

A new species of the shore-fly genus *Paralimna* Loew, 1862 (Diptera: Ephydriidae) from Australia

Новый вид мух-береговушек рода *Paralimna* Loew, 1862 (Diptera: Ephydriidae) из Австралии

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КЛЮЧЕВЫЕ СЛОВА: Diptera, Ephydriidae, *Paralimna bocki*, новый вид, Австралия, описание, определительная таблица.

ABSTRACT. A new shore-fly species, *Paralimna* (*Paralimna*) *bocki* sp. n. from Australia, is described. Due to general brown coloration and many strong facial setae the new species is differentiated well externally from the other Australian species of the subgenus *Paralimna* Loew, 1862. The new species differs by the shape of presurstyli in posterior view: presurtyli of *P.* (*P.*) *bocki* broader than those of *P.* (*P.*) *millepuncta* and significantly longer and narrower than in *P.* (*P.*) *spatiosa*.

РЕЗЮМЕ. Новый вид мух-береговушек *Paralimna* (*Paralimna*) *bocki* sp. n. описан из Австралии. По коричневой окраске тела и большому количеству щетинок на лице новый вид внешне хорошо отличается от других видов подрода *Paralimna* Loew, 1862, известных из Австралии. Новый вид отличается также по форме пресурстилей, которые значительно шире, чем у *P.* (*P.*) *millepuncta* и длиннее и уже, чем у *P.* (*P.*) *spatiosa*.

Introduction

The genus *Paralimna* Loew, 1862 includes 100 described species and is one of the richest in species genera in the tribe Dryxini, proposed by T. Zatwarnicki [1992]. This tribe comprises 9 genera, distributed both in the Old and New Worlds with Afrotropical Region being especially rich in species [Mathis, Zatwarnicki,

1995, 2002; Krivosheina, 2013; Raffone, 2012, 2015; Ale-Rocha, Mathis, 2015]. Attention of many dipterologists was attracted to this group of Diptera because in this tribe we discover the largest and remarkable specimens among Ephydriidae with body length to 12 mm. Cogan completed first significant revision of this group, considering it inside tribe Notiphilini, and described more than 10 species mainly from the genus *Paralimna* [Cogan, 1968]. The latest revision of the New World species of the genus *Paralimna* allowed to describe 15 new to science species [Ale-Rocha, Mathis, 2015]. In the same year G. Raffone described 2 new species of *Paralimna* from Africa [Raffone, 2015].

Paralimna was divided into two subgenera for a long time: *Paralimna* Loew, 1862 and *Phaiosterna* Cresson, 1916. These subgenera are distinguished by the shape of the eye, which is nearly round in *Paralimna* and the height of which is distinctly exceeding its width in *Phaiosterna*, and gena high in *Paralimna* and short in *Phaiosterna*. The subgenus *Phaiosterna* was described by Cresson in 1916 and was accepted by subsequent authors. Mathis and Zatwarnicki [2002] revised *Phaiosterna* with 6 included species from the Old and New Worlds. Four more species were described in this subgenus [Raffone, 2012, 2015]; so the number of *Phaiosterna* species reached ten. The subgenus *Paralimna* was richer in species and more diverse and divided into several species groups [Cogan, 1968]. One of these groups, *limbata*, was surely mono-

phyletic as characterized by gena being secondary short [Ale-Rocha, Mathis, 2015]. This fact was discussed in the work of Mathis and Zatwarnicki [2002] by separation of the group in the Key to subgenera of *Paralimna*. As a result, this species group was raised to subgeneric level and the new subgenus *Coganolimna* Ale-Rocha et Mathis, 2015 was described [Ale-Rocha, Mathis, 2015]. The species of *Coganolimna* are known from Afro-tropical Region only. The members of the other two subgenera are distributed widely in the Old and New Worlds countries, including Australasian/Oceanian.

