Two new genera of the Oriental Sphaeroceridae (Diptera)

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Abstract – Two new genera, *Aspinilimosina* gen. n. (type species *A. postocellaris* sp. n., Sri Lanka) and *Pellucialula* gen. n. (type species *P. polyseta* sp. n., Indonesia, Western Kalimantan) are described from the Oriental region. With 21 figures.

Key words - Sphaeroceridae, Aspinilimosina, Pellucialula, new genera and species, taxonomy, Oriental Region.

INTRODUCTION

The family Sphaeroceridae was recently divided into five subfamilies (ROHÁ-ČEK et al. 2001). Two of them (Tucminae and Homalomitrinae) are very small as for the number of species included. Another two, Sphaerocerinae and Copromyzinae are richer in species but generic revisions have already been made on them. It means, that although numerous new species are to be described in them also in the future, at the same time it is unlikely to find unknown genera. The species richest subfamily is Limosininae. ROHÁČEK (1982, 1983, 1985) published a book-size revision paper in four parts for the Palaearctic Limosinini (formerly mostly united under the generic name Limosina). I was wrong saying after the publication of that revolutionary work that also the tropical, exotic species ought to have been studied for such a revision. Contrary, the generic status of very few of the species treated by ROHÁČEK (1982, 1983, 1985) have been changed since then. Even in the case, where an exotic genus "swallowed" the Palaearctic one (Phthitia/Kimosina) Ro-HÁČEK's work facilitated descriptions on a higher level, etc. Prof. STEVEN A. MARSHALL and co-authors have achieved important results on the Nearctic and Neotropical Limosinini, describing a number of new genera. No such a work has been done on the Afrotropical and Oriental species yet. There are known species, which must belong to new genera (Limosina monorbiseta DEEMING, the Poecilosomella multicolor species group and the Paralimosina eximia species group are

among those examples, see e.g. PAPP 1991). HACKMAN (1977) listed only Acuminiseta DUDA, Anommonia SCHMITZ and Poecilosomella DUDA, which are really tropical genera in the Oriental Region. Since that time Indiosina L. PAPP was described and Biroina RICHARDS, Pterogrammoides L. PAPP were reported from the Oriental region, not to mention rather numerous species, which belong to genera, which are represented also in the Palaearctic region. However, we know by now that also Pterogramma SPULER is richly represented, though not published from the Oriental region. All in all, there is much to be done in the Oriental Limosininae and so this paper is just a small bit of those unknown.

Subsequently, two new genera of the Oriental Limosinini are described.

The type specimens are preserved in the Naturhistoriska Rijksmuseum (Swedish Museum of Natural History), the Department of Entomology, Stockholm, Sweden (NHRS), the Diptera Collection of the Department of Zoology, Hungarian Natural History Museum, Budapest (HNHM) and the Royal Ontario Museum, Toronto, Canada (ROM).

Aspinilimosina gen. n.

Type species - Aspinilimosina postocellaris sp. n.

Gender - Feminine.

Description – Very small longish flies with extremely long postocellar setae. It belongs obviously to the subfamily Limosininae.



Figs 1–2. Aspinilimosina postocellaris sp. n., paratype male, head. 1 = dorsal view, 2 = sublateral view (seen perpendicularly to gena). Scale: 0.5 mm

Frons and genae with longitudinal hatching (Figs 1–2), its frequency is thicker on interfrontalia than on orbitalia. Two pairs of equally long fronto-orbitals and a pair of extremely long postocellars (Fig. 1). Numerous (6 pairs of) interfrontals. No inner orbitals. Ocellar setae emerge far from each other. First flagellomere rounded, arista lateral. Genal seta present (Fig. 2).

Two pairs of postsutural dorsocentrals, sparse and not ordered acrostichals; scutellum short and broad.

Wings of normal size, costa without long and dense setae, and reaching far over apex of R_{4+5} (Fig. 3). Vein R_{2+3} almost straight. Medial vein continued as a vein fold almost to wing margin, anal vein very long, almost straight.



Figs 3–5. Aspinilimosina postocellaris sp. n., paratype male. 3 = right wing, 4 = hind leg, femur and tibia in lateral view, three apical tarsomeres in dorsal view, 5 = abdomen, dorsal view. Scales: 0.5 mm for Fig. 3, 0.4 mm for Figs 4–5

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Claws normal, pulvilli minute on legs. Mid tibia without middle ventral seta, a ventroapical seta present. Other setae on mid tibia sparse and not paired. No mid ventral seta on mid basitarsus. Hind tibia thickened with three strong thick apical spurs, but no dorsal preapical seta (Fig. 4). Hind basitarsus and second tarsomere enlarged.

