STETHORUS LOXTONI SP. N. (COLEOPTERA: COCCINELLIIDAE)
A NEWLY-DISCOVERED PREDATOR OF THE TWO-SPOTTED MITE

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Abstract

Stethorus loxtoni sp. n., a predator on Tetranychus urticae (Koch), is described and the Australian species of Stethorus are reviewed.

INTRODUCTION

Stethorus spp. are minute black Coccinellidae commonly found in orchards and notable for the voracity with which they prey upon the two-spotted mite [Tetranychus urticae (Koch)]. The population dynamics of the Stethorus mite relationship is the subject of study by Dr. J. L. Readshaw of this Division. This work has demonstrated the prime importance of Stethorus spp. in the control of mites in orchards. In the course of the work it became apparent that, in addition to Stethorus vagans (Blackburn) and Stethorus nigripes Kapur, a third, apparently undescribed species was present. The purpose of the present work is to describe this species in order to provide a name and means of identification for the use of orchard ecologists.

The existence of the third species was first detected in cultures started from material collected in a peach orchard at Loxton, South Australia by Mr. Noel Richardson of the South Australian Department of Agriculture and Dr. G. Rothschild of this Division. The orchard was unusual in that it had never been treated with insecticide. The third species was recognised in culture (by Mrs. B. Lee) by the fact that the elongate eggs were attached to the leaf by their ends instead of being placed on their sides.

The genus Stethorus is placed in the tribe Scymnini and is characterised by Kapur (1948).

Twenty-seven species of Stethorus were described up to, and including the review of the Old World species by Kapur (1948). Since that date a further 13 species (and one subspecies) have been described, which, together with the species described here, make a world total of 41 species.

The additional species and subspecies are as follows:

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<tr>
<th>Species</th>
<th>Country</th>
<th>Reference</th>
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<tr>
<td></td>
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<td>Kyoto pref. Univ. (Nat. Sci.) 3: A48, figs.</td>
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<tr>
<td>Stethorus chengi Sasaji</td>
<td>Formosa</td>
<td>1968, Etizenia No. 32: 2, 4, figs.</td>
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<tr>
<td>Stethorus guatemalensis</td>
<td>Guatemala</td>
<td>Hall &amp; Fleschner, 1958, Pan-Pacif.</td>
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<td>Ent. 34: 98, figs.</td>
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<td>Stethorus hirashirai Sasaji</td>
<td>Formosa</td>
<td>1968, Etizenia 32: 1, 5, figs.</td>
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<tr>
<td>Stethorus japonicus Kamiya</td>
<td>Japan</td>
<td>1959, Kontyū 27: 140, figs.</td>
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<tr>
<td>Stethorus loi Sasaji</td>
<td>Formosa</td>
<td>1968, Etizenia 32: 2, figs.</td>
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(A) *Stethorus nigripes* Kapur, adult, dorsal, × 72. (B) *S. loxtoni* sp. n., adult, dorsal, × 90. (C) *S. vagans* (Blackburn), adult, dorsal, × 70. (D) *S. vagans* (Blackburn), adult ♀, ventral, × 70. (E) *S. nigripes* Kapur, pupal exuviae, dorsal, × 65. (F) *S. vagans* (Blackburn), pupal exuviae, setae bearing drops of fluid, and spiracle of 2nd abdominal segment, × 350.
Stethorus weisei Mader, 1950, Explor. Parc. natn. Albert Miss. G. F. de Witte, fasc. CONGO
Stethorus yezoensis Mujatake, 1966, Trans. Shikoku ent. Soc. JAPAN

Two species, S. vagans Blackburn and S. nigripes Kapur, are so far known in Australia.

As the genus is widely distributed throughout the world and because the species in Australia are common on non-indigenous trees, feeding on an introduced species of mite, there is a possibility that the Australian Stethorus are also introduced species which may have been described elsewhere.

Kapur differentiated S. vagans and S. nigripes from the other Old World species and it therefore appears unlikely that they were previously described. The third Australian species, described below as Stethorus loxtoni sp. n., is distinguishable from all but one of the 40 known species by the fact that the antennae and mouthparts are black (colour is notably constant in Stethorus spp.). The only other species with black antennae and mouthparts is the Californian S. pictipes Casey, but this is distinguishable by its larger size (1.3-1.4 mm) and by the fact that the femoral lines do not extend beyond half the length of the proximal ventrite. It is therefore clear that S. loxtoni has not been described before, although the possibility that it has been introduced into Australia is not excluded.

Stethorus loxtoni sp. n.

Types.—Holotype and 20 paratypes ex culture originating from Loxton, South Australia.

The holotype is in the Australian National Insect Collection. Paratypes are deposited in the Australian National Insect Collection, the British Museum (Natural History), the California Academy of Sciences, the United States National Museum, Washington, the South Australian Museum, Adelaide, the Australian Museum, Sydney, and the Western Australian Museum, Perth.

Figs. 1-3.—Last instar larvae, dorsal: (1) Stethorus vagans (Blackburn); (2) S. loxtoni sp. n.; (3) S. nigripes Kapur.
Adult (Figs. 5, 6, 9; Plate IB).

Length—0.90 mm (S.D. 0.14 mm). Body colour entirely shining black; trochanters and femora black; tarsi, tibiae and mouthparts dark brown to black. Antennae black. Pronotum and elytra densely and uniformly setose, the setae colourless, curved, tapered, length c. 0.03 mm, each arising from a small puncture; density of the setiferous punctures on the middle of the elytral disc c. 1200/sq mm; ventral surface similarly, but less uniformly setose; the middle of the metasternum more faintly punctured, shining, without setae; the arcuate "femoral line" on the proximal ventrite reaching 1/2 of the length of the segment from the base and not complete externally; ratio of maximum width of head including eyes/minimum width of frons between the eyes 2.41; terminal ventrite similar in and without trace of an emargination; wings with microspicules on lamina colourless so that wing appears white; wing without traces of veins at apex, with a rudiment of vein M_r parallel to the main vein (M_r + Cu).

