

The Immature Stages of *Stethorus punctillum* Weise (Coleoptera: Coccinellidae)¹

By WM. L. PUTMAN²

Entomology Laboratory, Vineland Station, Ontario

Various authors have given general descriptions of the immature stages of various species of *Stethorus*, and Böving (1917) described certain morphological features of the larvae of *S. punctum* (Leconte) and *S. utilis* (Horn), but no complete account of the morphology of these stages in any species of the genus has apparently been published. Clement (1880) gave the most thorough of the earlier descriptions of the immature stages of *S. punctillum* Weise.

The following descriptions are based on material reared from adults captured at Vineland Station, Ontario, where the occurrence of *S. punctillum* was recently recorded by the author (Putman, 1955). Approximately 25 individuals of each stage were examined.

Egg.—Figured by Collyer (1953). Attached to the substratum longitudinally, elongate with bluntly rounded ends, 0.22 to 0.23 by 0.34 to 0.39 mm. Chorion very finely reticulate; white to pale yellow when fresh, becoming dusky as the embryo develops.

Fourth (last)- instar Larva.—Dark greyish to reddish-brown with darker tubercles and sclerites. Fusiform, widest on metathorax and first abdominal segment. Head (Fig. 1) prognathous, slightly deflexed. Cranium in dorsal

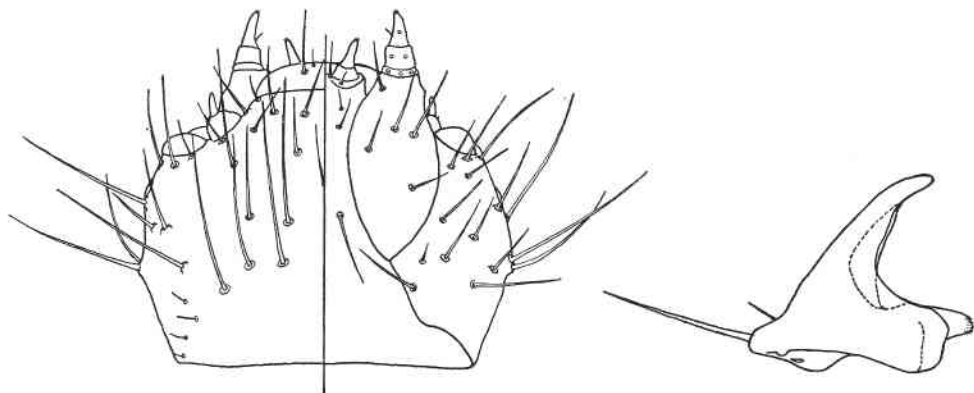


Fig. 1. Fourth-instar larva of *Stethorus punctillum* Weise; dorsal and ventral views of head and ventral view of right mandible.

aspect more or less rectangular, slightly wider than long, widest near middle; sides gently curved, occipital margin nearly straight. Antero-lateral margins of cranium obliquely truncate behind to the ends of the clypeolabral suture, which is slightly convex and about two-fifths as wide as the greatest width of the cranium. Dorsum of head without distinct sutures. The membranous gular region extending nearly across the posterior width of the cranium, narrowing anteriorly to the bases of the maxillae. Head with many long, finely pectinate setae, the longest about half as long as the width of the cranium. Labrum deflexed, broadly curved distally, more strongly rounded at sides. Two very large

¹Contribution No. 3363, Entomology Division, Science Service, Department of Agriculture, Ottawa, Canada.

²Entomologist.

ocelli, one dorsal and one ventral, directed forward at each anterolateral angle of head; a third ocellus much smaller, possibly functionless, on each side of the cranium behind the large ocelli.

Antenna greatly reduced, moundlike, wider than long, without distinct segmentation; terminated by a stout spikelike sensillum about 1.5 times as long as the rest of the antenna, probably homologous with a similar but relatively smaller structure on the second segment of other species illustrated by Gage (1920); beside it a group of minute sensilla presumably arising from the remnant of the third segment. Mandible falcate, deeply grooved internally, apex acute and entire; a prominent blunt mola with two longitudinal ridges; a membranous prostheca, very finely setose apically, above and distad of the mola and projecting beyond it. The molae of the opposing mandibles do not meet but work against the hypopharyngeal bridge as described by Böving (1917) in *Hyperaspis*.

Cardo and stipes of maxilla united, longitudinally ovate, pointed basally; palpifer large, length and width nearly equal, segmentlike but without evident division from cardo-stipes. Maxillary palpi large, three-segmented, each arising from a narrow articular ring; first segment much wider than long; second about the same length but thinner; third thinner than second, longer than first and second together, tapering slightly to a rounded tip bearing about 10 very small peglike sensilla. The distal part of the maxilla, or mala, a soft, membranous, undivided lobe, largely concealed ventrally by the palpus.

