

Records and a checklist of Strepsiptera (Insecta) from Sri Lanka

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Abstract

Sixteen species of Strepsiptera have been recorded in Sri Lanka. Three new records and two previously recorded species are documented from a collection by the Lund University Expedition to Sri Lanka in 1962.

KEY WORDS: Insecta, Strepsiptera, Sri Lanka, Elenchidae, Halictophagidae, Myrmecolacidae.

Introduction

The first strepsipteran to be described from Sri Lanka was the myrmecolacid *Myrmecolax nietneri* Westwood (1861), a parasite in a worker ant which Nietner collected in 1858. Subsequently Pierce (1911), Hofeneder (1949), Yang (1964), Kifune and Hirashima (1980, 1983) described species collected in Sri Lanka. Kathirithamby (1993a) has described six new species and twelve new records of Strepsiptera from Southeast Asia, and altogether 58 species have been recorded from this region

Material

All the material mentioned in this paper was collected by Brinck, Andersson and Cederholm (B., A. & C.) during the Lund University Expedition in 1962. ZML - Zoological Museum, Lund, Sweden.

Checklist of Strepsiptera from Sri Lanka

Mengenillidae Hofeneder, 1910

Mengenillinae Hofeneder, 1910a.

Mengenilla Hofeneder, 1910a.

orientalis Kifune & Hirashima, 1980. Olatithoduvai, 10 miles NW of Mannar, Mannar Distr. : 1+

Corioxenidae Kinzelbach, 1970

Triozocerinae Kinzelbach, 1970.

Triozocera Pierce, 1909.

ceylonensis Kifune & Hirashima, 1983 Hunuwilagama near Wilpattu, Anauradhapura Distr.; Chundikkulam, Jaffna Distr.; Mau Ara, Monaragala Distr.

Halictophagidae Perkins, 1905

Tridactylophaginae Hofeneder & Fulmek, 1943.

Tridactylophagus Subramaniam, 1932.

ceylonensis Kifune & Hirashima, 1980 Hunuwilagama, near Wilpattu, Anuradhapura District.

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Halictophaginae Perkins, 1905.

Halictophagus Curtis, 1831.

peradeniya (Pierce, 1911) (Host: *Thompsoniella arcuata* Mots.)

australensis Perkins, 1905 Kandy.

spectrus Yang, 1964 (Host: *Cofana spectra* Distant).

helleri Kinzelbach, 1971c.

sodeni Hofeneder, 1949 (Host: *Cicadella albida* Walk.).

radialis Kifune & Hirashima, 1983 Kitulgala Resthouse, Kegalle District.

minus Kifune & Hirashima, 1983 Kitulgala Resthouse, Kegalle District.

Myrmecolacidae Saunders, 1872

Myrmecolax Westwood, 1861.

nietneri Westwood, 1861, Ramboddo (Host: *Formica*).

Elenchus tenuicornis Green, 1902. Peradeniya, Kandy District.

Stichotrema Hofeneder, 1910b.

acutipenis (Kogan & Oliveira, 1964) Talawila, Wilpattu Park, Puttalam District.

ceylonense Kifune & Hirashima, 1980. Diyaluma Falls.

ambiguum Kifune & Hirashima, 1980. Diyaluma Falls.

krombeini Kifune & Hirashima, 1980. Diyaluma Falls.

simile Kifune & Hirashima, 1980. Diyaluma Falls.

minus Kifune & Hirashima, 1980. Diyaluma Falls.

Stylopidae Kirby, 1813

Paraxeninae Kinzelbach, 1971b

Paraxenos Saunders, 1872

"Spp. /" Induruwa Jungle, Gilimale, Ratnapura District.

krombeini Kifune & Hirashima, 1987 Ratmalana, Colombo District, Ma Villu, Mannar District.

ELENCHIDAE Perkins, 1905

Elenchidae Perkins, 1905:98

Elenchoidea Pierce, 1908:76.

Elenchinae Ulrich, 1930:7; Riek, 1970:634.

Elenchinae Perkins, 1905:106.

Deinelenchinae Kinzelbach, 1971a:9, syn. nov.

Elenchus Curtis, 1831:385.

Mecynocera Pierce, 1908:81.

Elenchoides Pierce, 1909:167.

Liburnelenchus Pierce, 1918:481.

Elenchinus Pierce, 1918:481.

Pseudelenchus Ogloblin, 1925:173.

Soqatelenchus Pierce, 1961:467.

Type species: *Stylops walkeri* Curtis, 1831 [= *Elenchus tenuicornis* (Kirby)].

