A new species of genus *Ephemeroporus* Frey, 1982 (Cladocera: Anomopoda: Chydoridae) from Peninsular Malaysia

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Abstract

Study of *Ephemeroporus* Frey, 1982 populations from Peninsular Malaysia revealed a new species. *Ephemeroporus malaysiense* sp. nov. is characterized by the presence of four-five large denticles on anal margin of postabdomen instead of two-three, and five distinctive pigmented spots on each valve. Pigmented spots on the valves were never recorded for any species of family Chydoridae. *E. malaysiense* sp. nov. seems to be another endemic Chydoridae species of South-East Asia. *E. malaysiense* sp. nov. is a rare species, associated with emergent macrophytes in the littoral zone of shallow lake. Most of *Ephemeroporus* populations from Peninsular Malaysia belong to eurybiotic Paleotropical species *Ephemeroporus barroisi* (Richard, 1984).

Key words: Cladocera, taxonomy, South-East Asia, Malaysia

Introduction

The genus *Ephemeroporus* Frey, 1982 was established for the *Chydorus*-like cladocerans lacking head pores in adult instars (juveniles of the first instar have single main head pore) and having peculiar armament of postabdomen, with several large marginal denticles at anal margin. Presently, the genus is composed of 10 species. *Ephemeroporus acanthodes* Frey, 1982 is known from South USA, Cuba and Guatemala, *Ephemeroporus hybridus* (Daday, 1905) and *Ephemeroporus archboldi* Frey, 1982 from South USA and South America, *Ephemeroporus tridentatus* (Bergamin, 1939) from South America, and recently described *Ephemeroporus quasimodo* Elmoor-Loureiro, 2014 from Brazil only (Smirnov 1996; Elmoor-Loureiro 2014). One more American taxon, *Ephemeroporus poppei* (Richard, 1897) was considered nomen dubium by Frey (1982) and, in our view, it is a correct opinion, as no type material exists, and Richard (1897) description and drawings are rather vague. This taxon was never reported again after its description. In the Old World, *Ephemeroporus phintonicus* (Margaritora, 1969) is known from Mediterranean and *Ephemeroporus margalefi* Alonso, 1987 and *Ephemeroporus ephiaphantoii* Alonso, 1987 are endemics of Iberian peninsula.

The oldest described taxon of the genus, *Ephemeroporus barroisi* (Richard, 1894), was presumed to be pantropical (Smirnov, 1996) and probably presents a group of cryptic species. *E. barroisi* was described from Syria. However, Frey (1982) concluded that *E. barroisi* is a nomen dubium due to the lack of type material and disappearance of type location because of draught. But this opinion was not supported by Smirnov (1996) and Kotov et al. (2011), as Richard (1894) descriptions were rather detailed, and we agree with the latter opinion. Recent attempt to redescribe *E. barroisi* s.str. (Yalim & Ciplak 2010) contained descriptions and illustrations of insufficient quality, but it confirmed the species differences from other Eurasian members of the genus. In the Old World, *E. barroisi* s. lato was frequently reported from tropical and subtropical Asia and Africa. The species was also recorded from Australia (Smirnov & Timms 1983), but *Ephemeroporus* populations from this continent were never described in details and are in need of revision. Most XX century records of *E. barroisi* from North America can be attributed to other species of the genus (Frey 1982), but the population of *E. cf. barroisi* described from Nicaragua by Smirnov (1996) is clearly different from all American species.
The cladoceran fauna of South-East Asia has been intensively studied during the last decades, but only a few recent works dealt with the morphology and taxonomy of the subfamily Chydorinae (Kotov et al. 2013; Sinev & Korovchinsky 2013; Sinev & Sanoamuang 2011, 2013; Sinev 2014; Sinev et al. 2015). The taxonomic status of *Ephemeroporus* populations from the region remains unclear. According to Korovchinsky (2013), most records of the genus in the region are attributed to *E. barroisi*. External morphology of *E. barroisi* populations from Malaysia (Idris 1983) and Laos (Kotov et al. 2013) did not differ from that of the West and Central Asian populations (Yalim & Ciplak 2010; Alonso 1987). Two other species of the genus, Mediterranean *E. phintonicus* and Neotropical *E. tridentatus* were reported from Thailand (Maiphae et al. 2008; Van Damme et al. 2013), but no description of these taxa were provided, and these records should be verified.

