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MICROMACROCERA GEN. N., THE SMALLEST MACROCERINE FLY (DIPTERA: KEROPLATIDAE, MACROCERINAE)

L. PAPP

Department of Zoology, Hungarian Natural History Museum and Animal Ecology Research Group of the Hungarian Academy of Sciences H-1088 Budapest, Baross utca 13, Hungary, e-mail: lpapp@nhmus.hu

Micromacrocera gen. n. of the subfamily Macrocerinae (Keroplatidae) is described (type species *M. stenobasis* sp. n.) from South Africa. An analysis of characters in comparison to those of the other genera of the subfamily is given. With 15 original figures.

Key words: Keroplatidae, Macrocerinae, new genus, *Micromacrocera*, taxonomy, Afrotropical region

INTRODUCTION

During a collection trip in 2007 to the Republic of South Africa, we captured a peculiar, very small fly of the Keroplatidae, subfamily Macrocerinae. Macrocerinae are regarded as a family in some literature, including some previous works by the present author but I follow now EVENHUIS's (2006) catalogue in ranking them as a subfamily. A short study of the features of the specimen revealed that it must belong to an undescribed genus.

In order to make any comparison easily, the terminology for the structure of the head follows that used for *Macrocera* by MATILE (1990); wing vein terminology follows KRZEMIŃSKI and EVENHUIS (2000).

The type specimen is preserved in the collection of the Hungarian Natural History Museum, Budapest (HNHM). It was originally minuten-pinned on site. It was double-mounted and labelled in the HNHM. All its body (except wings) was treated carefully in a ca. 10 % solution of sodium hydroxide, washed in water, treated in lactic acid, and washed again. Figures on body parts were made in glycerol on an excavated slide, where the excavated part was half-covered by a normal cover glass. Later, parts (other than genitalia) were transferred to 70% ethyl alcohol, to 96 % ethyl alcohol and put in methyl-cellosolve for some days. Finally it was prepared in Canada balsam between two pieces (about a quarter each) of a cover glass, which are on a 5 mm ∅ hole of a card of 17×7 mm. This card is pinned on a normal collection pin, together with the genitalia in a plastic microvial with glycerol. Its wings on a normal slide are kept separated with the same collection labels.

Micromacrocera L. PAPP, gen. n.

Type species: *Micromacrocera stenobasis* L. PAPP, sp. n.
Gender: feminine.
Etymology. This is the smallest species of the subfamily Macrocerinae.

Frons (postfrons) short oblique, cerebral sclerite large, occupying all dorsal part of head. Cerebral sclerite with some scattered setae. Occiput and postgena large. Eyes comparatively small, occupying less than half of the head in profile (Fig. 1). Three ocelli, anterior one forward, posterior ocelli dorsally directed. Pilosity of eyes distinct (Fig. 1). Face and clypeus separated by a rather broad membranous aperture. Face very short, in this respect it is similar to that of *Macrocera* spp. Clypeus high and comparatively narrow. Foramen small.

Antenna in all probability with 14 flagellomeres, but only 10 can be seen on the specimen (left side, on the right side only 8), apical flagellomeres lost. Scape comparatively long, ventrally with longer setae, pedicel globose. Flagellomeres (Figs 3–4) simple, cylindrical. Hair-like setae (cilia) of flagellomeres rather long, on the 10th flagellomere they are longer than diameter of flagellomere (Fig. 4).

Mouth-parts rather small, labella small, fleshy. Maxillary palpus with four palpomeres but seems 3-partite, since palpomeres 1–2 partly fused (Fig. 2).

Thorax (Fig. 5) small, height at middle (without coxae) only 0.50 mm (Fig. 5). Structure of thorax unusual: mediotergite largely dorsal, laterotergite not large but continued dorsally. Scutellum bulging, minute, 0.07 mm only. (I saw only 4 setal bases on scutellum, almost dorsal ones, i.e. not marginals; scutellum otherwise microtomentose only).

