

A new genus and species of coccinellid (Coleoptera: Coccinellidae) predator on *Rastrococcus* spp. (Homiptera: Pseudococcidae) from India

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Abstract

Aponephus lentiformis, a new genus and species of Coccinellidae, is described from southern India and placed in the tribe Scymnini. It was found during searches for natural enemies of *Rastrococcus* spp.

Introduction

Coccinellid beetles have been used for classical biological control since the later years of the nineteenth century when Albert Koebele introduced *Rodolia cardinalis* (Mulsant) from Australia into California to control cottony cushion scale, *Icerya purchasi* Maskell (Homoptera: Margarodidae), which was devastating the citrus industry. Since then, many species have been used for biological control throughout the world with varying degrees of success or failure (see for example, Clausen, 1978; Huffaker & Messenger, 1976). Except for the plant-feeding subfamily Epilachninae, some mildew-feeding, and some mite-feeding species, almost all other coccinellids are predators on Homoptera, especially aphids, whiteflies, and scale insects. However, for most coccinellids, their full range of prey is poorly known and this is in part due to difficulties in their identification, especially the smaller species.

The appearance of *Rastrococcus invadens* Williams in West Africa and its devastating effect on fruit production (Agounké *et al.*, 1988; Willink & Moore, 1988) sparked off a search for its natural enemies. The Food and Agriculture Organization of the United Nations (FAO) funded an initial project for the biological control of *R. invadens* undertaken by the CAB International Institute of Biological Control (now the International Institute of Biological Control, an Institute of CAB International), which led to the parasitoid *Gyranusoidea tebygi* Noyes (Hymenoptera: Encyrtidae) being introduced from India into Togo in 1987 where it has been remarkably successful (Agricola *et al.*, 1989).

Searches for natural enemies of *Rastrococcus* spp. in India revealed various species of predators and parasitoids (Narasimham & Chacko, 1988), including four species of Coccinellidae which all belong in the tribe Scymnini. Of these coccinellids, one was a small species

identified only as belonging to a genus near *Nephus*. Cultures of this species were reared in the laboratory at Bangalore, India on *Rastrococcus iceryoides* (Green). They also fed on *R. invadens*, although it was not known whether they would reproduce on a diet consisting solely of this species.

Sasaji (1971) keyed the subfamilies and tribes of Old World Coccinellidae, and the generic keys in Sasaji (1971), Iablokoff-Khnzorian (1976), and Fürsch (1987) include all the genera of the tribe Scymnini currently known from India. However, as the above Indian coccinellid species could not be assigned to any known genus, it is here described as a new species in a new genus.

Aponephus, gen. n.

Type species: *Aponephus lentiformis*, sp. n.

Diagnostic characters. Belonging to Scymnini and closely related to *Nephus* Mulsant by: pubescent eyes; normal, T-shaped prosternum, lacking carinae; trimerous tarsi; incomplete, postcoxal plates on basal, abdominal sternite; but differing by rather broad, strongly descending, elytral epipleura; very broad, plate-like femora; and strongly flattened tibiae.

Description. Body (fig. 1) short oval; outline of head, sides of pronotum and elytra continuous; dorsum moderately and evenly convex, pubescent; venter flat. Antennae (fig. 3) 9-segmented, very short, scarcely longer than half width of head between eyes; basal segment largest, broad medially, not visibly subdivided; second segment more or less quadrate; third to seventh segments short, becoming progressively more transverse; eighth quadrate and terminal segment weakly transverse; pubescent and with pale setae, but lacking any long, black setae (as found characteristically in *Pseudoscymnus* Chapin). Head (fig. 2) transverse; eyes of moderate size, moderately finely faceted, with erect pubescence and small emargination behind antennal insertions; clypeus emarginate

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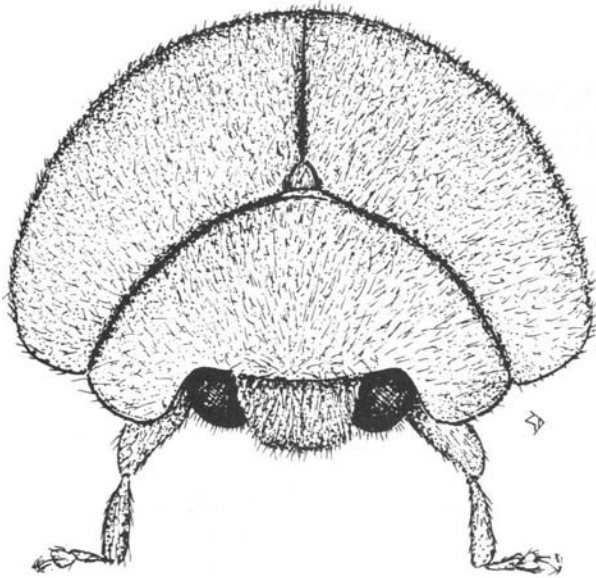


