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A review of the genus Paralimosina L. Papp (Diptera, Sphaeroceridae), with descriptions of ten new species

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Abstract — A review, covering the 20 Palaearctic and Oriental species of *Paralimosina* L. PAPP, 1973 is given. Data on primary types, published descriptions and figures, synonyms and distribution including new records, are provided. The genus is redefined without the subgenus *Canarisina* ROHÁČEK, 1983 which is removed and synonymized (syn. n.) with *Aptilotus* MIK, 1898. The monotypic apterous taxa *Hackmaniella* L. PAPP, 1979 and *Nipponsina* L. PAPP, 1982 are placed as new synonyms of *Paralimosina*, and their type species, viz. *P. ceylanica* (L. PAPP, 1979) comb. n. and *P. sexsetosa* (L. PAPP, 1982) comb. n. are redescribed. Ten new species are described and illustrated: *P. acris*, *P. minor* (both USSR: Far East), *P. lobata* (Pakistan), *P. brevis*, *P. bracteata*, *P. marshalli* (all Nepal), *P. dimorpha*, *P. icaros* (both India, Nepal), *P. gigantea* and *P. indica* (both India), and a key to all 20 *Paralimosina* species is presented. Notes on the relationships, plus figures of the male gonostylus, of all species are given. Knowledge of the female terminalia is supplemented by description and figures of the accessory glands. With 132 figures.

INTRODUCTION

The limosinine genus *Paralimosina* L. PAPP, 1973 was originally described as a monotypic genus for *P. kaszabi* L. PAPP, 1973 from Mongolia. On revising its type species, ROHÁČEK (1983) recognized that the *Limosina fucata*-group (of ROHÁČEK 1977) belongs to this genus and broadened its concept to include a new subgenus, *Canarisina* ROHÁČEK, 1983, erected for *Limosina beckeri* DUDA, 1918 and allied species. In the meantime L. PAPP & ROHÁČEK (1981) and ROHÁČEK & L. PAPP (1983) described 5 new species from Canary Is. and placed them tentatively in *Paralimosina* as forming a separate *P. beckeri*-group (because *Canarisina* was an unavailable name at that time). MARSHALL (1983) correctly recognized that the *P. beckeri*-group is closely related to *Aptilotus paradoxus* MIK, 1898 and transferred it to *Aptilotus* MIK, 1898. However, the removal of *P. avolans* ROHÁČEK & L. PAPP, 1983 and the subgenus *Canarisina* ROHÁČEK, 1983 from *Paralimosina* has not been formalized up to the present. Two additional species of *Paralimosina* have been described from Japan (HAYASHI, 1985) and further two species by L. PAPP (1979, 1982), one in *Hackmaniella* and one in *Leptocera (Nipponsina)*, respectively (see below).

The aim of this study is (1) to redefine the genus *Paralimosina* to include many new and additional species and to exclude the subg. *Canarisina;* (2) to review all 20 known species and provide new distributional records obtained during the last decade; (3) to describe new species from hitherto underinvestigated areas of the Palaearctic and Oriental Regions and (4) to provide a new key to the identification of *Paralimosina* species. Other biogeographic provinces of the Old World are purposefully neglected, although *Paralimosina* occurs there (see below), because of the lack of sufficient material.

The morphological terminology of ROHÁČEK (1982, 1983) is followed here, including

— Antennae paler, yellowish orange. Two *ors* arising close to each other. Fore tarsus whitish yellow. t_2 without mid ventral seta (Figs. 18, 19). Male *S5* simple (Fig. 7). Gonostylus (Fig. 8) with tapered posterior lobe and postgonite (Fig. 11) with pointed apex. Female terminalia (Figs 12–16) **P. bracteata** sp. n.