Abdominal tergites 3–5 somewhat reduced (Fig. 5) but sternites broad. Epandrium very small, surstylus short, phallus with large epiphallus and with a pair of long dorsal appendages (Fig. 9), like in *Spinilimosina*. Postgonites simple (Fig. 10).

Remarks – The first idea, when one looks at this species, is that it may be related to *Ceroptera* and allied genera by its strong hind tibial spurs. Actually, no species of *Ceroptera* possesses so strong spurs. Wing venation itself would not contradict its relegation to *Ceroptera* and allies, but as far as I know, they have always long and mostly dense costal setae, at least on first section. After all, I named it as *Aspinilimosina*, since *Spinilimosina* has those long dorsal processes of phallus, which is a shared character with our fly. However, there are no strong spinelike setae on epandrium as in *Spinilimosina*. In ROHÁČEK's (1998) key it runs to couplet 41, but I cannot find its closest relative in the Limosinini genera. It has a wing venation (although not peculiar) rather different from that of *Spinilimosina*.

The specific epithet of the type species refers to the extremely long postocellar pair, which may be a characteristic feature for the genus. There are some groups in spharocerids with long postocellars. For instance, I saw similarly strong postocellars in *Sclerocoelus clarae* (L. PAPP). However, postocellars of the *Ceroptera* species are not particularly long. In addition, I do not find any shared characters in the male genital structures of the species *Ceroptera* and allied genera to this new genus (cf. MARSHALL 1983, MARSHALL & MONTAGNES 1988).

Aspinilimosina postocellaris sp. n. (Figs 1–10)

Type material – Holotype male (NHRS): Ceylon, Sabaragamuwa, Prov. Kitulda, 21 mls N Ratnapura, 17. III. [19]62. Loc. 152 – Lund University Ceylon Expedition 1962, Brinck – Andersson – Cederholm. Paratypes: 3 males (NHRS, 2 males in HNHM): data same as for holotype.

The type specimens were kept in ethyl alcohol for 40 years. In the course of this long time they were completely discoloured, their body is light yellow, so I will not mention colour features in the description below. The holotype and the NHRS paratype were left in alcohol (they are also discoloured but otherwise in a good state of preservetion). The other two paratypes (HNHM) were treated with methyl-cellosolve and put into canada balsam in a round hole of a hard paper card each, covered on both sides by small pieces of cover glasses. One of those males is damaged, right wing and several setae are lost (postabdomen and genitalia in a plastic microvial with glycerol). The other male is severely damaged, its right wing was prepared on a microscopic slide, abdomen with genitalia are put into a microvial. I made the NaOH preparation years ago, and in November 2003, when I made the

figures on surstylus and gonites, I was unable to find the epandrium with surstyli, gonites and cerci in the microvial (only abdomen and phallus with epiphallus). So I made those two figures on the former specimen.



Figs 6–10. Aspinilimosina postocellaris sp. n., paratype males. 6 = sternite 5 and ventral part of sternite 6, ventral view; 7 = same, in higher magnification; 8 = surstylus, broadest extension (sublateral view); 9 = genital complex laterally; 10 = postgonite, broadest extension (sublateral view). Scale: 0.2 mm for Fig. 6, 0.1 mm for Figs 7–10

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Description – Measurements in mm: body length 1.65 (holotype), 1.55–1.65 (paratypes), wing length 1.38 (holotype), 1.34–1.38 (paratypes), wing width 0.67 (holotype), 0.59–0.65 (paratypes).

Body longish, length of abdomen equals that of head and thorax combined.

Facial plate slighty convex. Frontal vitta divided, bicolored but both parts densely dashed. Orbitalia less densely dashed. Two pairs of equally long and thick fronto-orbital setae (Fig. 1), plus a number of short orbital setulae. Ocelli rather small. Ocellar triangle not separated, area between ocelli not dashed but microtomentose. Ocellar setae long (0.42 mm) and emerge far from each other. Interocellar setulae short. A pair of extremely long postocellars just on border of vertex and occiput. Inner and outer verticals rather long, occipitals weak. No inner orbitals. Six pairs of medium long *ifr*. First flagellomere rounded, about as long as broad. Arista (Fig. 1) with sparse cilia, the longest 0.025–0.027 mm, cilia on flagellomere shorter. Eye facettes large. Gena broad and strongly broadening posteriorad (Fig. 2), with a medial dashed area (anteriorly running along eye). Genal seta 0.06 mm long on a paratype (Fig. 2). Vibrissa normal, peristomial setae rather weak. Clypeus narrow.