The Australian fauna of *Paralimna* was investigated by Ian R. Bock [1988] who mentioned 9 species from this genus. The further changes in the nomenclature of Ephydriidae replaced 3 of these species to other ephydrid genera: *Paralimna calva* Bock, 1988 was attributed to newly described genus *Papuama* Mathis et Zatwarnicki, 2002; *P. unisetata* Malloch, 1925 and *P. javana* van der Wulp, 1891 — to the genus *Oedenopiforma* Cogan, 1968 [Mathis, Zatwarnicki, 2002, 2012]. Two species, *P. (Phaiosterna) fusca* Bock, 1988 and *P. (Ph.) lineata* de Meijere, 1908 belong to the subgenus *Phaiosterna* [Mathis, Zatwarnicki, 2002]. The rest of species, 4 species, belong to the subgenus *Paralimna*: *P. (P.) stirlingi* Malloch, 1926, *P. (P.) millepuncta* Malloch, 1925, *P. (P.) pilosa* Bock, 1988 and *P. (P.) spatiosa* Bock, 1988.

The determination of *Paralimna (Paralimna)* specimens from the collection of the Zoological Museum of the Moscow Lomonosov State University allowed us to discover one new species from this subgenus.

Materials and methods

The descriptive terminology follows that used by Mathis & Zatwarnicki [2002]. Dissections of male terminalia were performed using the following method: microforceps were used to remove the most end of male abdomen, which was macerated in a potassium or sodium hydroxide solution. Cleared genitalia were rinsed in distilled water and then in 70% ethanol, the figures were made from genitalia placed to glycerin. Rest of abdomen and genital structures were placed in a plastic microvial filled with glycerin and attached to the pin supporting the insect from which it was removed.

The holotype and paratypes of the new species are deposited in the collection of the Zoological Museum of Moscow State University (ZMUM, Moscow).

Taxonomic part

KEY TO GENERA OF DRYXINI

1. Notopleuron bearing a single large seta; presutural supra-alar seta lacking; mid- and hindfemora moderately long to very long, length subequal to that of abdomen 2
- Notopleuron bearing two setae; presutural supra-alar seta

- usually present; lacking in *Papuama* Mathis et Zatwarnicki and one species of *Oedenops* Becker); mid- and hindfemora normally developed, length much shorter than that of abdomen 5
2. Ocellar seta present, although short, inserted slightly in front of anterior ocellus; reclinate fronto-orbital seta present; anepisternum bearing one well-developed seta along posterior margin; vein R₁ bare along dorsum; R stem vein lacking setulae; crossvein dm–cu normally developed, nearly straight, forming acute inner angle with vein M (southern Afrotropical) *Corythophora* Loew, 1862
- Ocellar seta lacking; reclinate fronto-orbital seta lacking; anepisternum bearing two to three thin, long, hair-like setae along posterior margin; vein R₁ bearing several setulae along dorsum; R stem vein basad of humeral crossvein bearing several pale thin setulae on ventral surface; crossvein dm–cu moderately long to long, sinuous 3
3. Scutellum with apical tubercles bearing setae and lateral projections lacking setae; wings maculate; both *vte* and *vti* setae reduced *Dryxella* Krivosheina, 2013
- Scutellum without apical tubercles bearing setae and without lateral projections; wings generally hyaline except in a few cases; both *vte* and *vti* setae or at least *vte* seta developed 4
4. Arista bearing seven to nine long, dorsal hairs; katepisternum lacking row of slender setae along dorsal margin and katepisternal seta reduced; crossvein dm–cu shallowly sinuous, generally forming angle with adjacent margin of wing; mid- and hindfemora normally developed, much shorter than length of abdomen (India, Iran, Oman) *Omyxa* Mathis et Zatwarnicki, 2002
- Arista bearing 12 or more long, dorsal hairs; katepisternum bearing a row of slender setae near dorsal margin and katepisternal seta usually well developed (secondarily reduced or absent in some species); crossvein dm–cu sinuous, long, generally running parallel with adjacent margin of wing; mid- and hindfemora elongate, subequal to length of abdomen (Afrotropical, Australian, Oriental) *Dryxo* Robineau-Desvoidy, 1830
5. Katepisternal seta absent or very weakly developed 6
- Katepisternal seta present, usually well developed (sometimes pale) 7
6. Arista bearing three to five dorsal rays (Afrotropical, Australian [Queensland], Nearctic [southern], Neotropical, Oriental, Palearctic [Egypt, Israel, Japan]) *Oedenops* Becker, 1903
- Arista bearing eight or more dorsal rays (Australasian, Oriental) *Papuama* Mathis et Zatwarnicki, 2002
7. R stem vein usually bearing one to three setulae on dorsum (usually two; lacking in *Oedenopiforma javana* (Wulp)). Two to three long facial setae, length subequal to combined length of pedicel and basal flagellomere, if two setae, these well separated, dorsal seta at about midheight, ventral seta closer to oral margin than to dorsal seta (Afrotropical, Australian, Oriental) *Oedenopiforma* Cogan, 1968
- R stem vein without setulae. One to four long facial seta (if longer setae present they are not as long or as separated as above, usually arranged in a somewhat vertical series of short setulae) 8
8. Forefemur lacking row of closely set, very short, somewhat blunt, toothlike spines along anteroventral surface; anterior proclinate fronto-orbital seta larger than posterior seta; face, gena, anepisternum, anterior surface of

