black or dark brown. *A. tamilnadensis* Mathew is very similar to *A. nubila* from which it can be distinguished by having the rostrum extending upto the last visible abdomnial segment.

The adults as well as nymphs suck sap from the developing seeds and calyx. They curtail the production of seeds by destroying

seeds and thus prevent rapid spread of the weed. Though the insect continues to feed and bread during the entire year, highest infestation is noticed in September-November. As many as 12-16 adult bugs were found feeding on a plant during peak period of activity. In summer these bugs are very scarce.

Eggs are deposited upright in three to four rows on tender leaves. Upto 30 eggs are laid at a time. The chorion, is sculptured with numerous outgrowths which give a reticulated appearance. The eggs hatch in about 4-7 days into tiny brown nymphs. They begin to feed immediately after hatching and the young nymphs from one egg cluster usually feed close together. The nymphs get into the calyx and feed and hence they are not usually seen outside. They pass through five instars and require about 21-28 days to complete their development. Other host plants are aniseed, cholam and flower heads of coriander.

Distribution : They are recorded from Kashmir, Sind, Khasi Hills, Calcutta, Bombay, Poona, Nilgiri Hills, Mysore, Tamilnadu, Kerala and also from Burma, Sri Lanka, China, Japan and Malaya.

2. **Sciocoris lateralis** Fieb.
(Hemiptera : Pentatomidae)

These small bugs, 4-4.5 mm long are ochraceous ; body drakly and coarsely punctate ; a broad longitudinal three-cornered whitish spot on the lateral margins of pronotum ; scutellum with the apex ochraceous ; membrane pale brown, connexivum alternately ochraceous and piceous ; antennae brown, third segmement much shorter than second segment, fifth segment is the longest.

The bugs are found among the cluster of flowers and they feed on sap from the developing seeds. Peak period of activity is from September to December. Considerable damage is observed to the developing seeds.

Pale yellow eggs are laid singly on the ground or on stems of grass which grow under or near the weed. Chorion is sculptured with incrustations and outgrowths. Eggs hatch in 4-6 days into tiny orange-coloured nymphs. There are five instars and the nymphs become full grown in about three weeks. Because of their obscure colouration and hiding habits these insects are not generally noticed.

Distribution : Coonoor, Madras, Courtallam and Wynad and also Sri Lanka.

3. **Dolycoris indicus** Stal.
(Hemiptera : Pentatomidae)

This brownish-ochraceous densely punctate bug is about 9-9.5 mm long, apical margins of juga, lateral margins of pronotum apex of scutellum, ventral side of the body, legs, basal segment and bases of antennal segments 2-5, luteous, connexivum spotted with black at the incisures. This pest is only occasionally recorded from leucas plant and can be considered as casual feeder. The extraction of sap from the plants by this insect is of minor importance. The adults were recorded from the plant in June-July.

Other host plant of this bug is cholam.

Distribution : This bug is widely distributed in India.

4. **Acrosternum graminea** (Fabr.)
(Hemiptera : Pentatomidae)

This green bug occasionally attacks the

plant in small numbers. Nymphs and adults suck from the tender buds and developing seeds. Injury is not very severe to the plant. *Cleome viscosa* L. a weed usually found in cultivated fields and waste lands along with *Leucas aspera* is the main host plant. They usually infest the plants during September-November.

5. **Nezara viridula** L.
(Hemiptera : Pentatomidae)

These large, flattended, shield-shaped, bright green, stinking bugs about 12-16 mm long, occasionally found on the lower surface of the foliage of grown-up plants, in small numbers. They suck from the tender shoots, buds and developing seeds. This is a minor pest of Leucas. It is only a casual feeder. The host plants of this bug include castor, potato, tenai, cumbu, cholam, rice and caravelle seed.

Distribution : Throughout India, Holarctic and Ethiopian, Neotropical, Oriental and Australian Region.

6. **Plautia fimbriata** Fabr.
(Hemiptera : Pentatomidae)

The adults are 9-11 mm long ; head, pronotum and scutellum bright oilivaceous-green ; corium purplish-red. They are found sucking on the developing seeds and tender shoots. They usually infest Leucas plant in summer months (May-July). It is only a minor pest. Other host plant is *Solamum torvum* Sw.