Wing (Fig. 15) membrane without macrotrichia and with microtrichia evenly distributed but wholly irregular. No strong costal fringe. Costa thick, reaches 3/4 of distance between R_5 and M_1. Longitudinal veins (incl. Cu1) setose dorsally, medial stalk (M_{1+2}) free of setae. R_4 absent but a small thickening on R_5 represents base of R_4. M_1 and M_2 not completely reaching wing margin. Base of M_3 not pigmented. Cu_2 and A_1 present as short indistinct parallel brownish folds on wing base (to the level of R-M fusion only). A_2 not discernible at all. No alula present between anal angle and wing scale, and even almost no alular region on wing. Prealular (basal) region with a straight margin (Fig. 15).

Halter simple, knob not too large.

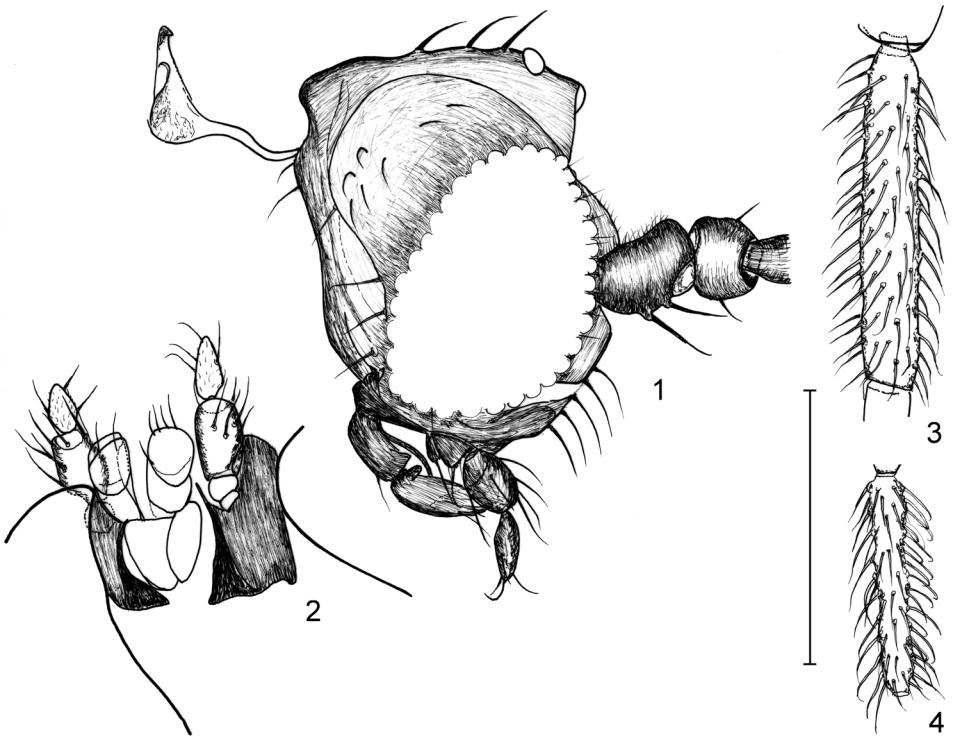
Femoral and tibial setulae simple, fine and rather long, and not ordered into rows. Fore coxa medium-long, the middle coxa short, the hind coxa very short (Fig. 5). Tibial spurs 1+2+1, i.e. posteroventral spur on hind tibia missing (at least I was unable to find its base even under a higher magnification). Fore tibia antero-apically without a large depressed or even emarginated area (Fig. 6), and with a row of 5 medium-long pointed setae, similar to some Sciaridae (e.g. *Bradysia*), rather than to any other Macrocerinae.

No anterior or posterior combs of small thornlets on mid and hind tibiae (Fig. 8). Tarsal claws simple, very small, and straight, except for apical part. No developed pulvilli; they are as hairy as empodium (Figs 9–10).