- tibiae, and basolateral surface of scutellum not silvery microtomentose as in combination below (Pantropical with occasional extensions into temperate)
 *Paralimna* Loew, 1862
- Forefemur bearing anteroventral row of very short, stout, toothlike setae; proclinate fronto-orbital setae greatly reduced and subequal, setulalike; face, gena, anepisternum, anterior surface of tibiae, and basolateral surface of scutellum densely, silvery microtomentose (Afrotropical) *Afrolimna* Cogan, 1968

KEY TO SUBGENERA OF PARALIMNA LOEW

1. Gena high, height about 1/3 of eye or more; postpedicel at most 1.5 times width *Paralimna* Loew, 1862
- Gena short, height about 1/4 of eye height; postpedicel elongate, length more than twice width 2
2. Scutum and anepisternum mostly unicolorous and greyish brown to black; wing unicolorous
 *Phaiosterna* Cresson, 1916
- Scutum and anepisternum striped, yellowish to brownish grey between brown stripes; wing hyaline with variable pattern, with strong infuscation on veins or cells fully brown spotted
 *Coganolimna* Ale-Rocho et Mathis, 2015

Subgenus *Paralimna* Loew, 1862

Paralimna Loew, 1862: 138. Type species: *Paralimna appendiculata* Loew, 1862 (= *Notiphila punctipennis* Wiedemann 1830), by monotypy.

DIAGNOSIS. This subgenus is distinguished from other congeneric subgenera by the following combination of characters: small to large shore flies, body length 1.85–6.90 mm; thorax usually darkened dorsally and lighter laterally, frosted, without shining aspect.

Head. Frons usually with characteristic pattern of spots, brown with yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, between inner vertical and interfrontal seta, on fronto-orbits between proclinate fronto-orbital setae, and just above antennal bases, sometimes unicolorous. Ocelli arranged in equilateral or isosceles triangle; ocellar seta well developed, usually longer than anterior fronto-orbital seta and subequal to outer vertical seta, setae well separated, usually inserted anterolateral to anterior ocellus. Arista bearing 7–16 long hairs along dorsal surface. Face conspicuously convex, with carina and antennal groove marked, comparatively well arched; usually bearing 1, occasionally 2–4 long facial setae. Eye rounded, as wide as high or slightly higher than wide. Gena high, height is about or slightly more than 1/3 eye height; usually with few setae on ventral half.

Thorax. Scutum brown medially and through dorso-central track, between yellowish to brownish gray, often conspicuously vittate; pleural area predominantly grey, with or without spots, sometimes predominantly brown; dorsal surface of scutellum flat. Wing with coloration variable, from hyaline to distinctly patterned. Forefemur of male with 3 to 8 strong posteroventral setae and frequently with a row of modified

setae (curved, slightly or distinctly flattened setae) on anteroventral surface.