14 (12) Eyes very small and flat, their diameter smaller than genal height (see ROHÁČEK 1983: Fig. 376). Gonostylus as in Fig. 90 **P. kaszabi** L. PAPP

— Eyes larger, their greatest diameter at least twice as long as smallest genal height. Gonostylus different 15

15 (14) t_2 with mid ventral seta (cf. Fig. 116). Anterior lobe of gonostylus with long, anterodorsal, finely haired projection (Fig. 113) **P. japonica** HAYASHI

— t_2 always without mid ventral seta but males with a row of short ventral spines in apical 3rd or 4th (Figs 112, 118). Anterior lobe of gonostylus different 16

16 (15) Males 17

— Females (females of *P. acris* sp. n., *altimontana* and *minor* sp. n. unknown) 21

17 (16) *S5* strongly prolonged posteromedially (see HAYASHI 1985: Fig. 10) 18

— *S5* not prolonged, at most sinuously margined posteriorly (Fig. 2) 19

18 (17) Head paler. Gonostylus (Fig. 76) with posterior lobe densely covered with relatively short setae. Postgonite (ROHÁČEK 1977: Fig. 31) not curved but with tubercles on apex **P. altimontana** (ROHÁČEK)

— Head darker, particularly in posterior half. Gonostylus (Fig. 114) with 4 strong, long setae on anteroventral corner of posterior lobe. Postgonite (HAYASHI 1985: Fig. 12) distinctly curved, apex simple **P. prominens** HAYASHI

19 (17) *S6* ventrally with 2 tooth-like processes (Fig. 1). Subanal plate with a long caudal seta and very weak paired ventral setae (Fig. 4); posterior lobe of gonostylus with long setae 20

— *S6* ventrally simple (Fig. 119). Subanal plate with a short caudal seta and paired ventral setae flattened and scale-like; posterior lobe of gonostylus with short setae (Fig. 120) **P. minor** sp. n.

20 (19) Gonostylus (Fig. 6); fore lobe with sharply projecting anteroventral corner; posterior lobe caudally tapered, with shorter setae. Postgonite very robust, almost straight (Fig. 5) **P. acris** sp. n.

— Gonostylus (Fig. 106); fore lobe robust, anteroventrally shallowly incised; posterior lobe more robust, with longer setae. Postgonite more slender, slightly bont (ROHÁČEK 1983: Fig. 382) **P. trichopyga** (RICHARDS)

21 (16) Eyes smaller, their diameter about twice as long as the smallest genal height. Abdominal terga not sculptured. *T10* and *S8* much larger, long (HAYASHI 1985: Figs 14, 15) **P. prominens** HAYASHI

— Eyes larger, their diameter nearly three times as long as smallest genal height. Abdominal terga with transverse, microsculpture. *T10* very short and *S8* much smaller, rounded triangular (ROHÁČEK 1983: Figs 387, 389)

P. trichopyga (RICHARDS)

REVIEW OF THE SPECIES OF *PARALIMOSINA*

1. **Paralimosina acris** sp. n. (Figs 1–6, 111, 112)

Type material — Holotype ♂: Южн. Приморье, 40км Ю-В Уссурийска, 11. VIII. 1984, труп лягушки, 10.000–11.00, А. Озеров (ZMUM).

Description — Male. Total body length 2.06 mm; general colour dark brown. Frons largely dark brown, orbital plates, ocellar triangle and adjacent area with silvery grey microtomentum; also interfrontalia greyish tomentose; anterior part of intraorbital area orange, except for the

Figs 1–6. *Paralimosina acris* sp. n. (♂, holotype): 1 = S6, 2 = *S5*, 3 = genitalia laterally, 4 = external genitalia caudally, 5 = aedeagal complex laterally (right postgonite omitted), 6 = gonostylus laterally. — Scales: Figs 1, 2 = 0.2 mm, Figs 3, 4 = 0.1 mm, Figs 5, 6 = 0.05 mm.

M-shaped, velvety black, dull mark. Frontal lunule ochreous brown, yellowish microtomentose; face dark brown, gena partly reddish brown, occiput blackish brown. Cephalic chaetotaxy: *pvt* minute and hair-like; 2 usual *ors;* 3 *ifr*, anterior thin and short, middle and posterior moderately long; *g* well developed. Eyes not much reduced, their diameter about twice as long as smallest genal height. Antennae dark brown, 1st flagellomere with dense and long cilia; arista three times as long as antenna, with short cilia.

