# On the taxonomy of the Ceylonese and Southern Indian species of the genus Xylota Meigen (Dipt, Syrphidae)

HEIKKI HIPPA
Department of Zoology, University of Turku
SF-20500 Turku 50

HIPPA, H. 1974. On the taxonomy of the Ceylonese and Southern Indian species of the genus *Xylota* Meigen (Dipt., Syrphidae). — Ann. Ent. Fenn. 40, 56—60.

The original material of *Xylota carbonaria* Brunetti 1923 from Southern India and Ceylon is revised. The problem of whether this species occurs in Ceylon is discussed. *Xylota atroparva* sp. n. from Ceylon is described.

## Introduction

The present paper is a by-product of the author's study on the classification of the *Xylota* group of genera of the world, and was initiated by attempts to identify two closely similar Ceylonese species of the genus *Xylota*. Both appeared to be close to *Xylota carbonaria* Brunetti 1923, the only species of this genus hitherto known from Ceylon. Re-examination of BRUNETTI's (1923) material from Southern India and Ceylon finally led to the discussion presented and the description of a new Ceylonese species.

Concerning the fauna of Southern India, only one other species of *Xylota, X. bistriata* Brunetti 1915, is known from the area. This species differs from *X. carbonaria* in many respects (see BRUNETTI 1923) and is not further discussed here.

The present study is based exclusively on old museum material deposited in the British Museum (Natural History), London, and the Department of National Museums, Colombo.

At least the two species occurring in Ceylon cannot be common. Neither of them was found by Dr. Keiser (KEISER 1958) during his long collecting trip to that country. Nor did the present author see them during a few weeks' visit to Ceylon in 1969. As to *X. carbonaria* in Southern India, the only specimens known seem to be those mentioned in the original description (compare also CHERIAN 1934). The species discussed below seem to inhabit mountainous areas.

## The type of Xylota carbonaria Brunetti

The original description of *X. carbonaria* (BRUNETTI 1923, p. 240) was based on two males from Shevaroys, Yercaud, Southern India. One of these, originally designated as the »type», is preserved in the British Museum (Natural History). Because of BRUNETTI's singular noun in his note »Type in British Museum», this specimen is considered the holotype by the present author, although the specimen was afterwards labelled as a syntype.

In this context the original description of *X. carbonaria* needs one correction: the hind trochanters were described as simple, but in fact there is a distinct, although small, spur.

## Xylota carbonaria Brunetti in Ceylon

In the appendix to his work, BRUNETTI (1923, p. 413) mentioned additional material of *X. carbonaria* from three localities in Ceylon. The material is in the British Museum (Natural History) and consists of two males and two females. One specimen of each sex labelled by Brunetti as a cotype of *X. carbonaria*. The males are not conspecific with the holotype of *X. carbonaria*, but represent a new species, *X. atroparva*, described below. The females are conspecific with the other Ceylonese specimens in the following list of material. Whether these are conspecific with *X. carbonaria* is discussed below.



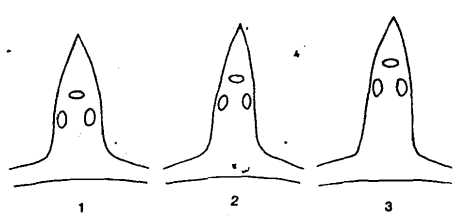
Material studied: 1 ♂ Ceylon, Rakwana, Morningride, 4000' 8. V. 1929. In the Department of National Museums, Colombo.

2 ♀♀: Ceylon, Henaratgoda, 7. II. 1892, Lt.-Col. Yerbury 1892—192. One of these is labelled as a cotype of *X. carbonaria*. In the British Museum (Natural History).

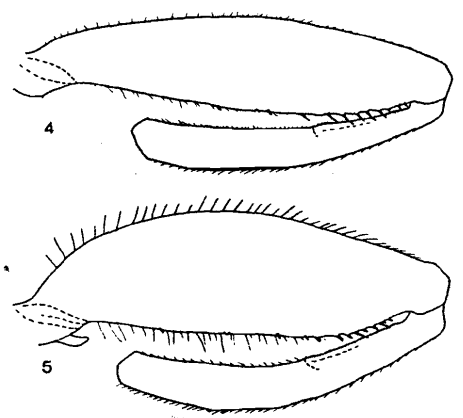
2 ♀♀: Ceylon, Pundaluoya (possibly refers to Punduloya) XII. 1897, E. E. Green, 1903—150. In the British Museum (Natural History).