Fig. 1. *Aponephus lentiformis* sp. n.

around antennal insertions, weakly concave anteriorly. Mouthparts typically scymninae; mandibles (fig. 4) bifid apically; maxillary palpi (fig. 5) short, apical segment slightly longer than broad, more or less parallel sided, obliquely truncate apically; labial palpi (fig. 6) 3-segmented; mentum (fig. 6) of moderate width basally.

Lateral margins of pronotum strongly descending (fig. 1). Scutellum small (fig. 1). Prosternum (fig. 7) T-shaped, prosternal process convex anteriorly, lacking carinae. Mesocoxae (fig. 8) moderately well separated. Elytral epipleura (fig. 8) rather broad, strongly descending externally, with weak impressions but not obviously foveate to receive femoral apices; internal marginal bead continued anteriorly to base of epipleura (fig. 8), not partially traversing epipleura just behind humeral angles (as fig. 12). Legs (fig. 10) with femora very broad, strongly flattened; trochanters very broad; tibiae strongly flattened with apical fringe of setae but lacking tibial spurs; tarsi trimerous. Metendosternite (fig. 9).

Abdomen with six visible sternites in both sexes; post-coxal plates (fig. 11) on first visible sternite almost reaching hind margin of sternite and approaching lateral margin. Apophysis of ninth abdominal segment in male (fig. 18) elongate; hemisternites of female (fig. 19) elongate; sperm duct (fig. 19) without sclerotized infundibulum.

Etymology. The prefix *Apo-* is used to suggest that this genus is separate from *Nephus*. Gender is masculine.

***Aponephus lentiformis*, sp. n.**
(figs 1–11, 13–19)

Description. 1.9–2.5 mm long, uniformly brownish yellow. Head with frons finely punctured; punctures separated by about one diameter; interstices very finely microsculptured. Pronotum shiny, without microsculpture; punctures fine, separated by about 1.5–3 diameters except adjacent to lateral margins where punctation coarser. Elytral punctation shallow, slightly coarser than

that on pronotum, but similarly spaced; lacking subsutural rows of larger punctures. Elytral pubescence directed apicad, variable in length, shorter hairs decumbent, longer hairs semi-erect.

Sixth visible sternite notched medially in male (fig. 17), entire in female. Male genitalia with parameres broad, median lobe rather short and asymmetric apically (figs 15, 16), siphon (figs 13, 14). Female genitalia with spermatheca simple, sperm duct short (fig. 19).

Distribution. Currently known from southern India.