Abdomen with 8 normal preabdominal (pregenital) segments. Both tergites and sternites broad, in each segment tergite and sternite almost meet laterally, i.e. intervening membranous area rather small. Spiracle pairs 1–7 are situated in membrane. Tergite 8 (Fig. 11) not much shortened, sternite 8 short, not much more than half as long as tergite (0.57x). Tergite 9 comparatively long, anterior edge broadly emarginated, caudally largely pentagonal (Fig. 12). Cerci comparatively large and broad with 2 pairs of rather short apical setae.

Male genitalia rather small. Left and right gonocoxites fused but on a short ventral section only (Figs 13–14). Genital structures in three layers (from ventral to dorsal): gonocoxal fusion,

parameral complex, and most dorsal, just under tergite 9, gonocoxal apodemes with their fine plate (see below). Medial wall of gonocoxites less long (high) than breadth of gonostylus. Parameres with long lateral arms joining long gonocoxal apodemes. Sclerite connecting parameres with basiphallus very short compared to that of *Macrocera* spp. Phallus (distiphallus) membranous, disintegrated when treated with sodium hydroxide. The medial slightly asymmetrical sclerotized structure, ventral to the level of tip of parameres and gonocoxal apodemes, must be regarded as ejaculatory apodeme. There are 2 pairs of parameral lateral arms: one dorsal, connected to gonocoxal apodemes; the ventral pair as long as dorsal one, completely overlapping it, (Fig. 13), slightly ventrally curved pair of processes may support phallus. Gonocoxal apodemes connected by a lamina, which is distinct though not strongly sclerotized, and, that connects gonocoxal apodeme apices with basiphallus (not seen in *Macrocera*). Inner wall of gonocoxites almost complete, i.e. ends not far from base of gonostylus with a basal lateral process; lateral half of the apex of gonocoxites with a U-shaped emargination, which allow moving the apex of gonostylus laterally. That inner (medial) wall plain, i.e. not concave as in *Sciarokeroplatus* (see PAPP & ŠEVČÍK 2005) and present not far from gonostylar base, contrary to *Sciarokeroplatus*.



Figs 1–4. *Micromacrocera stenobasis* sp. n., holotype male. 1 = head laterally with scape and pedicel, 2 = mouth-parts in a ventral, sublateral view (stipes and cardo dark); 3 = first flagellomere, 4 = 10th flagellomere. Scale: 0.2 mm for all

Micromacrocera stenobasis L. PAPP, sp. n.
(Figs 1–15)

Holotype male (HNNM): RSA: Eastern Cape Prov., Bloukrans Pass, in a side valley – Jan 17, 2007, No. 23, GPS16, S33°57'09.6" E23°37'59.4", 70 m, leg. L. Papp & M. Földvári. [Its body is in a balsam preparation (see above), wings prepared on a slide, genitalia with the 8th segment in a plastic microvial with glycerol.]

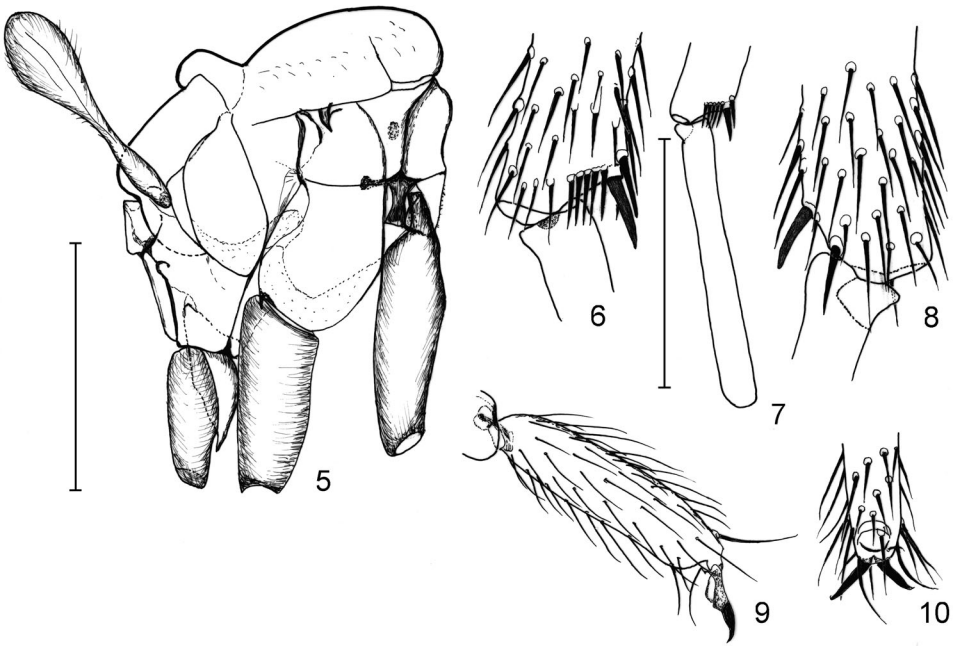
Measurements in mm: body length 1.48, wing length 1.92, wing width 0.75.