Comparison of the above-mentioned Ceylonese male with the holotype of *X. carbonaria* has raised a difficult question about the taxonomic status of the Ceylonese representatives. The male from Rakwana and the holotype of *X. carbonaria* are very closely similar in most respects, but at the same time they differ from each other in some structural characters to an extent that exceeds the usual infraspecific variation in *Xylota* spp. One of the characters concerned is the shape of the vertical triangle and the placement of the ocellar triangle (see Figs. 1 and 2). In the type of *X. carbonaria* the vertical triangle is relatively broad and short and the ocellar triangle is slightly, but distinctly, shifted forward. In the Ceylonese specimen the vertical triangle is conspicuously narrower and longer and the ocellar triangle is pushed much further forwards. In the structure of the vertex the Ceylonese specimen strongly resembles *X. atroparva* sp. n. (see Figs. 2 and 3). Among the less pronounced differences, apart from the male genitalia, are the relatively slightly longer thrid antennal segment, the slightly less extensive areas without microtrichiae on the wings, and the darker general colouration in the Ceylonese specimen. In the structure of the male genitalia there are slight differences in the shape of the surstyli, but very pronounced differences in the hypandrial theca. These are the position of the transparent fenestrum and the differences in the shape and proportions of the apicolateral structures (see Figs. 8 and 9).

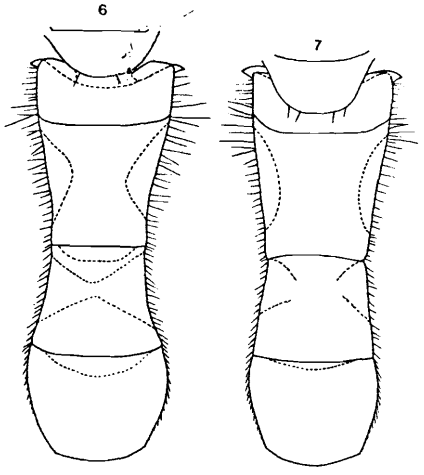
The morphological differences between these two males are of the degree usually found in closely related species of *Xylota* and imply the existence of considerable genetic differences between the populations from which these two specimens were drawn. However, because nothing is known about the variation of the male characters mentioned within the popu-




Figs. 1—3. Vertex of male in dorsal view — 1. *Xylota carbonaria* Brunetti (holotype), 2. *X. carbonaria* Brunetti (Ceylon), 3. *X. atroparva* sp. n. (holotype). — Orig.




Figs. 4—5. Hind trochanter, femur and tibia of male in prolateral view. — 4. *Xylota carbonaria* Brunetti (holotype), 5. *X. atroparva* sp. n. (holotype). — Orig.




Figs. 6—7. Abdomen of male in dorsal view. — 6. *Xylota carbonaria* Brunetti (holotype) 7. *X. atroparva* sp. n. (holotype). — Orig.

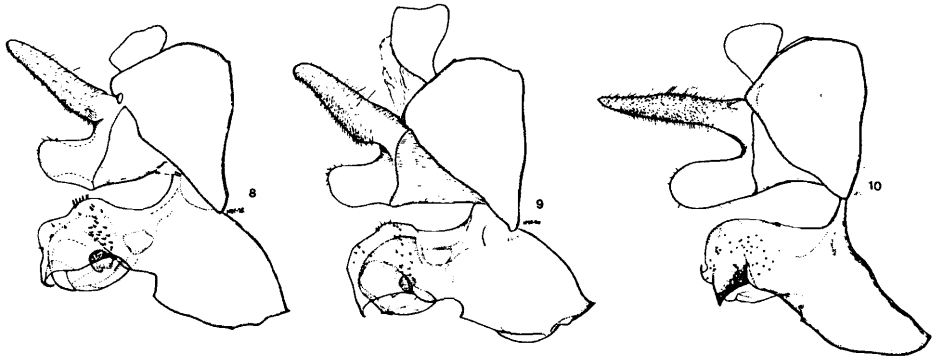
lations concerned and because in any case the two groups are extremely closely related, it would be premature to distinguish the two forms nomenclaturally.

The Ceylonese females listed above are closer to the corresponding male than to the holotype of *X. carbonaria*.

**Xylota atroparva sp. n.**

A rather small-sized, dark, largely dull species with a forwardly shifted ocellar triangle, slight hairy pattern on mesonotum, briad spur on hind trochanters, swollen hind femora with pro- and retrolateral rows of spines, spinose baso ventral ridge on hind tibiae and dark constricted abdomen. Length about 8.2—9.5 mm, wing length about 6.0—6.5 mm.