Mesonotal setae: 1 postpronotal, 2 notopleural, 1 supra-alar, 2 dorsocentral (anterior one at level of posterior np), 1 thin postalar, 1 postsutural and 1 posterior intra-alar pairs. Acrostichals sparse and not ordered, ca. 4 in the level of *sa*, ca. 6 in a level anteriorly. Scutellum broad and short, i.e. 0.132 mm long, 0.31 mm broad basally, apical scutellar 0.23 mm, lateral scutellar 0.165 mm long . One medium-long katepisternal seta

Wings without long or particularly dense costal setae, basally with 2 setae, the longer one is only 0.062 mm. Radial veins R_1 and R_{2+3} short, latter almost straight, upcurving into costa on a short section only (Fig. 3). Second costal section 0.323 mm, third section 0.385 mm, ratio 0.84. Costal vein definitely overruns apex of R_{4+5} . Vein R_{4+5} slightly bent towards the costa, i.e. apical part more curved than basal part. Discal cell medium-long, intra-crossvein section of medial vein 0.18 mm, dM-Cu 0.08 mm, ratio 2.25. Medial vein continued as a vein "shadow" almost to wing margin. Cubital vein continued distally to dM-Cu on a short section only. Anal vein rather long, almopst straight. Alula comparatively large and broad, with widely rounded apex.

Fore leg without any special setae. Fore basitarsus 0.088 mm. No middle ventral seta on mid tibia. Mid basitarsus 0.22 mm long, no characteristic ventral seta anywhere on it. Mid tibial armature: 0.06 mm long (this is the longest seta on tibia) dorsal at 15/17, anterodorsals at 6/17 and 13/17. Male mid tibia ventrally without long setae or hairs. Ventroapical seta (plus an anteral apical seta) normal. Hind tibia with 3 apical thorns (Fig. 4), the ventral one is the longest. The relative length of the thorns is different from specimen to specimen, in cases only 2 thorns present. Hind basitarsus and second tarsomere enlarged. Claws normal but pulvilli minute (hardly discernible).

Tergite 1+2 short (Fig. 5) with comparatively long thin marginal setae. Male tergites 3–5 slightly reduced. Abdominal sterna broad: sternite 4 and 5 almost as broad as abdomen, sternite 2 narrow (small), size of sternite 3 between them. Sternite 5 with a separate caudal sclerite, which bears comparatively long dense setae apically (Figs 6–7).

Epandrium and genitalia very small, epandrium with thin and medium-long setae only. Cerci normal. Surstylus (Fig. 8) longer than deep, medially and subapically with a long and thick but not acute thorn, lateral surface with numerous long setae. Postgonite (Fig. 10) with blunt apex, not strongly curved, without remarkable setae. A rather long epiphallus present. Aedeagal apodeme comparatively short. Distiphallus not markedly separated from basiphallus, with a pair of long narrow dorsal processes (Fig. 9).

Female unknown.

Distribution - Sri Lanka.

Pellucialula gen. n.

Type species – Pellucialula polyseta sp. n.

Gender – Feminine.

Description – A robust fly with numerous perpendicular macrotrichia on both sides of the wing (on the upper (radial) part) (Fig. 11). The other characters of the species are as follow:

Eyes large. Lateral arista, long aristal cilia, weak *poc* but 2 pairs of strong occipitals, strong genal bristle, no inner orbitals.

Three or four short pairs of *dc* in front of the longer posterior *dc*. A third, basal pair of scutellars present.

Costal vein without erect perpendicular hairs but costal hairs dense and rather long even distally to R_1 . No strong basal (costagial) seta. Vein R_{4+5} slightly bent up to costa, costal vein ending at R_{4+5} (Fig. 11). Medial and cubital veins continue over dM-Cu only by very short faint vein shadows, but anal vein reaching wing margin or nearly so. Alula large.

Short and flattened tarsomeres, particularly so for the hind leg. A complete row of strong anterodorsals on mid tibia (posterodorsals much weaker). No mid ventral seta on mid tibia. No ventro-apical seta on mid tibia of male (present in female) but a ventral seta on mid basal tarsomere plus rows of other thick setae there, short thick ventral spur on hind tibia.