Body dark brownish grey, microtomentose.

Head as in Figs 1–2. Length of left flagellomeres: 23, 16.5, 19, 19, 20, 19, 17, 16, 16.5, 13.5 (others lost) (1 unit = 0.011mm), width of 1st flagellomere 0.043 mm, that of the 10th one 0.022 mm. Basal palpomere minute, third palpomere rather large with 7 setae, fourth palpomere with 4 setae.

Pronotum short. Pleural sclerites bare, including laterotergite, no setae cranial or caudal to anterior spiracle. Scutellum only 0.7 mm long, at most with 4 dorsal macrosetae. No acrostichal setae. Dorsocentrals sparse (6–7). Some setae present on the postpronotal and notopleural areas. Metanotum not small, angular in lateral view, mediotergite left free.

Wing (Fig. 15) comparatively large, longish rather than broad, broadest just behind M_1-M_2 fork. Wing light brownish, veins brown. Costa continued to 25/33 i.e. ca. 3/4 section between apices

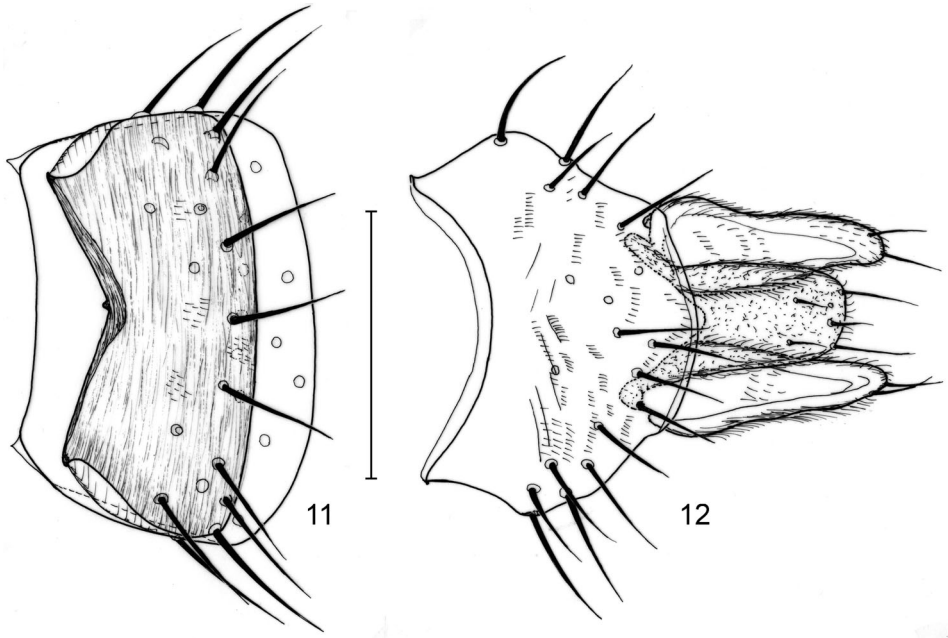


Figs 5–10. *Micromacrocera stenobasis* sp. n., holotype male. 5 = thorax with coxae, lateral view, 6 = apex of right fore tibia, anterior view, 7 = contour of fore basitarsus, anterior view, 8 = apex of left hind tibia, anterior view, 9 = fore tarsomere 5, lateral view, 10 =apex of fore tarsus, dorsal view. Scales: 0.4 mm for Fig. 5, 0.2 mm for Fig. 7, 0.1 mm for Figs 6, 8–10