Labium soft and membranous, undivided, without evident division from the gula. Labial palpus well developed, two-segmented, arising from a narrow articular half-ring; first segment wider than long; second narrow, slightly tapering, length about four times the greatest width; tip blunt with one larger and several smaller peglike sensilla.

Pronotum transversely elliptical, about 1.4 times as wide as long, widest slightly behind the middle, closely set with minute rigid spicules and with many long, finely pectinate setae.

Meso- and meta-terga each more than twice as wide as long, indistinctly divided longitudinally into two heavily sclerotized regions bearing setae and spicules like those on the pronotum. The conspicuous mesothoracic spiracle and the rudimentary metathoracic one situated below the cephalolateral angle of the tergum; no tubercles or spines in the spiracular region. According to Böving (1917), in the tribe Scymnini (including *Stethorus*) this region is united with the tergum. In *S. punctillum* the spiracular region is membranous and distinct from the lightly sclerotized tergum although they are not separated by a suture. On each thoracic pleurum below the caudolateral angle of the tergum, a tubercle bearing three setae. Meso- and meta-thoracic pleura each with a narrow, oblique sclerite; rest of pleura and sterna membranous without distinct divisions. Legs stout; femora and tibiae subequal in length, coxae slightly longer; tips of tibiae each with about 18 long tenent hairs; tarsunguli deeply toothed at bases.

Abdominal segments 1 to 8 with low, lightly sclerotized tubercles (*verrucae* of Gage, 1920) bearing pectinate setae of greatly varying length and many minute spicules; four tubercles arranged transversely on each tergum, one on each pleurum, and four reduced ones on each sternum; inner tergal tubercles with eight or nine setae up to 0.5 mm. long; outer tergal, five or six up to 0.5 mm.; pleural, five to eight up to 0.92 mm. Sternal tubercles small, not sclerotized, each with four to six short setae. Spiracles on terga near cephalolateral angles. Ninth segment with tubercles coalesced, without spiracles; tenth segment normally invaginated but eversible as an anal sucker.

The membranous parts of the integument of the thorax and abdomen are finely roughened with closely set points, most evident on the dorsum.

In the intersegmental membrane between the first and second abdominal terga are a pair of longitudinal invaginations, probably the openings of repugnatorial glands.

Earlier Instars.—The earlier instars are similar to the fourth, the most obvious difference being fewer setae on the tubercles. Length of first-instar larva, 0.58 to 1.04 mm.; second, 0.90 to 1.46; third, 1.39 to 1.87; fourth, 2.01 to 2.88. Average width of head capsule of eight larvae: first instar, 0.143 mm.; second, 0.198; third, 0.242; fourth, 0.302.

Pupa.—Similar to that of *S. punctum* as figured by Weldon (1909); free of the larval exuviae, which are pushed down about the anal attachment. Dorsum piceous-black, variably lighter on mesonotum and laterally on abdominal tergites, pale ventrally; covered, except ventrally, with pale yellowish-brown pubescence composed of longer, tapering setae mixed with shorter, clavate ones. Ovale, widest at first abdominal segment, depressed and closely appressed to the substratum, to which it is attached by the anal end and by a soft process from the frontal region of the head. If the frontal process is forcibly detached from the substratum it shrivels into a rough scar. Such pupae produce normal adults. Pronotum large, deflexed at right angles to the rest of the thorax. Head directed caudad. Elytra extending to the third abdominal segment laterally and to the caudal edge of the fourth ventrally; hind wings extending to the fifth.

Acknowledgment

The writer is indebted to Dr. E. C. Becker, Entomology Division, Ottawa, for criticism of this paper and for references to the literature.

References

- Böving, A. 1917. A generic synopsis of the coccinellid larvae in the United States National Museum, with a description of the larva of *Hyperaspis binotata* Say. *Proc. U.S. Natl. Mus.* 51: 621-650.
- Clement, A.-L. 1880. Observations sur les premiers états du *Scymnus minimus* Payk. *Ann. Soc. Ent. France*, 5th ser., 10: 341-346.
- Collyer, Elsie. 1953. Biology of some predatory insects and mites associated with the fruit tree red spider mite (*Metatetranychus ulmi* (Koch)) in southeastern England. II. Some important predators of the mite. *J. Hort. Sci.* 28: 85-97.
- Gage, J. H. 1920. The larvae of the Coccinellidae. *Illinois Biol. Monogr.* 6(4).
- Putman, W. L. 1955. Bionomics of *Stethorus punctillum* Weise (Coleoptera: Coccinellidae) in Ontario. *Canadian Ent.* 87: 9-33.
- Weldon, G. D. 1909. Two common orchard mites. The brown mite. The red spider. *Colorado Agr. Expt. Sta. Bull.* 152.

(Received October 31, 1955)