Male sternite 5 with a strongly sclerotized small black plate (Figs 14–15), which is ventral to sternite 5 (and it seems rather disconnected and movable up and down). Medial part of sternite 6 with a patch of small pointed black thornlets, which cover partly also membrane. Nothing special in male genitalia: long hypandrium and phallapodeme (Fig. 17), hypandrium without ventral appendages, short phallus, extremely long but only apically curved postgonite (Fig. 18), rather strong epiphallus (Fig. 17).



Fig. 11. Pellucialula polyseta sp. n., left wing of a paratype female, dorsal view. Scale: 0.5 mm

Female postabdomen not telescopized. Three globular spermathecae with rather long weakly sclerotized "stalks" (Fig. 21). No common stalk for the paired spermathecae, their own stalk equals with the single one's.

Remarks – Pellucialula gen. n. is easily recognisable. The macrochaetae on both sides of wing on the radial region are unique among the limosinine flies, but this is not obviously a generic character (synapomorphy); one can decide only after a discovery of a second species sharing this character with *P. polyseta*. The third (basal) pair of scutellar setae and its extremely short tarsi are also very characteristic. It runs to couplet 33 in ROHÁČEK's (1998) key, which I think as the most comprehensive key for the limosinine genera (there is no key published for the Oriental Limosininae). However, it is not related to the *Archicollinella–Kimosina* complex. At the same time, its mid basitarsal seta is not on middle of basitarsus but that is subbasal. Its broad abdominal sterna, structure of spermathecae and wing venation may be those features, which may serve as characters in search of its relatives.

Pellucialula polyseta sp. n.

(Figs 11-21)

Type material – Holotype male (ROM): INDONESIA: W. Kalimantan, Gunung Palung Nat. Pk., June 17-June 29 1991, Darling, Rosichon, Sutrisno. IIS 910134 – Cabang Panti Res. Sta. 1°15'S, 110°6'E, 1° rainforest, 100–400 m, Malaise trap (pans), Sandstone. Three paratype females (ROM, 1 in HNHM): same data as for the holotype; one of the ROM paratypes with abdomen and genitalia in a plastic microvial with glycerol, left wing of this species has been prepared on a slide.

The specimens were (probably) mounted from alcohol; the female paratype's abdomen was not treated in NaOH, but shortly washed in lactic acid only, this is why its spermathecae are still black but this way I was able to depict the slightly sclerotized ducts.

Description – Measurements in mm: body length 1.98 (holotype, with downcurved abdomen), 2.0–2.20 (paratype females), wing length 1.67 (holotype), 1.68–1.70 (paratypes), wing width 0.825 (holotype), and 0.67–0.82 (paratypes).

Facial plate and gena yellow, anterior part of frons greyish yellow, posterior part grey, orbitalia and frontal triangle shiny. Thorax and abdomen brown.

Two pairs of rather short but thick fronto-orbital setae close to each other. Ocellars rather lateroclinate, thick. *vti* extremely thick, *vte*, *occe*, *occi* comparatively strong (thick). Outer occipitals longer than posterior fronto-orbital pair. Postocellars very small, down on occiput. Four or five pairs of rather strong *ifr*. Genal seta strong upcurving 0.175 mm long, otherwise only 1–3 setula above peristomials. Gena broad, 0.12 mm broad just behind genal seta. Pedicel with long apical setae, first flagellomere subconical with rounded dorsal apex, covered by very dense and comparatively long white cilia. Arista lateral: originates from middle of the dorsal outline of first flagellomere, with long dense cilia. Clypeus narrow. Palpus with 2 strong black apical setae each.

Mesonotum with 1 postpronotal, 2 notopleural, 1 true supra-alar, 1 postalar pairs of setae; 1 anterior (just postsutural, above anterior *np*) and 1 posterior ("supra-alar") intra-alar pairs. One posterior dc, plus 3 or 4 more anterior short dc pairs. Presutural pair 0.13 mm long. Acrostichals short and numerous, not ordered into rows. Prosternum broader than linear. Anterior katepisternal thin and short, posterior pair strong, 0.38 mm (!) long. Scutellum as long as wide basally, concolorous with the



Figs 12–16. Pellucialula polyseta sp. n., holotype male, genitalia. 12 = epandrium, surstyli and cerci in caudal view; 13 = epandrium and subepandrial sclerite, anterior view; 14 = sternite 5 and part of postabdominal sternite, ventral view; 15 = medial part of sternites 5 and 6, 16 = surstylus, lateral view. Scales: 0.4 mm for Fig. 14, 0.2 mm for Figs 12–13, 15, 0.1 mm for Fig. 16

mesonotum, basal scutellar 0.075 mm (holotype), lateral scutellar 0.33 mm, apical scutellar 0.515 mm long.