Elenchinus japonicus Esaki & Hashimoto, 1931. Loc. Japan: Fukuoka.

Elenchus yasumatsui Kifune & Hirashima, 1975. Loc. Thailand, Amphoe Hang Dong, Chaing Mai Prefecture. (Syn. nov.).

Material: 1 female *Sogatella furcifera* (Horváth) with 1 male pupa, Province of Uva, Diyatalawa, altitude 4,000 ft., 3 miles north of Haputale, 21.iii.1962, loc. 166, B., A. & C. (ZML); 1 female *S. furcifera* with neotenic female, same data as above, (ZML).

Distribution: Southeast Asia, Japan and Sri Lanka.

Remarks: this is the first record of this species in Sri Lanka. The host species *S. furcifera* and *Nilaparvata lugens* (Stål) is widely distributed in rice growing regions.

Kuno and Hokyō (1970) said that *Nilaparvata* migrating from Southeast Asia into rice fields in Japan are *Elenchinus* (now *Elenchus*) *japonicus*. Kifune and Hirashima described a new species from Thailand as *E. yasumatsui* and subsequently Hirashima and Kifune (1978) recorded this species in Sarawak, Chandra (1978) in the Philippines and Mochida et al. (1978) in Java. Kathirithamby (1979, 1981a, 1981b, 1982, 1985) found a species of *Elenchus* in West Malaysia, Sarawak, Bangladesh, Phillipines, Indonesia, and Korea. She had not examined *japonicus* and hence in her above studies referred to the strepsipteran as *Elenchus* sp.

A study has been made of *japonicus* and the other species, and *yasumatsui* has been synonymised with *japonicus* (Kathirithamby, 1993b).

The strepsipteran causes morphological abnormalities in the planthoppers and it has been said that the males become females and vice versa when stylopedised (Esaki and Hashimoto, 1940). However, Kathirithamby (1979, 1982) found that the host external genitalia are very reduced. The host planthopper is thus unable to reproduce. The parasitoid is a valuable natural enemy of the most economically important planthoppers in the rice fields in Southeast and East Asia.

HALICTOPHAGIDAE Perkins, 1905

Halictophaginae Perkins, 1905:98.

Halictophagoidea Pierce, 1908:76.

Halictophagidae Pierce, 1908:76.

Dioxoceridae Pierce, 1908:76.

Diozoceridae Pierce, 1911:504.

Halictophaginae Perkins, 1905.

Coriophaginae Kinzelbach, 1971a:8.

Halictophagus Curtis, 1831.

Halictophagus Curtis, 1831:433.

Halictophagus (Bruesia) Perkins, 1905:102.

Megalechthrus Perkins, 1905:105.

Pentacladocera Pierce, 1908:80.

Pentoxocera Pierce, 1908:80.

Anthericomma Pierce, 1908:84.

Dioxocera Pierce, 1908:81.

Agalliaphagus Pierce, 1908:83.

Neocholax Pierce, 1909:160.
Pentagrammaphila Pierce, 1909:169
Diozocera Pierce, 1911:504.
Pentozocera Pierce, 1911:504.
Pentozoe Pierce, 1911:504.
Tettigoxenos Jeannel, 1913:4.
Pyrilloxenos Pierce, 1914:128.
Dacrytocara Pierce, 1918:473.
Cyrtocaraxenos Pierce, 1918:475.
Indoxenos Subramanian, 1927:132.
Oedicystis Hofeneder, 1927:377.
Pseudopatella Bohart, 1937:101.
Membracixenos Pierce, 1952:5.

Twenty nine Australio-Pacific, Southeast East Asian and Sri Lankan species of *Halictophagus* have been described so far (Pierce, 1911; Perkins, 1905; Hofeneder, 1949; Kifune & Hirashima, 1983; Kathirithamby, 1992, 1993a).

Halictophagus australensis Perkins, 1905. (Fig. 1).

Halictophagus (Bruesia) australensis Perkins, 1905, Rept. exp. Stat. Hawaii Sugar Planters' Assoc. Bull, 1(3):103. Loc: Australia; Cairns, Qlds.

Pentoxocera Pierce, 1908, Proc. ent. Soc. Wash., 9:80, 83. *Pentoxocera australensis* (Perkins, 1905): Pierce, 1909, U.S. nat. Mus., Bull. (66):158.

Pentozocera Pierce, 1911, Proc. U.S. nat. Mus, 40:504. *Pentozocera australensis* (Perkins); Pierce, 1911 Gen. Insect., (121):38.-: Pierce, 1918, Proc. U.S. nat. Mus., 54:474.