Distribution : They are widely distributed and are recorded from Sikkim, Naga Hills, Bombay, Calcutta, Nilgiri Hills, Kerala, Javadi Hills, Sri Lanka, Burma, Malaya, China, Japan and Madagascar.

7. **Bythoscopus chlorophara** Melich
(Homoptera : Jassidae)

The slender, greenish-yellow, active, leaf hoppers are 4-4.5 mm long. The wings are held roof like above the abdomen. They run side ways when disturbed. They are found on the stem, underside of the leaves and among the flowers. They suck sap from the stem just below the terminal clusters and from the calyx. The feeding of the insects causes the flowers and the terminal portion of the shoot to wither. Peak period of activity is from December to February ; 22-24 adults were recorded at a time from a plant during this period.

8. **Cassida sp. nr. saginata** Spaeth
(Coleoptera : Chrysomelidae)

Small beetles, 4 mm long, turtle-shaped, flat below, with margins of the body extended so as to hide the head and legs, choclate-brown in colour ; the disk mottled with black. The adult beetles and larvae either eat the entire leaf or the foliage of the plant is cut full of holes. Usually they feed from the underside of the leaf. When the beetles attack the plant in large numbers the injury may be very severe. They are very destructive to *Leucas* during October to December. 12-15 adults were found feeding on a plant during this period.

The females of the tortoise beetle excavate small holes on the underside of leaves by eating the epidermis and mesophyll and lay their eggs one in each hole, covering each dull yellow egg with a very fine muslin like material which prevents the egg from falling down and also protects it. The egg is ellipsoid and is laid horizontaly. The chorion is smooth. The tint of the egg is dull yellow.

In about 7-9 days the eggs develop into tiny yellowish-green larvae which are about 1.4 mm in length and the margins of their bodies are beset with 32 thorny spines. Two thick tail like projections which can be turned up over the back at an angle of 90 degrees from the leaf, bear the shed skins. 21-24 days are required to complete the life cycle. Fully grown larvae are about 4.5 mm in length. When growth is completed the larvae fasten themselves to leaves. Pupation period is about 6-9 days.

IV. **Plectranthus wightii** Benth.
(Family : LABIATAE)

A tall herb with white flowers speckled with red points and large panicles of prominently small-bracted cymes. The leaves are cordate at base. This plant is recorded from Western Ghats, Nilgiris, Anamalis and Shevaroy Hills.

1. **Carbula scutellata** Dist.
(Hemiptera : Pentatomidae)

This slender bug is upto 8 mm in length and ochraceous in colour ; thickly and blackly punctate ; head narrow, elongate lobes of equal length ; thorax much broader than long ; posterior lateral angles acutely produced into black spines ; scutellum triangular, as long as broad at base ; two large spots at the basal angles and the apex ochraceous ; corium with purplish tinge, deeply punctate.

Numerous bugs have been observed feeding on the plant. The extraction, of sap from the plants by this insect is usually of minor importance.

Distribution : Kashi Hills, Bombay, Burma, Silent Valley and Shinagad, Pune.

2. **Carbula socia** Walk.
(Hemiptera : Pentatomidae)

Ochraceous, deeply and thickly punctate ; *head* : twice as long as broad between eyes ; lobes of equal length ; *thorax* : twice as broad as long ; anterior margin deeply emarginate ; anterior angles acute ; posterior angles produced into moderately long obtuse black spines ; *scutellum* : triangular, a large spot at each basal angle and apex ochraceous ; corium with purplish tinge ; *length* : 8 mm.

Numerous bugs were found feeding on the plant along with *C. scutellata.*

V. **Amaranthus spinosus** Linn.
(Family : AMARANTHACEAE)

Hindi : Cholai ; Kanta nutiya ; Tamil : Mullu Keerai ; Telugu : Mulla Thotakoora ; Malayalam : Mullan Cheera.

Stout spinous annual shrub upto about 39 to 60 cms. tall ; slender spines arise from leaf axils ; Thc stem is rounded, green or reddish-green ; leaves alternate, oval to oblong in outline, tip blunt with a hair-like point ; inflorescence in dense spikes arising from leaf-axile ; flowers small, green ; common in fields gardens and waste lands.