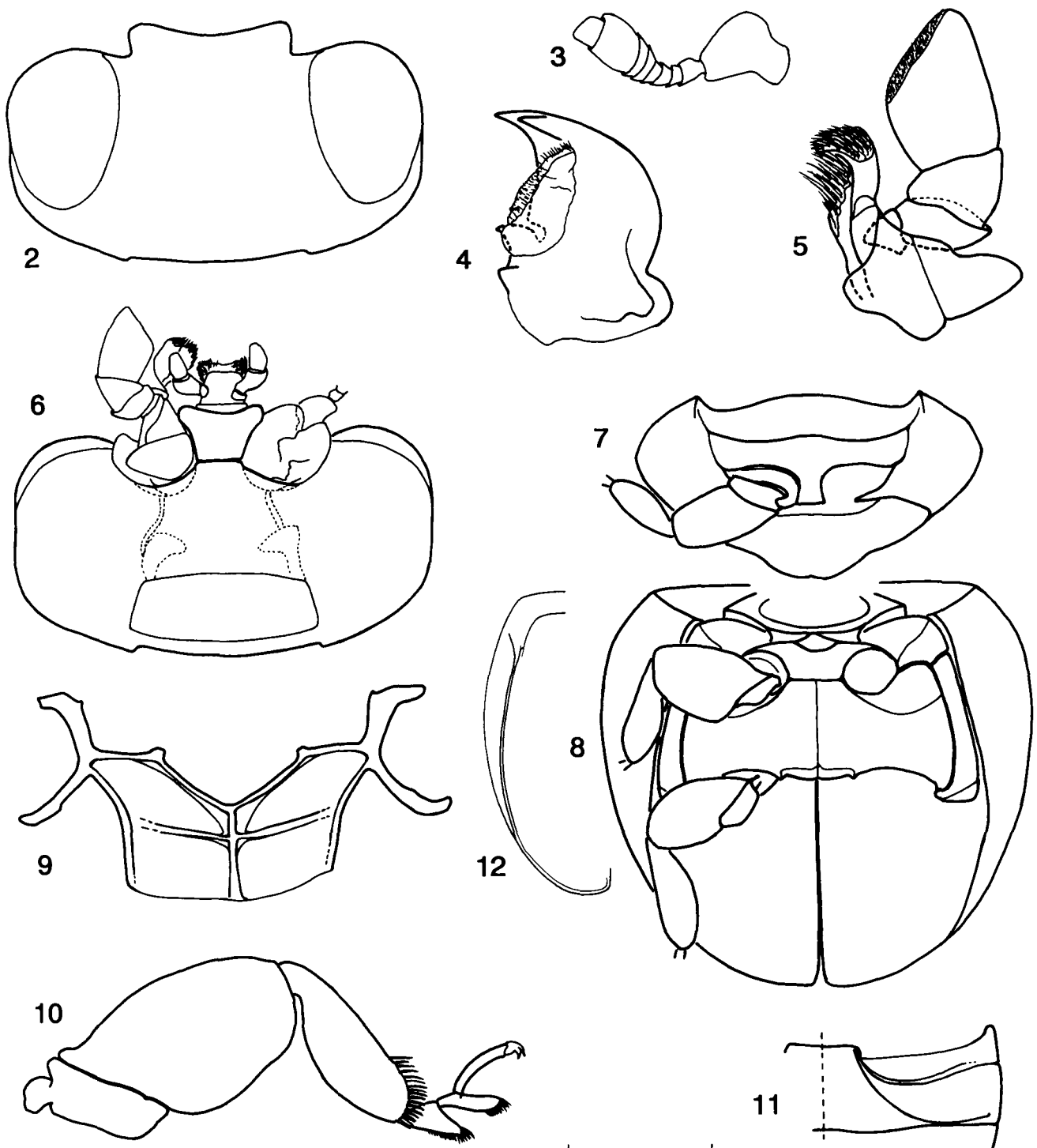
Material examined. Holotype ♂: INDIA, Tamil Nadu, Vriddhachalam, July 1986, on mango with *Rastrococcus iceryoides*, CIE A18380 (The Natural History Museum, London).

Paratypes: 37. INDIA, 2 ♂, 1 ♀, 16 not sexed, as holotype; 1 ♂, 1 ♀, 10 not sexed, as holotype but collected with *Rastrococcus*, CIE A18130; 6 not sexed, CIBC India Station, Bangalore, 1986, laboratory reared on *Rastrococcus iceryoides*. Paratypes are deposited in The Natural History Museum, London, the United States National Museum, Washington, and in the Zoological Survey of India, Calcutta.

