

* Description and Biology of a New Species of Weevil
Damaging Snake Gourd (*Trichosanthes anguina*)
in South India (Part II)

by

T. R. SUBRAMANIAM, M. SC.,
Agricultural College and Research Institute, Coimbatore.

LIFE-HISTORY AND DESCRIPTIONS OF STAGES

Copulation: The weevils freely copulate both in the field and laboratory. Copulation lasts for 30 to 40 minutes. The time from emergence to copulation varies from 1 to 2 days.

Pre-oviposition, period of oviposition and fecundity: Observations on these aspects were made on 15 females. The pre-oviposition period ranged from 5 to 11 days with an average of 21.9 days. The maximum number of eggs laid under captivity was only 42. The number of eggs laid varied from 23 to 42 with an average of 31.6. The daily range of egg laying varied from 1 to 4.

Place and method of oviposition: Eggs are laid in the leaf petiole and at the nodal region of the stem. The weevil makes a small puncture at the place of oviposition, the length of which being as long as rostrum, and inserts one egg. The gummy fluid that oozes out due to the injury made dries up and forms a covering for the egg.

EGG

The egg is pale yellow, smooth, glossy and oblong oval in shape. A freshly laid egg measures on an average 0.51 mm. in length and 0.36 mm. in width. As it develops, the egg swells up slightly and the brown mandibles of the embryo become visible in 3 days.

The incubation period with reference to 50 eggs was found to range from 5 to 6 days with an average of 5.8 days in the laboratory when the average maximum and minimum temperatures and humidity were 83.4°F, 76.7°F and 87.1% respectively.

LARVA

The larva passes through five instars. There is not much difference in the general characters between the various instars. The description of each instar and the duration of each studied with reference to 20 individuals are given below.

* Forms part of thesis submitted for M. Sc., degree of Madras University.

First instar: Length of the body 0.9 mm; width 0.4 mm.; length of head 0.27 mm; width 0.27 mm.

Apodous. Colour pale white. *Body* slender, cylindrical, moderately curved with a narrow posterior end. *Head* smooth, pale yellowish brown, shiny with a dark streak on the posterior end of frons. *Mandibles* prominent and dark brown. The whole body is sparsely beset with minute hairs.

The duration of the first instar varied from 3 to 4 days with an average 3.1 days.

Second instar: Length of the body 1.9 mm, width 0.5 mm. Length of head 0.36 mm; width 0.34 mm.

Colour and body characters similar to first instar. A dark line or epicranial ridge on each side of the cranium commencing from a small posterior emargination and running anteriorly more or less parallel to the outer margin of the head capsule and a broad V shaped pale whitish band on the dorsal side are very distinct. Other characters similar to first instar.

The duration of the second instar varied from 3 to 4 days with an average of 3.6 days.

Third instar: Length of body 2.3 mm; width 0.75 mm. Length of head 0.47 mm; width 0.42 mm.

Characters similar to previous instar.

The duration of third instar varied from 3 to 4 days with an average of 3.9 days.

Fourth instar: Length of body 2.8 mm.; width 1.0 mm. Length of head 0.61 mm; width 0.52 mm.

Colour white. Other characters similar to third instar.

The duration of fourth instar varied from 4 to 5 days with an average of 4.2 days.

Fifth instar: (Full grown grub)

Length of body 4.2 mm.; width 1.2 mm. Length of head 0.7 mm; width 0.62 mm.

Colour uniformly white. Apodous. *Body* weakly curved, slender, cylindrical and much wrinkled with posterior end narrowing slightly.