The present paper clarifies the status of *Ephemeroporus* populations from Peninsular Malaysia. A new rare species is recorded, while most studied populations belongs to *E. barroisi*. The detailed description of the latter species is provided.

**Material and methods**

Samples were collected during October 2013 and December 2014 with a standard plankton net (25 cm diameter, 50 µm mesh size) and dip net (70 µm mesh size), and preserved in 3% formaldehyde. Animals and exuviae were selected from wet samples under a binocular stereoscopic microscope, placed on slides (in a drop of a glycerol-ethanol mixture), and studied under an optical microscope *in toto* (and measured). Dissections of specimens were conducted with electro-galvanically sharpened tungsten needles. For SEM examination, specimens were submitted to critical point drying, coated with gold-palladium, and studied under a scanning electron microscope (JEOL 405-A). Measurements were conducted using an eyepiece-micrometer; all drawings were made with a *camera lucida*.

**Abbreviations.** In the list of material: ZMMU=Zoological Museum of M.V. Lomonosov Moscow State University; AYS: personal collection of the first author. In the illustrations and text: I–V: thoracic limbs I–V; as: accessory seta of limb I; cbs: copulatory brush seta of limb I; e1–3: endites 1–3 of limb I; ep: epipodite; ex: exopodite; gfp: gnathobase filter plates of limbs II–V; il: inner lobe of limb V; IDL: inner distal lobe of limb I; ms: male seta of limb I; ODL: outer distal lobe of limb I; pep: pre-epipodite; s: sensillum.

**Results**

**Taxonomy**

**Class Branchiopoda Latreille, 1817**

**Order Anomopoda G. O. Sars, 1865**

**Family Chydoridae Stebbing, 1902**

**Subfamily Chydorinae Dybowski & Grochowski, 1894**

**Genus *Ephemeroporus* Frey, 1982**

*Ephemeroporus malaysiense* sp. nov.  
(Figs. 1–3).

**Etymology.** Species named after the country where it was found

**Type locality.** Chini lake, Johor province, Malaysia, specimens collected during 19.10.2013 by A. Y. Sinev, F.M. Yusoff, P. Kuppan and M. S. Abu Bakar.

**Type material.** Holotype: parthenogenetic female from type location, ZMMU MI-145.

**Paratypes:** 6 parthenogenetic females from type location, ZMMU MI-146; 3 parthenogenetic females from Bukit Merah reservoir, Perak province, Malaysia, coll. A. Y. Sinev and M. S. Abu Bakar. (AYS-ML-103).
Eight more parthenogenetic females from type location were studied by SEM or dissected for analysis of appendages.

Description. Parthenogenetic female. Body of preserved specimens (Fig. 1A–C, 2A–C) from weakly yellow to colorless, relatively opaque, with five distinctive pigmented spots on each side of valve, located: (1) at anterior margin of valve below articulation point; (2) at 2/3 of anterior half of ventral margin; (3) at the middle of posterior half of ventral margin; (4) at posterodorsal angle of valves; (5) at dorsal portion of valves, after midline of the body. Examination of the spots revealed that each of them was formed by four to ten strongly pigmented hypodermic cells (Fig. 1D). Position of pigmented spots was the same in all studied specimens, but number of cells in each spot varied. In lateral view body rounded (Fig. 1A–C, 2A); height/length ratio about 0.9, maximum height at midline. Body only weakly laterally compressed (Fig. 2B–C). Dorsal outline evenly curved, ventral margin of valves with bulge at the middle, convex in anterior half and straight or weakly concave in posterior half.

Valves. Anterior corner broadly rounded, with a submarginal flange at inner side. Ventral margin (Fig. 1E) with about 6–7 moderately short setae in anterior portion, followed by 7–8 tooth-like serrated expansions of seta bases.
with extremely short setae at the end (Fig.1F); followed by 10–12 short setae increasing in length posteriorly; and followed by 20–25 long, setulated setae attached to inner side of valve, length of setae in the group decreasing posteriorly. Postero-ventral corner (Fig. 1G–H, 2D) with single long, slender, slightly sinuous denticle; length of denticle about 3 widths of denticle base. Valves covered by polygonal sculpture, more prominent along ventral margin (Fig. 2F).