Thorax dark brown, with brownish grey microtomentum. Two *dc*, the posterior long, the anterior less than twice as long as *dc* microsetae; 8 rows of *ac* microsetae. Scutellum comparatively long, its length 0.7 of its width. Apical *sc* long and arising on small tubercles; lateral *sc* as long as scutellum length. Two *stpl*, but the anterior only slightly longer than the several additional setulae on sternopleuron. Legs largely dark brown but knees, apices of tibiae and all tarsi reddish brown. f_1 and f_3 slightly thickened. t_2 chaetotaxy as in Figs 111, 112, with a row of short ventral spines terminated by reduced *va*. The ratio $t_2 : mt_2 = 1.65$. Wing pale brownish, *C* brown, other veins very pale brown. *R2+3* and *R4+5* sinuate, the latter proximally curved, distally straightened. Coloured extension of *M1+2* beyond *tp* very short but with a long colourless fold; brown process of *M3+4* much longer. Wing measurements: length 2.23 mm, width 1.00 mm, *C*-index = 1.12, *ta-tp* : *tp* = 1.88. Halteres yellow.

Abdomen blackish brown, rather shining, despite greyish brown microtomentum. *S5* (Fig. 2) simple, with sinuate posterior margin and short dense setae. *S6* (Fig. 1) with 2 tooth-like processes on its stripe-like ventral part.

Genitalia — Periandrium (Figs 3, 4) long, ball-shaped, uniformly setose. Subanal plate reduced and fused with periandrium, carrying a very long caudal bristle and very weak fine paired ventral setae. Gonostylus (Fig. 6) — posterior lobe more slender and with long hair-like setae and some micropubescence; anterior lobe flat and projecting in a slender, acute anteroventral process. Aedeagal complex (Fig. 5) with short, ventrally rounded phallophore. Distiphallus composed of a dorsal sclerite armed by some teeth and projections and a larger ventral sclerite connected with apical, less sclerotized part. Postgonite very robust and wide, subapically somewhat widened, with several minute setulae at anterior margin; its rounded apex with a small tubercle. Ejaculatory apodeme S-shaped but very slender.

Etymology — Named according to acutely projecting anterior lobe of gonostylus.

Distribution: USSR (Far East).

Discussion — The species seems to be closely related to the European *P. trichopyga*, chiefly because of the similar external characters, aedeagal complex and male *S5* and *S6*. See the key for differences between them.

2. Paralimosina altimontana (ROHÁČEK, 1977) (Fig. 76)

Limosina altimontana ROHÁČEK, 1977: 411–415, (male only), 400 (Fig. 15), 412 (Fig. 25), 414 (Fig. 31), 417 (Fig. 39).
Paralimosina (Paralimosina) altimontana: ROHÁČEK, 1983: 50 (comb. n.).

Type material — Holotype ♂: Nepal, Taplejung distr., below Sangu, c 6000 ft., 30 10 1961, by stream in shady ravine, Brit. Mus. East Nepal Exp. 1961–62, R. L. Coe leg. (BMNH) (examined).

New records — Nepal: 28°00′N, 85°00′E, 1 ♂ 20. May 1967, 10,500 ft., Malaise trap 6, Can. Nepal Exped. (BRI). Pakistan: Swat, Malam Jabba, 1 ♂ 9. V. 1983, 2300 m (No.4c), Besuchet et Löbl leg. (MHNG).

Supplement to description — Male *S5* projecting posteromedially only slightly less than that of *P. prominens; S6* with a simple, short, transverse, finely haired, membraneous lobe behind its stripe-like ventral part. Male subanal plate with 2 pairs of very widened scale-like ventral setae. The figure of the gonostylus (Fig. 76) is based on a new male from Nepal. The female is unknown.

Distribution: Nepal (ROHÁČEK 1977), Pakistan (new).

Discussion — Apparently, *P. prominens* is the sister-species of *P. altimontana;* both these species share a similar aedeagal complex, gonostylus, male *S5* as well as external characters.

16. **Paralimosina minor** sp. n. (Figs 117–121)

Type material — Holotype ♂: Амурская обл., г. Зея, 3. 3. IX. 1981, А. Шаталкин (ZMUM).

Description — Male. Total body length 1.36 mm; general colour black, with greyish to brown microtomentum. Head with dark brown occiput and posterior part of frons. Anterior part of frons, in front of the blackish M-shaped mark, orange; orbits and very narrow interfrontalia silvery grey. Cephalic chaetotaxy: *pvt* reduced, indistinct; 2 usual *ors;* 3 *ifr*, anterior small; *g* distinct but weak. Frontal lunule ochreous brown; face shining brown; gena paler than face, ochreous brown. Eye diameter about 2.9 times as long as smallest genal height. Antennae brown, base of 1st flagellomere paler; arista 2.4 times as long as antenna, with medium long cilia.