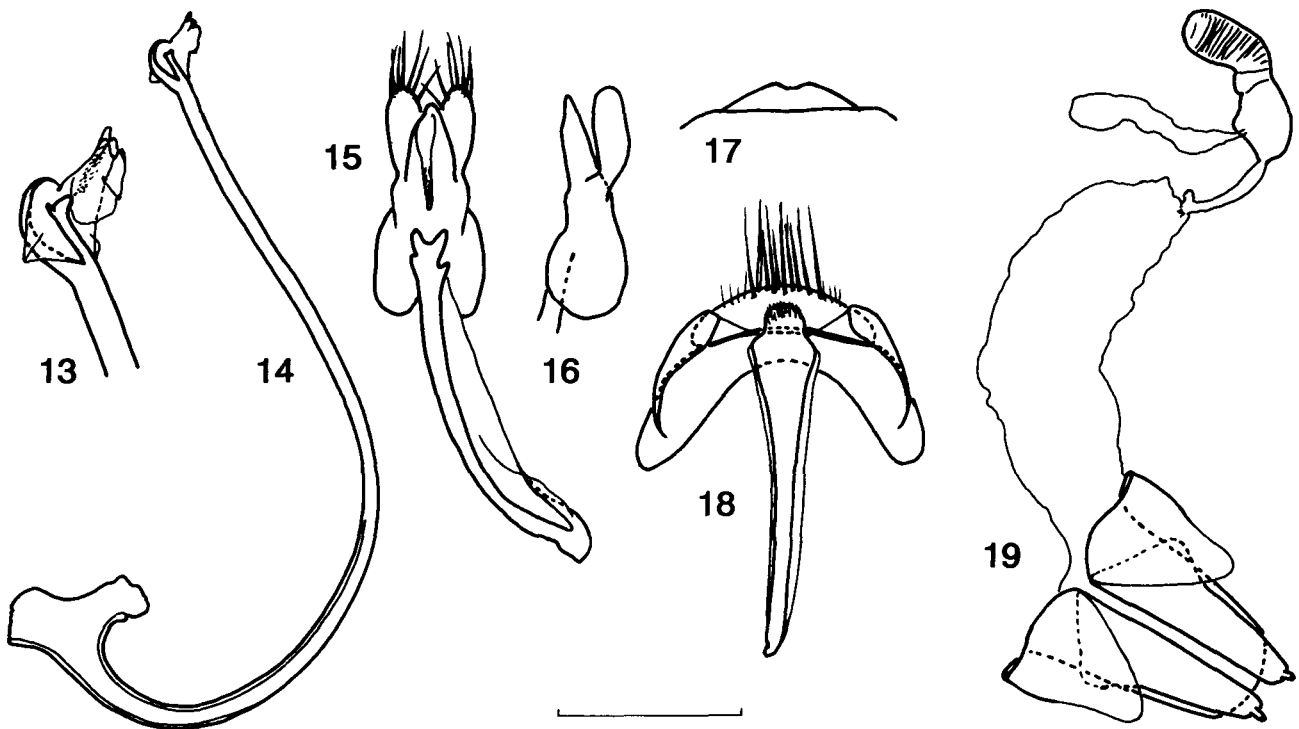
Discussion. This curious species exhibits a variety of characters found in other genera within the Scymninae. Its overall shape and descending elytral epipleura distinguish it from all other Indian Scymnini, and it even bears a very superficial resemblance to the Indian genus *Jauravia* Motschulsky in the subfamily Sticholotidinae; within the Scymnini, a similar dorsal shape and descending elytral epipleura can be found in the Australian genus *Bucolus* Mulsant. The very broad, plate-like femora are similar to those found in the Oriental scymninae tribe Aspidimerini, although the foveae on the sterna and epipleura of the latter which receive the folded legs are lacking in *Aponephus*. The antennae of most Scymnini are either 10 or 11-segmented, but in *Aponephus* they are very short and reduced to nine segments. Such a reduction is also found in the genus *Pseudoscymnus* Chapin, which includes numerous (many undescribed) Afrotropical, Oriental, and Australasian species, and in *Bipunctatus* Fürsch, a subgenus of *Nephus* Mulsant, with species at present known from the Palaearctic and Afrotropical regions. In many (possibly all) species of *Scymnus* Kugellan, and in *Cryptolaemus* Mulsant, the internal, marginal bead of the elytral epipleura partially traverses the epipleura behind the humeral angles as an oblique ridge (Booth & Pope, 1986). In *Aponephus*, as in *Scymnodes* Blackburn which also has broad, though flat epipleura, the internal marginal bead of the epipleura reaches the base of the elytra. However, a full assessment of the potential taxonomic value of this character within the Scymnini has not been carried out yet, and as far as I am aware, it has not been used by other authors.

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Figs 2-12. Figs 2-11, *Aponephus lentiformis* sp. n.. 2, head, dorsal view; 3, antenna; 4, left mandible, ventral view; 5, left maxilla, ventral view; 6, head, ventral view; 7, underside of prothorax; 8, underside of meso- and metathorax; 9, mesothoracic leg; 10, metendosternite; 11, postcoxal plate on first visible abdominal sternite. Fig. 12, *Cryptolaemus montrouzieri* Mulsant, elytral epipleuron (not to scale). (Scale marker = 0.5 mm, figs 7, 8 & 11; 250 μ m, figs 2, 6, 9 & 10; 125 μ m, figs 3, 4 & 5).



Figs 13–19. *Aponephus lentiformis* sp. n., holotype ♂ and paratype ♀: 13, apex of siphus; 14, siphus; 15, median lobe, parameres, trapeses, ventral view; 16, same, lateral view; 17, male sixth visible abdominal sternite; 18, male genital segments, ventral view; 19, female genitalia. (Scale marker = 0.5 mm, fig. 16, 250 µm, 14, 15, 16, 18 & 19; 125 µm, fig. 13)

Department of Entomology, The Natural History Museum, and for access to the collections.

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