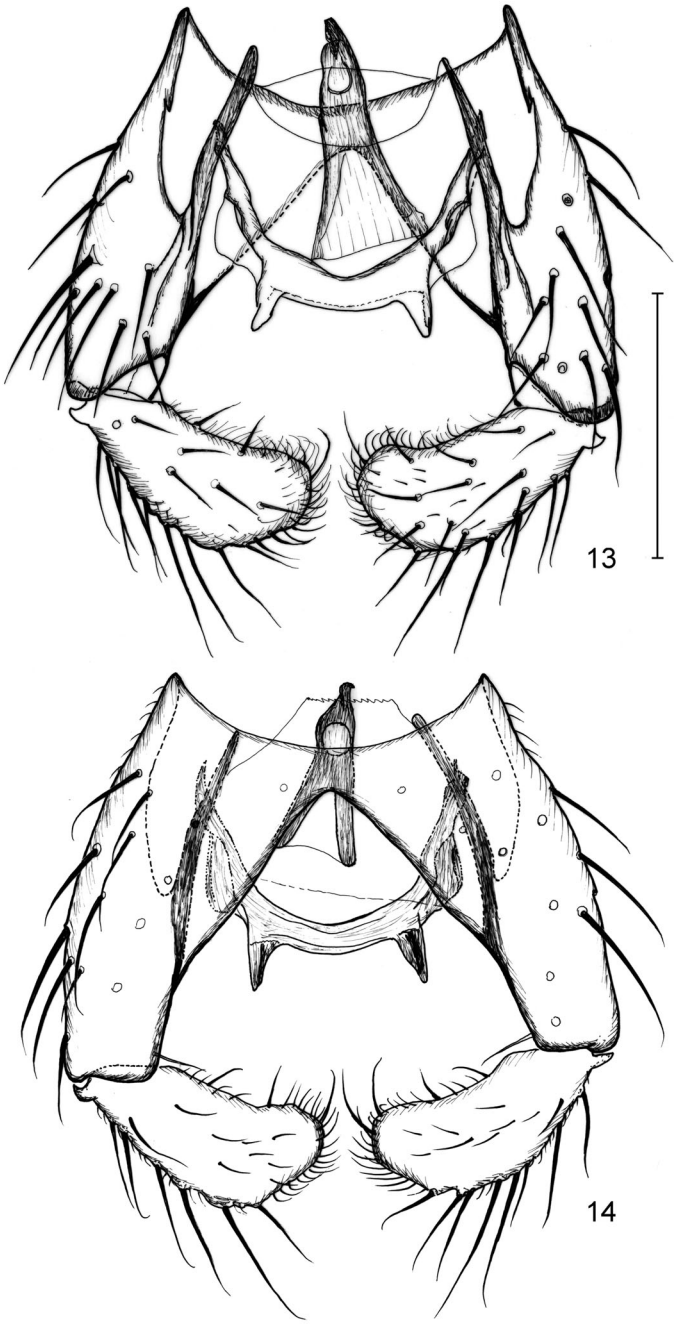
of R_5 and M_1. Longitudinal veins (incl. Cu_1) setose dorsally, medial stalk (M_{1+2}) free of setae. Wing margin sections (base to virtual apex of Sc, Sc-R_1, R_1-R_5, R_5-M_1, M_1-M_2): 45–47–58.5–34–20.5 (1 unit = 0.011mm). R_5 and basal part of M_3 merged/confluent into a thick R-M fusion (0.09 mm long). R4 absent but a small thickening on R_5 represents base of R_4. M_1 and M_2 not completely reaching wing margin. Base of M_3 not pigmented. Veins Cu_1 and M_3 approaching near R-M fusion, similarly to *Macrocera*. Cu_2 and A_1 can be traced to the level of R-M only. A_1 slightly thicker than Cu_2. A2 not discernible at all. Longest cilia on hind margin 0.033 mm. Halter dark.