Thorax black, mesonotum rather shining despite some microtomentum; pleural part dull. Thoracic chaetotaxy: 2 *dc* but the anterior one hardly distinguishable from *dc* microsetae; 8 rows of *ac* microsetae; *sc* long; 2 *stpl*, the posterior one long but anterior one reduced to a microseta about as long as the 2 other setulae below it. Scutellum flat, rounded, its length about 0.64 of its width. Legs pale to dark brown; trochanters, knees and tarsi yellowish to ochreous. f_1 and f_3 somewhat thickened and darker. t_2 with a row of short ventral spines in apical half; chaetotaxy as in Figs 117, 118. The ratio $t_2 : mt_2 = 2.21$. Wing with brownish membrane and yellowish brown veins. *R2 +3* strongly sinuate; *R4 +5* slightly sinuate and its apical part straight. Discal cell broad, with anterior outer corner slightly acute. Coloured extensions of *M1 +2* and *M3 +4* beyond tp very short. Alula very narrow. Wing measurements: length 1.34 mm, width 0.61 mm, *C*-index = 0.73, *ta–tp* : *tp* = = 2.08. Halteres yellow.

Abdomen with black, greyish brown tomentose, subshining terga. Sterna brown, more densely setulose and duller. *S5* simple, transversely oblong, sparsely setulose. *S6* with finely setulose membraneous lobe (Fig. 119) behind its ventral stripe-like part.

Genitalia — Periandrium globose, uniformly shortly setulose. Subanal plate with short caudal setae and 2 pairs of flattened, scale-like ventral setae. Gonostylus (Fig. 120) small; posterior lobe shortly setose and with small ventral projection. Anterior lobe flat, pale, of rhomboid form, with finely haired apex. Aedeagal complex (Fig. 121) composed of short, ventrally pointed phallophore and complex distiphallus armed with a number of teeth in its middle and with a tuberculate structure subapically. Postgonite slender, with cut apex, 2 setulae at anterior margin and some minute tubercles at tip. Ejaculatory apodeme well developed.

Female unknown.

Etymology — The name refers to the unusually small size of the species.

Distribution: USSR (Far East).

Discussion — *P. minor* sp. n. and *P. japonica* form a distinct sister-pair (for shared features see under *P. japonica*) but they differ in size (*P. japonica* is much larger — 2.1–3.0 mm), ventral chaetotaxy of male t_2 (*P. japonica* with mid ventral seta), and form and setosity of posterior lobe of gonostylus etc.

17. **Paralimosina prominens** HAYASHI, 1985 (Fig. 114)

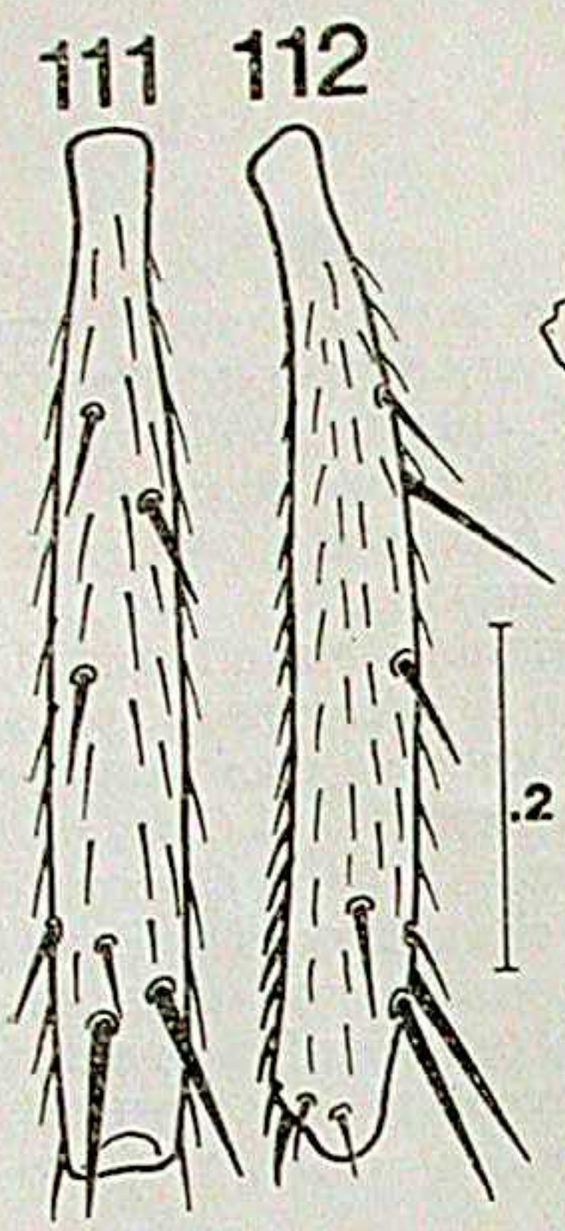
Paralimosina (Paralimosina) prominens HAYASHI, 1985: 331–333, 330 (Fig. 2), 333 (Figs 10–16).