Head Capsule: Chitinised, yellowish brown, longer than broad with a distinct and characteristic dark line or epicranial ridge posteriorly placed on each side of cranium on the dorsal surface and a system of broad V shaped pale whitish bands on the dorsal surface in addition to frontal and epicranial sutures. *Epicranial suture* somewhat longer than half the cranial sutures. *Epicranial ridge* curved, commences from posterior end of epicranial suture and runs anteriorly parallel to the outlines of the head capsule, each ridge a little more than half as long as as epicranial suture. Each epicranial half with five setae. *Frons* subtriangular, a little wider than long, length three fourths epicranial suture and with a distinct dark median line on the posterior end extending to half the length of frons; provided with three pairs of setae. *Ocellus* one present on each side. *Antenna* small, two jointed; basal joint wide, flat, membranous; apical joint conical and proximally with a ring-shaped chitinisation. *Clypeus* one and a half times wider than long with two pairs of tiny setae and four sensory punctures on the posterior margin. *Labrum* strongly transverse, anterior margin convex and posterior margin prolonged into a triangular projection and covered by the clypeus; upper surface with one pair of long and two pairs of medium sized setae. *Epipharynx* with a pair of rods extending beyond the middle of clypeal zone, and converging posteriorly, the anterior margin with six median setae and a lateral group of three stout elongate ovate, somewhat curved, basically suddenly constricted setae arranged in slightly oblique, inwardly and anteriorly directed series on each side; between the rods are two pairs of setae; anterior pair much bigger and more widely separated, and placed between the apices of the rods. *Mandibles* strong, subtriangular, with broad basis and heavy condyle, apex acutely bidentate; length equal to its greatest width. *Maxilla* elongate; cardo smooth without setae; stipes longer than broad with a basal lateroventral seta and two setae in the palpiferous region; palpus two jointed, basal joint as long as broad with a small seta and a pair of sensory pores; apical joint longer than broad, a little shorter than basal joint in length and only half as wide as basal joint; provided with one sensory pore in the middle and sensory pegs at the tip; mala simple, large and armed with nine long setae and a minute seta. *Labium* longer than broad, posteriorly limited by a Y shaped chitinised band and with one pair of setae on labial stipe; palpus two jointed, basal joint as long as broad with one sensory pore, apical joint distinctly longer than broad with one sensory pore in the middle and a few sensory

pegs at the tip; ligula thick with two pairs of setae anteriorly; subfascial area entire with one long and two short setae on each side.

Thorax: With three distinct divisions namely prothorax, mesothorax and metathorax. *Prothorax* is hardly so wide as mesothorax; tergum simple with four pairs of setae. *Meso and Metathorax* with tergum divided into two folds namely prescutum and scuto-scutellum; pre-scutum with a pair of setae, scuto-scutellum with four setae in a straight line; alar area with one minute seta. Pedal lobes are distinct and not protuberent each carrying four small setae.

Abdomen: Ten segmented, each of the first eight segments has three distinct tergal folds namely prescutum, scutum and scutellum, scutum being smaller; prescutum with two pairs of setae, scutum without seta and scutellum with two pairs of setae; alar area with two setae; each epipleural lobe with a single seta and hypopleural lobe with two setae. The ninth abdominal segment has a simple entire tergum with few hairs and the last segment is short and wart shaped with a few minute setae. *Spiracles* small, bifore and present on the mesothorax and first eight abdominal segments; each with two contiguous air tubes which are longer than peritreme and each air tube with about seven incomplete annuli; spiracular opening circular.

The duration of fifth instar was found to be four days in all the individuals.

The total larval period was found to vary from 18 to 20 days with an average of 18.7 days for 20 individuals.

Habits of larva: Immediately after hatching the grub starts feeding on the tissues around the hole in which egg is laid. Later it gradually starts boring and reaches the nodal region if egg is laid in the petiole. If egg is laid in the node, the grub feeds on the contents surrounding the nodal region. The grubs very often complete the lifecycle in the nodal region itself and do not bore long distances in the vines. When full fed the grub forms inside the stem an entirely close elongate oval cocoon formed of largely excrementitious matter. The grubs are very sluggish by nature.

PREPUPA

At this stage the grub measures 3 mm. in length. This stage lasts for one day. The stage can be recognised by the shortening of the grub in length and thickening of the thoracic region.

PUPA

Average length of the body 2.8 mm. ; width 1.1 mm.

General colour uniformly white but turns still darker before transformation into adult. *Body* soft beset with hairs which are concolourous with the body. *Head* smooth, broader than long and provided with three pairs of setae originating from minute tubercles as follows: one pair on the vertex near the longitudinal middle line, one pair laterally above the eye case and one on the inner margin of the eyes. *Rostrum* about one third total length of pupa, curved, and bears three pairs of setae on small tubercles, posterior pair placed close to the eyes, middle pair between the position where scape is inserted and the third pair at the anterior end. *Antenna* geniculate, segments not distinct. *Prothorax* one and one fourth times broader than long, posterior end more than twice as broad as anterior end, provided with six pairs of long and one pair of tiny setae raised on tubercles which consist of four pairs marginal, two pairs discal and one pair basal setae. *Mesothorax* broader than long and bears two pairs of setae on tubercles. *Metathorax* with six pairs of setae, three placed in scutellar area. *Abdomen* one and a half times longer than broad, nine segmented; segment 1 to 8 with transverse row of setae on prominent tubercles dorsally, consisting of two median pairs and one pair in the pleural region; ninth segment with a pair of curved processes. There are no setae on any abdominal sternum. *Legs* folded and each femora with one pair of setae at the distal end.