Halictophagus australensis Perkins, 1905: Bohart, 1943, Ann. ent. Soc. Amer., 36:353 -: Kinzelbach, 1971b, Zoologica, 119:152. Kifune & Hirashima, 1989, Esakia, 28:17. Loc: Australia: Cairns, Qlds. Kathirithamby, 1992, Invertebr. Taxon. 6:173. Loc: Australia: Moorooka, Brisbane, Qlds.

Halictophagus spectrus Yang, 1964, Acta Zootax. Sinica. 1:78. Loc: China: Yaan, Szechuan. Hirashima & Kifune, 1978, Esakia, 11:57. Loc: eastern Malaysia: Sarawak. Kifune & Hirashima, 1984, Esakia 22:82. Loc: Japan: Okinawa Is. Kathirithamby, 1992, Invertebr. Tax. 6:173. (Syn. nov.).

Halictophagus helleri Kinzelbach, 1971c, Stuttgart Beitr. Naturk. 230:2. Loc: Sri Lanka: Kandy. Kathirithamby, 1992, Invertebr. Taxon. 6:173. (syn. nov.).

Material: Western Province, Yakkala, 18 miles north east of Colombo, 1-14.iii.1962, in light, loc.10; host - *Cofana spectra* female with 2 male pupa, B.,A.&C.; same data as above, 14-31.i.1962, 1 male with 1 female and 2 male pupa; same data as above, 1 female with 1 male pupa, 1 male with 2 females & 1 male pupa, 1 female with 4 male pupa, 1 male with 1 male pupa; 1 male, 27.ii.1962, 1 male, 1-14.iii.1962, loc 10; sama data as above, 1-15. iii. 1962, 1 male with 1 male pupa, 1 female with 1 male pupa; Sabaragamuwa Prov., Rakwana, in light, 27.ii.1962, loc. 100, 7 females with 1 male pupa, 7 males with 1 male pupa, 2 females with 2 male pupa, 1 male with 2 male pupa; 1 male, same data as above, 1 male, same data as above; Northern Province,