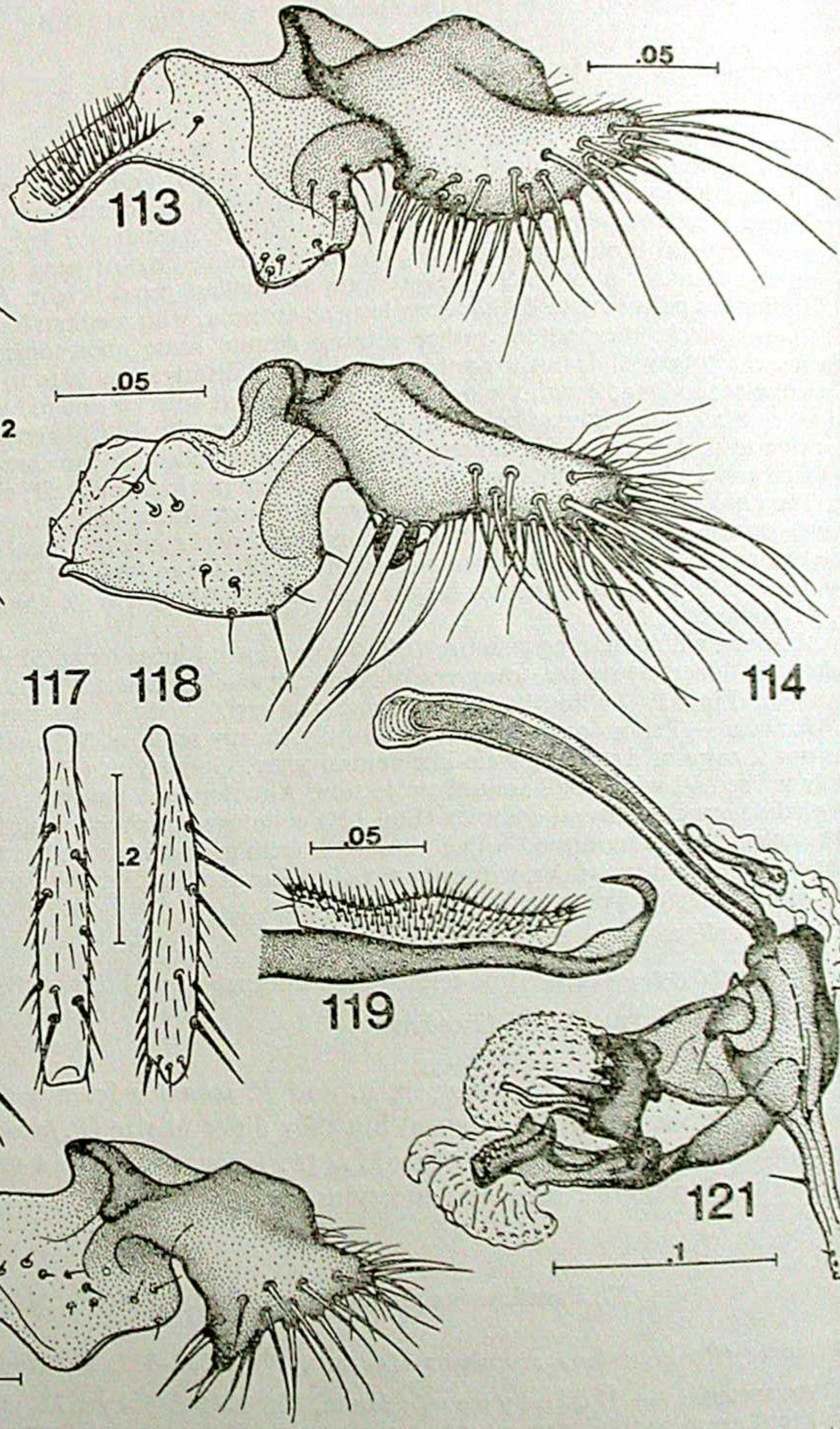
Type material — Holotype ♂: Japan, Mt. Takao, Tokyo, 22. vi. 1983, T. Hayashi leg. (NITI) (not examined). For paratypes see Hayashi (1985); two of them examined (1 ♂ +1 ♀, JRO).