**Head** with short rostrum, protruding downward. Length of rostrum about 1.5 length of antennule. Ocellus 2–3 times smaller than eye. Head shield moderately large, with maximum width after mandibular articulation; posterior margin of headshield broadly rounded (Fig. 2E.). Rostrum blunt, broadly rounded in frontal view (Fig. 1I). Headshield sculpture as polygons, similar to that of valve, but less pronounced. Head pores absent in adult specimens.

**Labrum** with large labral keel (Fig. 1J–K) projecting far below the tip of rostrum. Labral keel of moderate width, with elongated apex with rounded tip. Anterior margin of keel irregularly convex, with 3–4 very short spines, posterior margin concave.

**Postabdomen** (Figs. 2H–G, 3A–B) short, rather narrow, narrowing distally; maximum height at preanal angle. Length about three heights. Ventral margin straight, with clear break bearing small spine at 1/4 length from the end. Basis of claws bordered from distal margin by clear incision. Distal margin very short. Distal angle rounded. Dorsal margin irregularly concave in distal portion, with distal portion only slightly longer than the preanal portion. Postanal and anal portion of similar length. Preanal angle extremely well expressed, prominent, postanal angle not defined. Preanal margin weakly concave. Dorsal margin with two distinctive groups of narrow sharp denticles, followed by two groups of short setulae. Distal group consists of 5–6 shorter denticles, whose lengths strongly decrease basally. Basal group consists of 4–5 longer denticles, with distalmost members longer than in the previous group. Postanal part with 3–4 clusters of 1–3 short thick setulae; anal portion with broad lateral fascicles of very short setulae; clusters of irregularly spaced setulae at preanal angle. Postabdominal claw (Fig. 2I) short, curved, two times shorter than preanal portion of postabdomen, with two basal spines: distal spine about 0.3 length of the claw, proximal spine three times shorter. A pecten of spinulae on dorsal side of claw; long spine on its tip, 1.5 times longer than shorter basal spine.

**Antennule** (Fig. 1L) of moderate size; length about 2.5 widths. Antennular seta thin, about 2/3 length of antennule, arising almost at the middle of antennule. All aestetascs terminal, about 2/3 length of antennule.

**Antenna** relatively short (Fig. 1M–N). Antennal formula: setae 0-0-3/0-1-3; spines 1-0-1/0-0-1. Branches relatively short; exopodite basal segment 1.5 times longer than two others, exopodite basal segment 2 times longer than two others. Basal segment of endopodite without seta. Seta arising from middle segment of endopodite of similar size with apical setae. Apical segments of both branches with three apical setae. All antennal spines very short.

**Thoracic limbs**: five pairs.

**Limb I** of moderate size (Fig. 3D–E). Epipodite oval, with curved projection 2.5 times longer than epipodite itself. ODL with only one seta, small ODL seta absent. IDL with three slender setae. IDL setae 1 and 2 of about 1/3 and 2/3 length of ODL seta, seta 3 only slightly shorter than ODL seta. Endite 3 with four setae, inner seta (1) much shorter than outer setae (a–c). Endite 2 with two long distally setulated setae (e–f) of similar length; a shorter seta near its base (d) and an inner seta (2) armed with long setulae on anterior face of limb. Endite 1 with three 2-segmented setae of similar size (g–i), setulated in distal part and a naked inner seta (3) on anterior face of limb, and a flat seta (j) pointed to the limb base. Ventral face of limb with three thick setulae in basal part, followed by four rows of thin long setulae. Two long ejector hooks, one slightly shorter than other; a cluster of 4–5 long setulae near their base.

**Limb II** subtriangular (Fig. 3F). Exopodite elongated of irregular shape, with long seta as long as scraping spine 3. Eight scraping spines with fine denticles; three basalmost spines (6–8) subequal in length, the others increasing in length distally. Basalmost spine with longer and thicker denticles than others. A small sensillum located between spines 3 and 4. Distal armature of gnathobase with four elements. Filter plate II with eight setae, the posteriormost member two times shorter than others.