1. Amaranthus Weevil **Hypolixus truncatulus** F.
Coleoptera : Curculionidae)

The amaranthus weevil is the most serious insect pest of amarathus plant in South India. The grubs of the weevil bore into the top shoots and stem and produce gall-like swellings. The grubs eat the soft part of the stem by tunneling and the plant is killed by the time adult emerges out from the plant. The grubs pupate inside the stem 12-15 grubs

were found in a full grown plant. Incidence of the insect is the maximum in October-December.

2. **Zinckenia (=Hymenia) fascialus** Cramer
(Lepidoptera : Pyralidae)

Small, dark brown ; forewing with a medial black edged white band, its outer margin irregular and toothed on vein 2 ; hind wing with the band wider, slightly narrowing to the inner margin. The caterpillars feed on the leaves. The moths lay eggs on the tender leaves during October-November, pupate inside rolled leaves.

Distribution : Neotropical, Ethiopian ; Palearctic, Asia, (from Syria to Japan) Oriental region and Australian region.

VI. **Digera arvensia** Forsk
(Family : AMARANTHACEAE)

Hindi : Latmahuria ; Tamil : Thoya Keerai ; Telugu : Chenchali Koora.

Common weed found in most loamy soil of the cultivated field. A slender herb with prostrate branches ; the stem is round, striate ; glabrous. Leaves are simple and alternate ; flowers are pink and green.

1. **Cassida exilis** Boh.
(Coleoptera : Chrysomelidae)

Small beetle 3.75 mm long, yellow-brown to light yellow in colour without markings ; head smooth with a few scattered punctures ; prothorax elliptical, the lateral angles acute, the front margin forming an arch and drawn forward in the middle ; the disc convex, smooth and impunctate ; on each elytron nine to ten rows of punctures.

The adults feed mainly on the leaves ; they chew rounded holes into the leaf blades (fig. 7) and weaken the plant. The beetles were found feeding on the plant in large numbers in September-October.

VII. **Echinochlosa crusgalli** Beauv.
(Family : GRAMINEAE)

Hindi : Samak ; Tamil : Swau ; Telugu : Othagaddi.

A slender, annual growing to a height of 30-60 cm. ; stem tufted, bend upward ; blades laceolate ; inflorescence consists of terminal racemes ; spikelet broadly oval, pointed ; spikelets crowded in small groups on the spikes ; very common in rice fields, open damp places, waste grounds and sandy or clay soils.

1. **Menida histrio** Fab.
(Hemiptera : Pentatomidae)
(Fig. 8)

Reddish-ochaceous, 6-8 mm in length ; head with the margins and four longitudinal lines blackly punctate ; pronotum with an anterior submarginal black line and two transverse annulate black markings on anterior area ; scutellum with a reddish ochraceous spot on each basal angle ; an anterior discal spot and one on each lateral margin a little before the apex black ; corium with the disk greyish olivaceous, the apical area reddish ochraceous ; connexivum ochraceous spotted with black ; membrane colourless ; a central abdominal series of spots black ; antennae ochraceous ; abdominal spine reaching intermediate coxae. They damage the developing spikelets by sucking the juice and thus prevent seed formation.

Main host plants are rice and millets. When the rice is ripe the bugs feed on the weeds. The highest infestation is in June-August.

Distribution : West Bengal, Karnataka, Sri Lanka, Burma, China and Formosa.

VIII. **Eclipta Alba** Hassk

(Family : COMPOSITAE)

Hindi : Babri, Bhangra ; Tamil : Karasalanganni ; Malayalam : Kyonni, Telugu : Guntakalavaraku.

Common weed in rice fields, bunds of irrigation cannels and tank beds ; annual ; stem is round with strigose hairs, leaves 2.5-9 cm. long, both sides covered with hairs.

1. **Spodoptera mauritia** Boid.

(Lepidoptera)

Grey and Black moth with a blotch of white on the forewing, tufts of hair on the fore legs of the male.

This species is widely distributed and is a major pest of rice. The caterpillars which are green eat the leaves of the weed in large numbers during and after rain. The infestation is very severe in October-November.