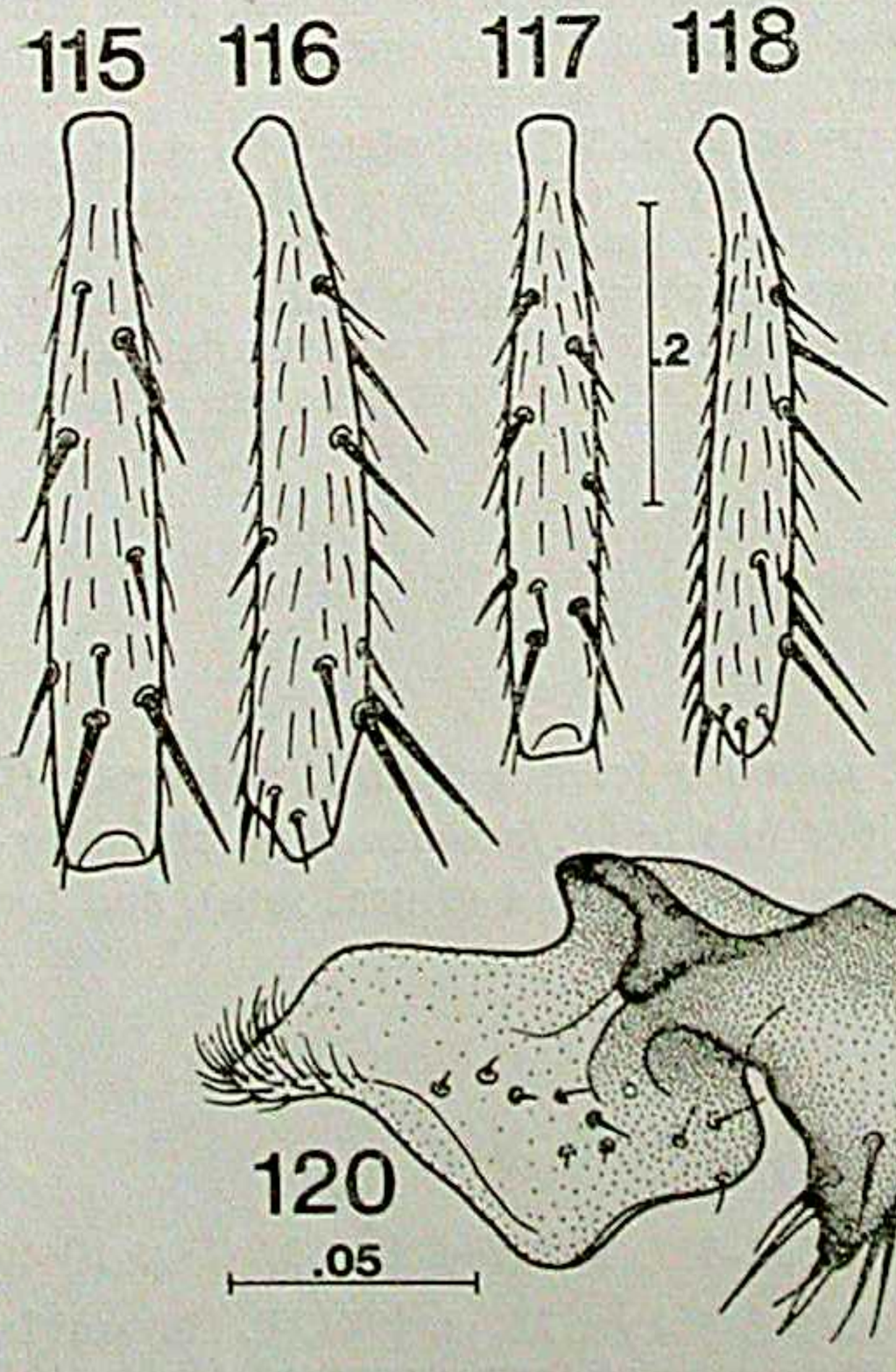
Supplement to description — Male S6 ventrally stripe-like but bent out posteromedially; behind this arch with a transverse, finely haired, membraneous lobe. Male subanal plate with scale-like ventral paired setae not very widened.