Abdomen. Frequently tergites with fasciate pattern with darker fascia basally. Sternite 1 shiny. Male terminalia: epandrium simple, band-like, unadorned; cerci subelliptical; presurstylus not connected to each other dorsally; postsurstylus usually widest medially with a protuberant setulose lobe anteriorly and a variable process posteriorly in the middle; aedeagus mostly tubular, elongate, gently flattened laterally; lateral aedeagal process narrowed in middle, curved ventrally in lateral view.

Paralimna (Paralimna) bocki, sp.n.

Figs 1–2.

MATERIAL. Holotype ♂, **Australia:** Queensland, Proserpine env. (20.4°S 148.6°E), 29–30.I.2013, N. Vikhrev (ZMUM). Paratypes: 2 ♀♀, the same label and date (ZMUM). Holotype male specimen is dissected, male terminalia are prepared and placed inside plastic tube filled with glycerin.

DIAGNOSIS. Due to general brown coloration, many strong facial setae and more developed setation of the body the new species is differentiated well externally from the other Australian species of the subgenus *Paralimna*. The new species differs from the other four known species by the shape of presurstyli in posterior view: presurstyli of *P. (P.) bocki* long and broader than those of *P. (P.) millepuncta* (Figs 3–4) and significantly longer and narrower than in *P. (P.) spatiosa* [Bock, 1988, Fig. 6].

DESCRIPTION. Body medium-sized, length 6.2 mm in male, 6.5–6.9 mm in female, wing 5.7 mm. General coloration brown, pollen, lateral surfaces brownish-grey, pollen with blackish spots at bases of setae.

Head. Frons dark, brown-pollen, orbits and ocellar triangle brown; face brown; carina brown; clypeus brown; parafacial and gena greyish-brown; palpus black; antennae black except scape grey dorsally; arista brown with 9 long dorsal rays; eye oval, higher than wide; eye-to gena height ratio 3:1; face with vertical row of 8 setae, the length of which decreasing downwardly, the four upper setae strong.

Thorax. Scutum and scutellum dark brown pollen with numerous short setulae and dark brown spots at bases of all setae; anepisternum and katapisternum grey-brown; haltere yellowish; wing hyaline with brownish tinge, veins dark; costal vein with strong spine at subcostal level and further four short spines; costal vein index 2.2:1.

Legs black with dark grey pollen except the most apices of femora, tibiae and tarsi, which are yellowish-brown; forefemur of male with 3 strong posteroventral setae and a row of anteroventral setae similar to those of *Paralimna flexineurus* Cresson [Ale-Rocha, Mathis, 2015, Fig. 211].

Abdomen. Dark grey, subshining, with indistinct brownish anterior bands on tergites 3–5.

Male terminalia: epandrium U-shaped in posterior view; cercus long and narrow, tapered anteriorly and



Figs. 1–2. *Paralimna bocki* sp.n., holotype ♂ (1) and *Paralimna millepuncta* Malloch, ♂ (2): head and thorax, lateral view.
 Рис. 1–2. *Paralimna bocki* sp.n., голотип ♂ (1) и *Paralimna millepuncta* Malloch, 1925, ♂ (2): голова и грудь сбоку.

posteriorly, with many setae; sternite 5 trapezoid-oval with deep apical emargination, each apical lobe with 3 strong setae; presurstylus deeply bifurcate with horizontal process narrow and basoventral process long, moderately broad, rounded apically; postsurstylus long, slender, bifurcate apically, with 2 strong and 4 thinner setae at median part; in lateral view postsurstylus moderately wider medially, with two medial lobes; aedeagus oval; phallapodeme triangular in lateral view; hypandrium deeply concave; the shape of it is close to *P. (P.) adunca* [Ale-Rocha, Mathis, 2015, Fig. 4].