Male: Face at the level of ventral eye margins about 1/3 of the width of head; dark, greyish white pollinose. Frontal triangle shining except for apex and narrow stripes along eye margins, which are greyish pollinose; mainly black, brownish anteriorly. Antennae with basal segments brown to blackish brown; segment 3 about 1.5 —1.7 × as long as deep, brown to pale brown, lighter than basal segments; arista dark, tending to be paler basally and apically. Eye suture about 2/3 of length of vertical triangle before front ocellus. Vertical triangle narrow (Fig. 3) and elongate, with almost parallel sides posteriorly; greenish metallic and with depressed pale hairs before front ocellus, otherwise shining black with sparse erect pale hairs. Ocellar triangle situated conspicuously far forward; in consequence, vertex between posterior ocelli and median hind angles of eyes long, about 1.5




Figs. 8—10. Male genitalia in dextrolateral view. — 8. *Xylota carbonaria* Brunetti (holotype), 9. *X. carbonaria* Brunetti (Ceylon), 10. *X. atroparva* sp. n. (paratype from Kitulgala). — Orig.



× as long as broad. Postocellar orbits and occiput greyish white pollinose, with similarly coloured hairs.

Mesonotum with the surface rather rough; dull greenish black to the naked eye, under magnification with ± distinct longitudinal stripes with metallic sheen and opaque surface; hairs mostly short and pale, dark on lateral presutural and postsutural patches, mostly depressed; there is a faint hairy pattern composed of a narrow median stripe and a pair of broad submedian longitudinal stripes on anterior half, transverse bands along suture and small patches in front of posterior calli; in these the hairs are ± erect, they appear paler and are best seen in posterior view. Scutellum (Fig. 7) about twice as broad as long, surface and colour ± as on posterior part of mesonotum, with a narrow marginal rim, with four rather long pale setose hairs at posterior margin and a rather sparse subscutellar fringe. Pleurae dull, ± pollinose throughout. Metastigma somewhat larger than second antennal segment. Hind trochanters with a broad stout spur (Fig. 5). Hind femora (Fig. 5) considerably swollen, with a prolateral and a retrolateral row of spines ventrally. Hind tibiae somewhat arcuate, the basoventral median ridge with small black spinules. Hairs of legs mostly pale, on apical part of hind femora dark, those on tibiae short and ± depressed, not tending to form hairy fringes. Basal segments of anterior tarsi without long light hairs at apicodorsal prolatelar angle. Femora black with the apices pale yellowish to brownis, somewhat darkened on apical half, more faintly so dorsally; hind tibiae brown, but basal third yellow and apex paler. Basal three segments of anterior and middle tarsi pale yellowish, apical segments brownish; hind tarsi brownish. Wings slightly darkened, brownish, colour more intense on apical half; stigma brownish; microtrichiae absent as follows: basally on cell $R_1$ near to forking of $R_{2+3}$ and $R_{4+5}$, basally on 1 st basal cell and narrowly along vein Cu, basally on anal cell, between veins Cu and 1A, narrowly along vein 1A and narrow short stripes on both sides of vein 3A. Halteres orange. Calyptra whitish, with darker border and fringe.

Abdomen (Fig. 7): Tergite 1 shining black, obscurely pollinose medially. Tergites 2 and 3 dull blackish brown to brownish, with or without a pair of very ill-defined paler brownish spots and with rather weakly defined lateral shining aeneous patches. Tergite 4 shining black to aeneous, with narrow anterior margin dull, apically obscurely brownish. Hairs on dorsal surface of abdomen short, depressed and dark, becoming more erect, longer and paler towards lateral margins. Sternites 1 and 4 dark, 2 and 3 paler. For male genitalia, see Fig. 10.

Female: unknown.

Holotype ♂: Ceylon, Haycock Hill 27. IV. 1892, Lt.-Col. Yerbury, 1892—192; *Xylota carbonaria* Brun. ♂, det. Brun. 1921 22. In the British Museum (Natural History).

Paratype ♂: Ceylon, Haycock Hill 24. IV. 1892. In the British Museum (Natural History).

Paratype ♂: Ceylon, Kandy 18. V.1892, Lt.-Col. Yerbury, 1892—192; Cotype, *X. carbonaria* Brun. ♂, det. Brun. 1821. 22. In the British Museum (Natural History).

Paratype ♂: Ceylon, Kitulgala 9. IV. 1927. In the Department of National Museums, Colombo.

Paratype ♂: Ceylon, Labugama 10. IX. 1927. In the Department of National Museums, Colombo.