Pupation takes place inside the larval burrow itself in a cocoon composed of largely excrementitious matter. The duration of pupal stage ranged from 6 to 8 days with an average of 7.2 days.

The total life cycle from egg to adult varied from 29 to 33 days with an average for 31.8 days for 20 individuals.

Habits of adult: The adult is a small black weevil which is usually found clinging to the nodal region and to the base of the leaf blade in an infested creeper. The adults are very active especially during the early hours of the morning. When approached they fall down suddenly and feign death and in this posture they remain for

only a short time. They are capable of flying quickly to long distances and by this they spread to other places. They feed on tender stem and leaf petioles.

Longevity : Observations on the length of life of adults were made on 30 individuals in each sex, 15 without food and 15 with food. The duration varied from 13 to 49 days with an average of 27.2 days for females and from 21 to 39 days with an average of 21.2 days for males with food. Without food it ranged from 3 to 6 days with an average of 4.3 days for females and 2 to 7 days with an average of 4.0 days for males.

Dissemination : The weevil spreads from one place to another by flight.

Natural enemies : . No parasite or predator noted either on on grubs or adults during the studies.

Seasonal occurrence : Snake gourd is raised in two seasons at Coimbatore one from July to January and the other from March to July in summer. The weevil occurs mostly in the main season crop grown from July onwards. The adults appear early in September when the crop is about one and half months old. Egg laying is commenced in September and continued as long as the crop is left. Grubs are noted from September upto removal of the crop and pupae from end of October. About three generations are passed by the weevil in the main season crop. In the crop raised during the summer egg laying is commenced in the middle of May and continued up to the removal of crop. Most of the adults emerge by end of June. Only one generation of this weevil has been noted in the summer crop.

Summary : The description of a new weevil *Baris trichosanthis* n. sp. attacking the shoots of snake gourd (*Trichosanthes anguina*) a common vegetable grown throughout South India, is given. The aspects of biology of the weevil are also fully described. Eggs are laid on the nodal region and petioles in excavations made by the adult in 5 to 11 days after emergence. The maximum eggs laid is only 42. The oviposition period also is short maximum being only 28 days. The period of different stages of the weevil are 5 to 6 days for egg, 18 to 20 days for larva and 6 to 8 days for pupa. The larva has 5 instars the duration of each varying from 3 to 4 days. The duration of adult life for both sexes is short under captivity with a range from 13 to 49 days in female and 21 to 39 days in male. The

pest occurs throughout the year at Coimbatore. It has three generations in the main crop raised from July to January and only one in the crop raised in summer from March to July

Acknowledgements : The author is thankful to Sri K. P. Ananthanarayanan, retired Entomologist, Coimbatore, for his guidance and suggestions. He is also grateful to Sri G. A. K. Marshall, British Museum, London and W. Dwight Pierce, California for kindly identifying and confirming the generic name and also to Mr. Van Emden, British Museum for his advice in the study of larval morphology.

REFERENCES CITED

- Ramakrishna Ayyar, T. V. 1932 . Annotated list of the insects affecting the important cultivated plants in S. India. — *Bull. Mad. Agric. Dep.* 27 : 34
- 1940 Handbook of Economic Entomology for South India. P. 274.
Supdt. Government Press, Madras.

REVIEW

1. Power and Irrigation Projects of Madras State (in English) Price: 10 nP.
2. Power and Irrigation Projects of Madras State (in Tamil) Price: 10 nP.
3. Nutritive Wheat (in Tamil)

The above three booklets are issued by the Director of Information and Publicity, Madras.

Booklets (1) and (2) give briefly useful and interesting information of the Irrigation and Electricity Power Projects completed and under execution in Madras State. The photographs and particulars about amount spent, area irrigated, power developed etc. in respect of each project are interesting. The public would benefit by these details.

Booklet No. (3) furnishes details of the ultimate value of wheat and gives over 50 recipes for sweet and savoury wheat preparations, which will be interesting to house wives. The booklet is worth possessing by those interested in wheat as an article of diet since large imports of wheat are expected shortly under the recent Indo-American food agreement.