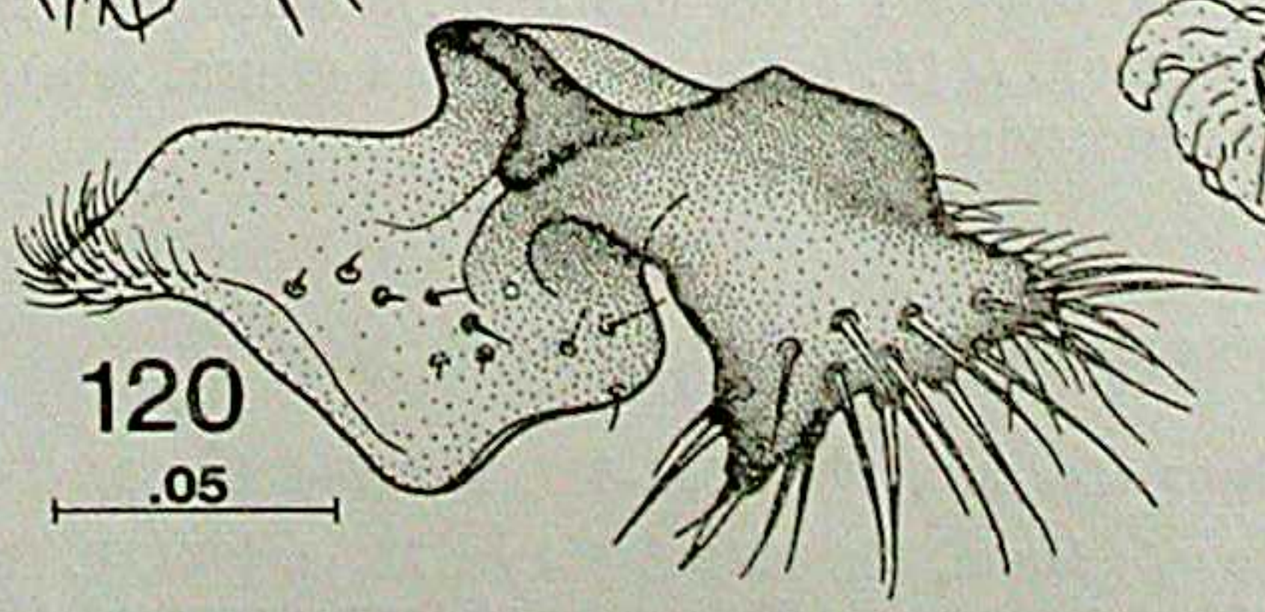
Distribution: Japan (Honshu, Hokkaido — HAYASHI 1985).

Discussion — The species seems to be most closely allied to the Nepalese *P. altimontana* (see under that species).









Figs 111–121. *Paralimosina acris* sp. n. (♂, holotype): 111 = left t_2 dorsally, 112 = ditto anteriorly. — Fig. 113. *P. japonica* HAYASHI (♂, Japan): gonostylus laterally, — Fig. 114. *P. prominens* HAYASHI (♂, paratype): gonostylus laterally, — Figs 115–116. *P. marshalli* sp. n. (♂, holotype): 115 = left t_2 dorsally, 116 = ditto anteriorly. — Figs 117–121. *P. minor* sp. n. (♂, holotype): 117 = left t_2 dorsally, 118 = ditto anteriorly, 119 = ventral portion of *S6*, 120 = gonostylus laterally, 121 = aedeagal complex laterally. — Scales: Figs 111, 112, 115–118 = 0.2 mm, Fig. 121 = 0.1 mm, others = 0.05 mm.