Fore leg ratios: coxa 29, trochanter 8, femur 45.5, tibia 53, basitarsus 21.5, tarsomeres 2–5: 11.5, 10, 8, 9 units. Mid coxa 24, trochanter 10, femur 52.5, mid tibia 68, length of tarsomeres on mid leg: 34.5, 16, 12.5, 9.5, 8.5 units. Length of hind coxa 22, trochanter 10, femur 64, tibia 82, basitarsus 45 units (left mid and hind leg and right hind tarsomeres 2–5 lost) (1 unit = 0.011 mm). Basitarsi long and rather thin (Fig. 7). Mid tibial spurs minute: 0.022 and 0.025 mm. Hind tibia with medium-long dorsal setae from 30/82 to 63/82 (more distal ones are short). Length of anteroventral spur on hind tibia 0.028 mm. Hind tibia with only an anteroventral spur; posteroventral spur missing (see above). The black anterior spine ("paired" with the extant spur, see Fig. 8) cannot be regarded as a spur.

Abdomen comparatively long with 8 normal pregenital segments. Both tergites and sternites broad, in each segment tergite and sternite almost meet laterally, i.e. intervening membranous area rather small. Spiracle pairs 1–7 are situated in membrane. Tergite 8 (Fig. 11) not much shortened, 0.9 times as long as tergite 7; tergal setae only 0.02–0.022 mm long. Sternite 8 short, not much more than half as long as tergite (0.57×). Tergite 9 comparatively long, anterior edge broadly emarginated, caudally largely pentagonal (Fig. 12). Cerci with 2 pairs of rather short apical setae.



Figs 11–12. *Micromacrocera stenobasis* sp. n., holotype male, terminalia. 11 = tergite and sternite 8, ventral view (tergal setae omitted), 12 = tergite 9 and proctiger, dorsal view (hypoproct covered). Scale: 0.1 mm



Figs 13–14. *Micromacrocera stenobasis* sp. n., holotype male, genitalia. 13 = dorsal view, 14 = ventral view. Scale: 0.1 mm

Male genitalia as Figs 12–14. Left and right gonocoxites fused but on a short section only. Parameres with long lateral arms joining long gonocoxal apodemes. Sclerite connecting parameres with basiphallus very short compared to that of *Macrocera* spp. Phallus (distiphallus) membranous, disintegrated when treated with sodium hydroxide. The medial, slightly asymmetrical sclerotized structure ventral to the level of tip of parameres and gonocoxal apodemes must be regarded as ejaculatory apodeme. There are 2 pairs of parameral lateral arms: one dorsal, connected to gonocoxal apodemes; the ventral pair as long as dorsal one, completely overlapping it (Fig. 13), slightly ventrally curved pair of processes may support phallus. Gonocoxal apodemes connected by a lamina, which is distinct though not strongly sclerotized, and which connects gonocoxal apodeme apices with basiphallus (not seen in *Macrocera*). Inner wall of gonocoxites almost complete, i.e. ends not far from base of gonostylus with a basal lateral process. Consequently, lateral half of the apex of gonocoxites with a U-shaped emargination, which allow moving the apex of gonostylus laterally.

Female unknown.

Etymology. The specific epithet (Latin 'stenobasis' [noun] = narrow base) refers to the reduced (narrow) basal part of the wing.