## Discussion

The above-described species is very similar to *X. carbonaria* Brunetti, but is easily distinguished from it by the strong hind trochanteral spur (Figs. 3—4), more swollen hind femora (Figs. 3—4), more arcuate hind tibiae (Figs. 3—4) and the structure of the genitalia (Figs. 8—10). There are also differences in the shape of the abdomen (Figs. 6—7) and the third antennal segment, which is relatively shorter in *X. carbonaria*. Further, the submedian hairy stripes on the mesonotum are longer in *X. carbonaria*, and run distinctly over the suture. Also the areas without microtrichiae on the wings are slightly more extensive in *X. carbonaria* than

in *X. atroparva*. If the Ceylonese material of *X. carbonaria* described in the present paper actually represents a new species, *X. carbonaria* and *X. atroparva* can readily be distinguished by the position of the ocellar triangle (Figs. 1—3) and the two Ceylonese species by the other characters mentioned above.

Both *X. atroparva* and *X carbonaria* are rather closely similar to *X. strigata* De Meijere 1914. *X. strigata* differs from the two species in the longer third antennal segment, which is about twice as long as deep; in having a long narrow spur on the hind trochanter; in the more elongate second abdominal segment, which is about 1.3 × as long as the basal width; and in its greatly different genitalia. In *X. strigata* the hind femora are slender, as in *X. carbonaria*, but the position of the ocellar triangle recalls that of *X. atroparva*.

Acknowledgements: I wish to thank Dr. Kenneth G. V. Smith and Miss Susan Chambers, of the British Museum (Natural History), London, and the personnel of the Department of National Museums, Colombo, for the material used in the present study and for hospitality at their institutions, as well as Mr. Kumar D. Ghorpade, M.Sc., Bangalore, for valuable correspondence.

## References

BRUNETTI, E. 1923. Diptera. Vol. III. Pipunculidae, Syrphidae, Conopidae, Oestridae. — In The Fauna of British India, including Ceylon and Burma. I—XII+424 pp. + pls. I—VI. London.

CHERIAN, M. C. 1934. Notes on some South Indian Syrphids. — J. Bombay Nat. Hist. Soc. 37, 697—699.

KEISER, F. 1958. Beitrag zur Kenntnis der Syrphidenfauna von Ceylon (Dipt.). — Rev. Suisse Zool. 65 (1), 185—239.

Received 26. XI. 1973



# Diurnal flight activity in a mixed population of Aculeata (Hym.)

MARKKU KÄPYLÄ

University of Jyväskylä, Department of Biology, Jyväskylä.

KÄPYLÄ, M. 1974. Diurnal flight activity in a mixed population of Aculeata (Hym.). — Ann. Ent. Fenn. 40, 61—69.

The flight activity of Aculeata was studied on a sandy area with sparse vegetation and tested for correlations with temperature, relative humidity, and light intensity. Temperature was the best explaining factor, and light intensity almost as good, but relative humidity had no significant effect. Probably the combined action of temperature and light intensity mostly determined flight activity, because Aculeata can start flying at lower temperatures during full sunshine. The larger species can fly at lower temperatures and lower light intensities than the smaller ones.

## Introduction

As a group, Aculeata are known to fly mostly on warm sunny days. In many papers concerning the ecology of this group, there are single observations on the influence of different weather factors on flight, especially on the first and last flights of the day. However, very little quantitative information is available. Such information is needed, for example, in making relative measurements on a size of a population, and in other problems of autecology. Further, the weather conditions and daily activity should always be taken into account when relative abundance and phenology are determined in Aculeata.

None of the populations of individual species available in a limited area was big enough to provide adequate data for regression analysis. Therefore a mixed population of many different species was studied. In Finnish conditions Aculeata are sufficiently uniform in diurnal flight activity.

## Study area and methods

The study was made in Forssa, in a sandy bank beside the Turku — Hämeenlinna highway. The sparse vegetation was assumed to cause very little change in the microclimate near the ground. Here, an area as uniform as possible was chosen. The observer patrolled within the area and caught insects with a net. The number of Aculeata caught within 15 minutes was used as a measure of their flight activity.

The insects were released by cautiously opening the net a little and allowing them to escape one by one. At the same time, the individuals were determined and counted. If the catch was too big, the insects were first slightly narcotized with ether. Ants (Formicoidea) were not included in the calculations. Wingless females of Mutilloidea were caught by hand when seen. As the numbers of Aculeata were relatively small, it was necessary to let individuals go, otherwise their numbers in the area would have diminished rapidly. Fortunately these insects are strong, and so are not liable to damage when caught with a net.

The thermo- and hygrometers were protected from direct sunlight with a sheet of white cardboard. An ordinary mercury thermometer and a hair hygrometer were used. They were placed about 10 cm above the ground, which is assumed to be the average flight height of Aculeata in this habitat. Light intensity was measured with a camera exposure meter that had been compared with a lux meter. The weather readings were noted 5 minutes after the start of a measurement period. If the light intensity varied during the period, the mean value was calculated.

The field work was done during the summers of 1967 and 1968. Cool and rainy weather hampered measurements, especially in July 1968.