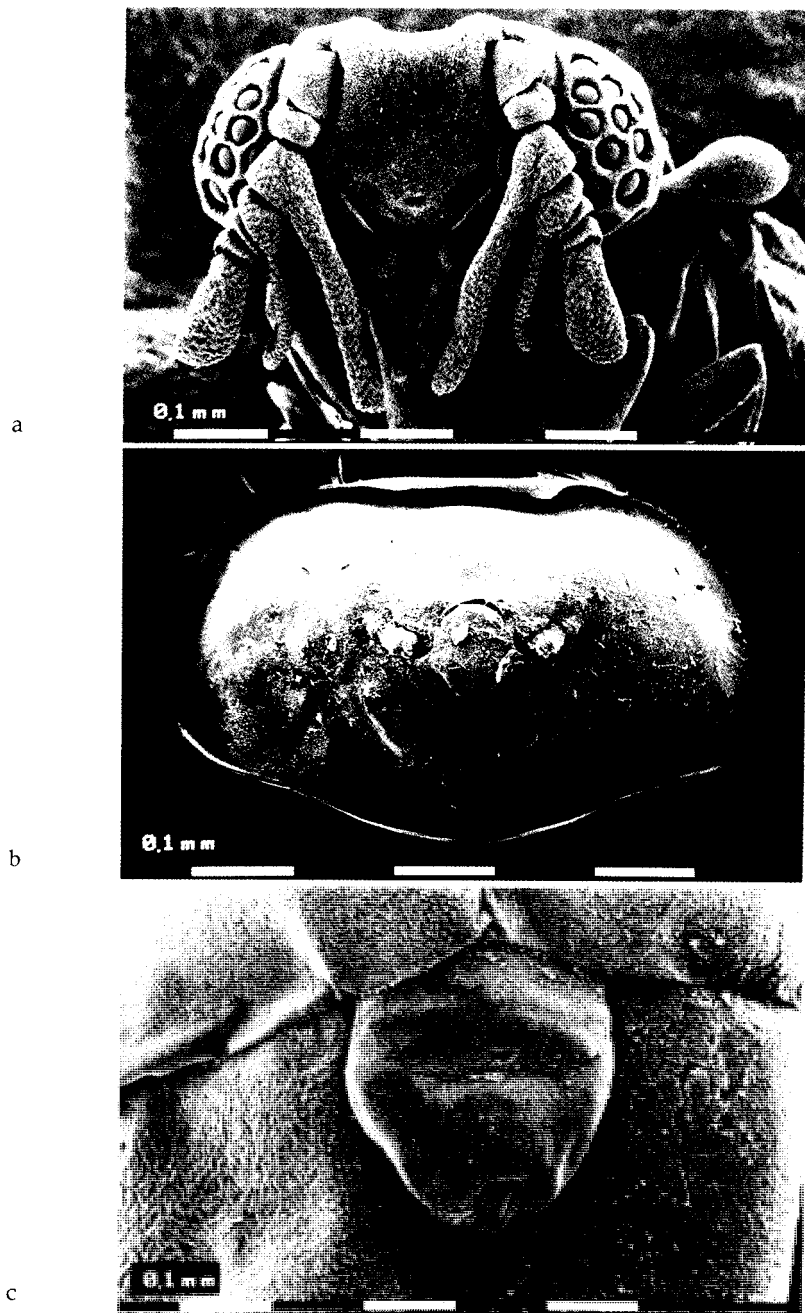


Figure 1. *Halictophagus australensis* Perkins male. **a**, SEM of ventral view of head; **b**, SEM of cap of male cephalotheca; **c**, SEM of female cephalothorax.

Tharakunda, 4 miles northwest of Mannar, 15.ii.1962, loc. 85, 1 male. All collected by B., A. & C.

Distribution: Australia, Japan, China, Southeast Asia, Mozambique and Sri Lanka.

Remarks. Kinzelbach (1971c) described *H. helleri* a parasite of *Cicadella spectra* (Distant) from Kandy. The host species was transferred to the genus *Cofana* and now considered *C. spectra* (Distant). Kathirithamby (1992) synonymised *H. spectrus* and *H. helleri* with *H. australensis*. The confusion was previously caused by the misidentification of the host *Cofana spectra* (Distant) (Cicadellidae). This host is widely distributed in Southeast Asia and Japan and is a common species on the rice plant. Recently the same host was collected by M. Olmi in Mozambique and these were also parasitized by *H. australensis*. Brenière (1969) and Descamps (1956) recorded the host species in West Africa as *Tettigoniella albida* Signoret.

Superparasitism was found to be common in this host (Kathirithamby, 1992). The material from Sri Lanka examined here and from Mozambique were also heavily superparasitized.

MYRMECOLACIDAE Saunders, 1872

Myrmecolacidae Saunders, 1872:20.

Myrmecolacidae Pierce, 1908:76.

Stichotrematoidea Hofeneder, 1910b:49.

Stichotrematidae Hofeneder, 1910b:49.

Myrmecolax Westwood, 1861

Myrmecolax Westwood, 1861:418.

Parastylops de Meijere, 1908:185.

Afrostylops Fox & Fox, 1964:754, pro parte.

Type species: *Myrmecolax nietneri* Westwood, 1861.

Myrmecolax flagellatus (de Meijere, 1908), Tijds Ent. 51:185-190. Loc: Indonesia, Java.

Material. 1 male, (ZML), S. Prov., Haycock, 21 mls., NNE Galle, coll. B., A. & C., 21.i.1962, Loc. 30:II.

Distribution. Indonesia and Sri Lanka.

Stichotrema Hofeneder, 1910b:47.

Caenocholax Pierce, 1909:88 pro parte.

Mantidoxenos Ogloblin, 1939:1277.

Rhipidocolax Bohart, 1951:94.

Type species: *Stichotrema dallatorreanum* Hofeneder, 1910b.

Stichotrema minus Kifune & Hirashima, 1980

Stichotrema minor Kifune & Hirashima, 1980, Esakia 15:152. Loc: Sri Lanka:

Diyaluma falls, Koslanda, Badulla District 3,000 ft. *Stichotrema minus*: Kifune & Hirashima, 1989, Esakia 28:47.

Material. 1 male (ZML), Sabaragamuwa Prov., Ratwana, coll. B., A. & C., 27-28.ii.1962, Loc. 100; 1 male (ZML), Uva Province, Stream, Alt. 3600 ft., 2 miles NW Haldummula, coll. B., A. & C., 2.iii.1962, Loc. 111.

Distribution. Sri Lanka.

Stichotrema simile Kifune & Hirashima, 1980, Esakia 15:150. Loc: Sri Lanka: Diyaluma Falls, Koslanda, Badulla District 3,000ft.

Material. 1 male (ZML), Sabaragamuwa Province, Rakwana, coll. B., A. & C., 27.ii.1962, Loc. 100.

Distribution. Sri Lanka.

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