IX. **Euphorbia Hirta** Linn.

(Family : EUPHORBIACEAE)

Hindi : Dudhi, Tamil : Ammam Paccharisi ; Telugu : Nanabalu.

Herb, hairy, 30 cm tail, branched from near the base ; stem often tinged reddish, leaves opposite ; main stem and leaf stalk, hairy ; single leaf oblong, base rounded and unequal, margins toothed, leaf stalk very short, inflorescence arise from the axils of leaves ; common in rice fields and waste land.

1. **Achoea janata** L. (Fig. 9)

(Lepidoptera : Noctuidae)

Pale Reddish-brown moth with hind wings black with a medial white band and three large white spots on outer margin.

Eggs round, blue green in colour : eggs are laid on the under surface of the leaves singly ; 1-6 eggs are laid at a time ; incubation period 2-5 days, first instar larva slender, yellowish green, full grown larva 60-65 mm in length with a black head ; apex of loop black with a red spot and tubercles red ; larvae gregarious, feed voraciously on leaves : they defoliate the plants leaving only the veins of leaves ; larval period ranges from 11-15 days ; pupates in the soil, pupal stage lasts 10-14 days.

Major pest of castor. Apart from castor it feeds on rose, pomegranate, T*ridax procumbens*, *Ficus bengalensis* and *Cardiospermum halicacabum* L.

X. **Croton Sparsiflorus** Morong

(Family : EUPHORBIACEAE)

Erect, branched annual, growing to a height of 1-3 feet ; stem green, woody at base, ends in an inflorescence ; leaves are simple, alternate, exstipulate and crowded towards the tops ; fruit is a capsule ; seeds oblong, polished.

1. **Acrosternum graminea** Fabr.

(Hemiptera : Pentatomidae)

This bug attack the plant by sucking on stems, leaves and flowers. Both adults and nymphs are injurious to the plant.

XI. **Acalypha Indica** Linn.

(Family : EUPHORBIACEAE)

Hindi : Kuppi, Kuppaimeni, Malayalam : Kuppameni, Telugu : Muripindaku. Erect, herbaceous

annual, growing to a height of of 30-60 cm ; the stem is round or angular, leaves simple, alternate ; flowers minute, green, unisexual, arranged in axillary spike ; male flowers many, minute, clustered towards the top of the spike.

The weed is very common in cultivated fields and waste lands especially after the rains.

1. **Acrosternum graminea** Fabr.
(Hemiptera : Pentatomidae)

Both adults and nymphs feed on the leaves and stem.

XII. **Borreria Laevicaulis** Ridl.
(Family : RUBIACEAE)

Herb with wiry, square, purplish stems, upto about 50 cm tall, branched at the base ; leaves opposite ; single leaf about 3-5 cm long, oblong, widest near the base, tip pointed, flowers in small heads in the leaf axils.

1. **Spermatodes veariolosa** Walk.
(Hemiptera : Pentatomidae)

Very small, ochraceour, thickly punctate ; head anterior area of pronotum, basal margin of scutellum and body beneath brassy:green, a sub-triangular discal spot to scutellum castaneous ; two central spots on anterior area of pronotum, three spots at basal margin of scutellum, legs, antennae, bases of femora green.

Adults and larval stages feed on the flowers and thus damage the flowers. The bugs are found throught the year, other host plants are not known :

Distribution : Madras, Wynad, Silent Valley, Shencottah, Sri Lanka.

ACKNOWLEDGMENTS

I am grateful to Dr B.K. Tikadar, Director, Zoological Survey of India and Dr R.S. Pillai, Deputy Director, Southern Regional Station, Madras for facilities ; I am most grateful to Prof. M.S. Mani for reviweing the manuscript and for valuable suggestions. I acknowledge with thanks the help given by the Officer-in-Charge, Botanical Survey of India, Coimbatore Circle and the Systematic Entamologist, I.A.R.I. New Delhi.

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Fig. 1. Damage to leaves of *Cleome viscosa* by flea beetles, *Phyllotreta chotanica* Duvr.

Fig. 2. Pods of *Cleome viscosa* injured by Caterpillars of *Exelastis atomosa*.