Wing yellowish grey, costa light brown, other veins yellow. Costal hairs long and dense. Vein R_{2+3} rather short (Fig. 11), second costal section much shorter than third. Apical half of vein R_{4+5} slightly curved up to costa, but even basal part not straight. Medial and cubital veins continued over cross-vein dM-Cu only by very short faint vein shadows, but anal vein (A₁) reaching wing margin or nearly so. Cubital stem-vein ventrally with long hairs. Base of A₂ is clearly discernible (Fig. 11). Alula large.

All the femora and tibia slightly thickened. Mid trochanter with a long lateral seta. Claws strong but simple. Pulvilli large, 0.10 mm, white pilose. Tarsi short, e.g. whole length of fore tarsi shorter than height of head. Mid femur subapically with 2 anterior thorn-like thick setae. Male mid tibia without a true ventroapical but with dense long hairs instead, female mid tibia with strong ventroapical seta. Mid tibial setae: no strong anteral or ventral seta at middle; strong (longer) anterodorsals at 14, 21, 30, 38, 44/50 (the last one almost dorsal), plus a subapical, short but thick anterodorsals at 11, 33/50; posterodorsals at 31 (medium long) and 41/50 (longer), but 1 or 2 additional shorter posterodorsal may present. Mid basitarsus with thick black short setae in rows: 2 dorsal and 1 anteroventral rows (of 0.045 mm setae as longest), subbasal ventral thick black seta of 0.067 mm long and 0.01 mm thick. Male mid basitarsus with dense hairs ventrally (but not a row of setae there), female mid basitarsus also with ventral row of short black setae. Hind tibia without dorsal preapical, apical ventral spur only 0.055 mm long but thick. Hind tarsi short and much flattened.

Abdominal tergites sparsely setose, no longer marginal setae, except for 2 pairs of long dorsal setae on female 7th tergite. Abdominal membrane between tergites and sternites with setae equal in length with those on tergites. Sterna broad, evenly covered with sparse medium-long setae.

Male sternite 5 with a strongly sclerotized small black plate (Figs 14–15), which is ventral to sternite 5 (and it seems rather disconnected and movable up and down). Medial part of sternite 6 with a patch of small pointed black thornlets, which cover partly also membrane. Epandrium short with



Figs 17–18. *Pellucialula polyseta* sp. n., holotype male, genitalia. 17 = genital complex, lateral view, 18 = postgonite, lateral view. Scales: 0.2 mm for Fig. 17, 0.1 mm for Fig. 18

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short setae. Anal opening comparatively small. Cerci normal, or even weakly sclerotized (Fig. 12), without any longer setae. Subanal plate (subepandrial sclerite) (Fig. 13) forms half of a cylinder with large laterally placed parts. Male surstylus of an intricate form (Fig. 16) with two lobes. Medial lobe of male surstylus bipartite: anterior part widely rounded, posterior part with a medially, perpendicularly directed thorn; medial lobe continued in the laterally placed part of subepandrial sclerite (Fig. 13). Lateral lobe with long setae. Most medial part of surstylus – hidden in medial lobe from outside – is a process with cranially directed apical thorn. Postgonite (Fig. 18) comparatively large but rather simple. Distiphallus short; a distinct epiphallus present (Fig. 17).



Figs 19–21. *Pellucialula polyseta* sp. n., paratype female, genitalia. 19 = terminalia in dorsal view, 20 = same, lateral view; 21 = spermathecae. Scales: 0.1 mm for Fig. 21, 0.2 mm for Figs 19–20

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Female tergite 8 tripartite (Fig. 19): a small central (dorsal) part without setae but with cilia only, lateral parts large (Fig. 20), their ventral part strongly sclerotized, shiny, slightly medioclinate. Epiproct triangular, bare. Hypoproct comparatively large, subtriangular and setose. Cerci small (Figs 19–20) with four pairs of longer setae. Wall of oviduct with two small dorsal sclerites, which placed above hypoproct when at rest and turned outside body, when egg-laying. Three spermathecae (Fig. 21) as described above.

Distribution - Indonesia (Western Kalimantan).

Etymology – The specific epithet (noun) refers to its numerous tibial and basitarsal setae and to the additional (basal) scutellar pair.

Remarks - P. polyseta sp. n. is an easily recognisable species. It is hypothesised that this species may be peculiar mainly with its wing macrochaetae, but there will possibly be more species discovered with similar characteristics.

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