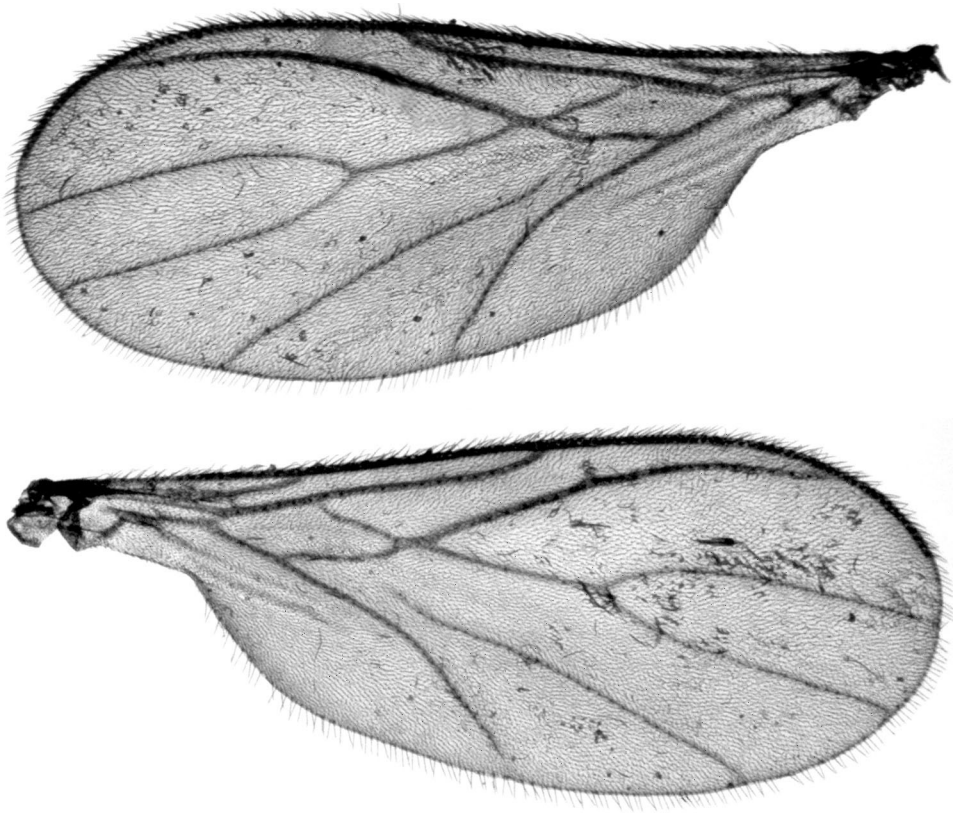


Fig. 15. *Micromacrocera stenobasis* sp. n., holotype male, photo of the wings dorsally

DISCUSSION

There is no close relative of *Micromacrocera* among the extant macrocerines. In most cases it is not reasonable to stress the importance of differences in size, but body length of *Micromacrocera* is only 1.50 mm, i.e. this is far the smallest species of the subfamily. Pulvilli and empodium are totally reduced and its claws are even smaller than in other Macrocerinae (Figs 9–10). Additional peculiar features are the reduction of the basal (alular) region of the wing as well as of vein R_4. I also compared the male genitalia of our fly to those of the other genera of Macrocerinae, which do not seem to be closely related. The fusion of the gonocoxites on a very short section, as well as the lamina between left and right gonocoxal apodemes are also rather characteristic.

Contrarily to all its peculiarities, *Micromacrocera* keys readily out to Macroceridae (or, Keroplatidae: Macrocerinae) in the keys for families in use (e.g. PAPP & SCHUMANN 2000, SØLI *et al.* 2000). The structure of its head with large cervical sclerite, etc. is very characteristic.

In MATILE's (1990) key it runs to couplet 10, but it is not similar to *Macrocera* or to the rest of Macrocerini. In any case, since the cerebral sclerite is not separated from the rest of the head capsule by a membranous area, and, distiphallus is membranous, it must belong to the tribe Macrocerini (cf. MATILE 1990). Its unpatterned wing and the structure of male genitalia exclude a closer relationship to *Chiasmoneura* DE MEIJERE. The anal part of the wing (both as regards shape and venation) and male genitalia of *Angazidzia* MATILE are much different (Figs 13–15, cf. MATILE's (1990) figs 259–261).

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