The species has also been found at Narrabundah, A.C.T. feeding on mites on apple and oak, and at Stanley, Victoria. The species is named after W. C. Loxton, whose name was given to the town of Loxton at its foundation in 1907.

Larva (Fig. 2)
The distinguishing characters of the larva are given in the comparative tables below:

**COMPARATIVE CHARACTERS OF Stethorus vagans, loxtoni and nigripes**

**Stethorus vagans**
1. Femora and trochanters pale brown or yellowish, tibiae and tarsi pale yellowish.
2. Antennae, mandibles and palpi pale yellowish.
3. Labrum pale yellowish.
4. Body length: mean 1.12 mm (S.D. 0.15 mm).
5. Setae on dorsal surface less dense (c. 1,000/sq mm).
6. Frons narrower (ratio of maximum width of head including eyes/minimum width of frons c. 2.8/1).
7. Terminal ventrite of without an emargination (Plate ID).
8. Microspicules on wing lamina pigmented so that wing under low magnification appears pale grey.
9. Larva very pale creamy-white, without obvious dark brown sclerotised areas on the head and thoracic terga. Setiferous tubercles dark brown and obvious on the thoracic and abdominal terga (Fig. 1), the groups of tubercles not united by dark pigmented areas.
10. Egg (2-day) white, surface shining, c. 0.38 x 0.20 mm, position on leaf prostrate, attached by the longer side.
12. Aedeagus, Fig. 4.
13. Wing venation as Fig. 8, M_r (Forbes 1922) diverging from M_r + Cu: R, present at apex.
14. Femoral line on proximal ventrite complete (Plate ID).

**Stethorus loxtoni** sp. n.
1. Femora, trochanters, tibiae and tarsi black.
2. Antennae black.
3. Labrum black.
4. Body length: mean 0.90 (S.D. 0.14 mm).
5. Setae on dorsal surface more dense (c. 1,200/sq mm).
6. Frons wider (ratio of maximum head width including eyes/minimum width of frons between the eyes c. 2.4/1).
7. Terminal ventrite of without an emargination.
8. Microspicules on wing lamina colourless so that wing under low magnification appears white.
9. Larva pinkish grey, with obvious dark brown sclerotised areas on head (at sides) and on the three thoracic terga (most obvious on the metanotum); setiferous tubercles on the abdominal terga fainter than in vagans and not united by dark areas (Fig. 2).
STETHORUS LOXTONI SP. N. (COLEOPTERA: COCCINELLIDAE)

Figs. 4-7.—Aedeagus: (4) S. vagans (Blackburn), lateral; (5) S. loxtoni sp. n., lateral; (6) S. loxtoni sp. n., dorsal; (7) S. nigripes Kapur, lateral.

10. Egg (2-day) pale pink, surface shining; size as in vagans, position on leaf erect, attached by end.
12. Aedeagus, Figs. 5, 6.
13. Wing venation as Fig. 9, M₁ (Forbes, 1922) separate from and parallel to M, Cu. absent.
14. Femoral line on proximal ventrite incomplete on outer side.

Stethorus nigripes

1. Femora brown to dark brown, trochanters yellowish brown, tibiae brown, or yellowish towards their distal ends; tarsi pale, yellowish.
2. Antennae pale yellowish brown.
3. Labrum brown.
4. Body length: mean 1.15 mm (S.D. 0.13 mm).
5. Setae on dorsal surface more dense (c. 1,500/sq mm).
6. Frons wider (ratio of maximum width across head including the eyes/minimum width of frons between the eyes c. 2.2/1).

Figs. 8-10.—Wing: (8) S. vagans (Blackburn); (9) S. loxtoni sp. n.; (10) S. nigripes Kapur.
7. Terminal ventrite in ♂ without an emargination.
8. Microspicules on wing lamina pigmented so that wing under low magnification appears pale grey.
9. Larva yellowish grey, with obvious dark brown sclerotised areas on the head (at sides) and on the three thoracic terga, and with smaller dark areas uniting the groups of three setiferous tubercles on the abdominal terga (Fig. 3).
10. Egg (2-day) pale pink, with dull, pruinose surface; shorter than in vagans and loxtoni (c. 0.32 × 0.20 mm); position on leaf prostrate, attached by long side.
12. Aedeagus, Fig. 7.
13. Wing venation as Fig. 10, Mf fused to M + Cu, R, present at apex.
14. Femoral line on proximal ventrite incomplete on outer side.

The pupae of all three species bear long, stout, erect setae on the thorax, elytra and abdomen. These setae are remarkable in that each bears at its tip a drop of fluid (Plate 1F). The drops are easily removed by wiping but are evidently of very low volatility because they persist long after the pupal exuviae are shed. They persist also under vacuum in the process of coating and examination in the scanning electron microscope.

ACKNOWLEDGMENTS

We are indebted to Mr. R. D. Pope [British Museum (Natural History)] for comparison of specimens with the holotypes of Stethorus vagans (Blackburn) and S. nigripes Kapur, and for assistance with literature. We wish also to express thanks to Mr. Hugh B. Leech [California Academy of Sciences] and Dr. R. Gordon [Systematic Entomology Laboratory, U.S. Department of Agriculture] for help with the comparison of S. loxtoni with the holotype of S. picipes Casey.

REFERENCES