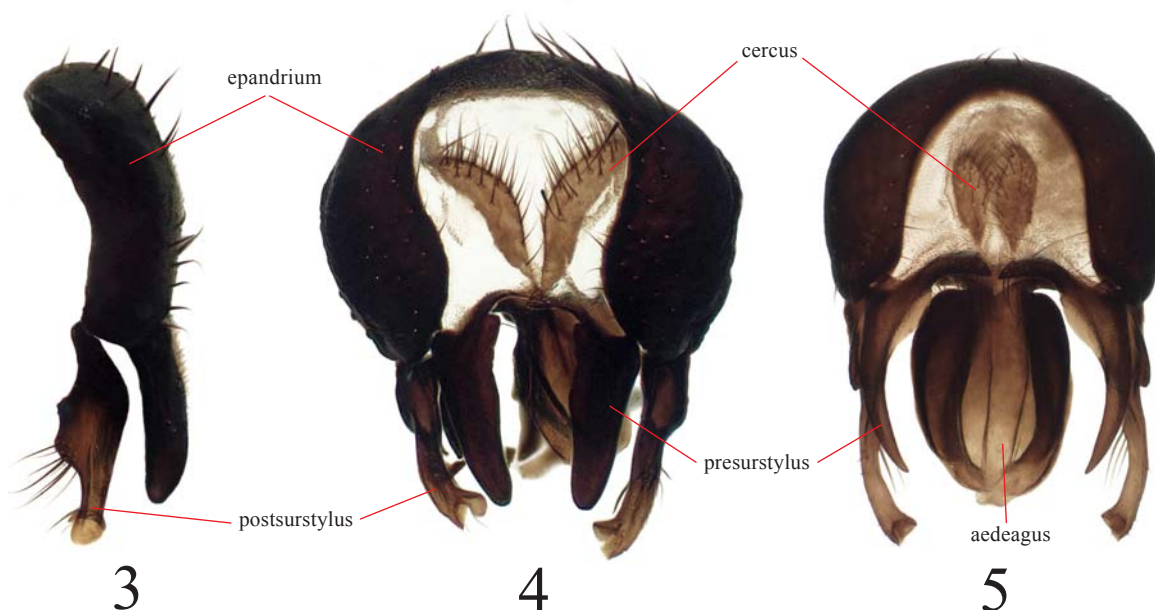
ETYMOLOGY. The species name is given in honour of famous dipterologist Ian R. Bock who was the

first to revise Australian fauna of *Paralimna* and described several species from this genus.

DISTRIBUTION. Australia (Queensland).

KEY TO AUSTRALIAN SPECIES OF SUBGENUS *PARALIMNA*

1. 4 stronger facial setae, basal coloration of mesonotum, scutellum and abdomen brown. Body length 6.2–6.9 mm *bocki*, **sp.n.**
- 2 stronger facial setae, basal coloration of mesonotum, scutellum and abdomen grey with areas of brown 2
2. Dark spots at apical scutellar macrochaetae not completely coalescing, leaving at least small pale spot at tip of scutellum 3



Figs. 3–5. *Paralimna bocki* sp.n. (3–4) and *Paralimna millepuncta* Malloch (5): 3 — epandrium, presurstylus and postsurstylus, lateral view; 4, 5 — same, posterior view.

Рис. 3–5. *Paralimna bocki* sp.n. (3–4) и *Paralimna millepuncta* Malloch (5): 3 — эпандрий, церки и сурстилы, сбоку; 4–5 — то же, сзади.

- Dark spots at apical scutellar macrochaetae completely coalescing, apex of scutellum entirely dark brown..... 4
- 3. Face and clypeus unicolor, light grey, mesonotum, scutellum and abdomen substantially grey with dark spots at bases of setae, hairs of pubescence and abdominal tergites. Body length 5.7–7.1 mm *stirlingi* Malloch, 1926
- Face golden-brown, clypeus light grey, mesonotum, scutellum and abdomen substantially grey with dark spots at bases of setae and abdominal tergites, spots at bases of hairs of pubescence coalescent. Body length 4.6–6.7 mm *millepuncta* Malloch, 1925
- 4. Abdominal micropubescence dense: grey area on tergite 4 with 16 microchaetae. Body length 4.7–6.3 mm *pilosa* Bock, 1988
- Abdominal micropubescence rather sparse: grey area on tergite 4 with 7 microchaetae. Body length 3.9–6.0 mm *spatiosa* Bock, 1988

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