**Limb III** (Fig. 3G–I). Epipodite oval, without finger-like projection. Exopodite subrectangular, with three lateral (1–3) and four terminal (4–7) setae. Seta 4 being longest; setae 6 and 7 about 3/4 and 2/3 length of seta 4, respectively; seta 1 and 5 about 1/2 length of seta 4; setae 2 and 3 short. Setae 1–5 plumose; setae 6–7 naked. Distal endite with three slender scraping setae (1–3) without denticles; length of setae 2 and 3 about 2/3 and 1/3 length of...
Distribution and ecology. *E. malaysiaensis sp. nov.* is so far known from Malaysia only. It is a rare species, not recorded by Idris (1983); it also was not found during our survey of Sabah State, Borneo (Sinev & Yusoff, 2015). During our sampling trips in peninsular Malaysia, we sampled over 80 water bodies, and *E. malaysiaensis sp. nov.* was encountered only in two large and shallow water bodies: in natural swampy Chini lake and in Bukit Merah reservoir. Located at 3° 22’–3° 28’ N and 102° 51’–102° 58’ E, Chini lake is a swampy flood plain lake connected to the longest river in Peninsular Malaysia (Pahang river) through a 4.8 km Chini stream. It is the second largest natural freshwater lake in Peninsular Malaysia with an area of 3.82 km², a mean depth of 2.5 m and a maximum depth of 6.0 m (Mushrifah, 2010). The lake is covered by extensive beds of emergent, floating leaved and submerged macrophytes, mainly Pandanus helicopus, Scirpus grossus, Lepironia articulata, Nelumbo nucifera and Cabomba furcata. Bukit Merah reservoir, located at 5° 01’ N and 100° 39’ E, is the oldest reservoir in Malaysia (constructed in 1906) with a surface area of 33.3 km², a mean depth of 2.5 m and a maximum depth of 5.3 m. (Hidzrami, 2010).

In both locations, *E. malaysiaensis sp. nov.* was found among the abundant submerged macrophytes (mainly *Cabomba furcata*) in the vicinity of *Pandanus helicopus* stands. *Cabomba furcata* is an introduced species that seems to successfully replace the natural floating leaved *Nelumbo nucifera* in Chini lake (Zati et al. 2012). Wan-Juliana et al. (2010) reported that *C. furcata* covered 95.1% of the lake area in 2009. The *Pandanus helicopus* seems to be the most dominant emergent species, probably due to its tall erect stand that can grow up to 6 m, which allows it to grow in both shallow and deep waters.

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**Limb IV** (Fig. 3J–K). Pre-epipodite setulated; epipodite oval, with projection longer than epipodite itself. Exopodite of characteristic form, almost semicircular, with seven setae; setae 1–4 long, of similar length; seta 5 and 7 about 2/3 length of seta 1; seta 6 about 3/4 length of seta 4. Setae 1–5 flat, plumose; seta 6 setulated unilaterally in basal part, seta 7 naked. Inner portion of limb IV with four outer setae (1–4) and small bottle-shaped sensillum. Scraping seta (1) of moderate thickness, distalmost flaming-torch setae (2) with thick basal part and short distal part, two others (3–4) with thin basal portion and long, slender distal part, all three armed with about 10 very long setulae; small sensillum located near base of seta 2. Four inner setae (a–d) slightly increasing in size basally. Gnathobase with one 2–segmented setae, a small hillock distally, and a sensillum. Filter plate IV with six setae.

**Limb V** (Fig. 3L). Pre-epipodite setulated; epipodite oval, with finger-like projection as long as epipodite itself. Exopodite moderately large, oval, with four plumose setae, their length evenly decreasing basally. Two small hillocks with long setulae located on basal side of exopodite near seta 4. Inner lobe long, narrow, with setulated inner margin. At inner face, two setae of similar length: outer seta densely setulated in distal part; inner one with long thick setules unilaterally in distal part. A row of long thin setulae located between inner seta and filter plate. Filter plate V with four setae.

**Ephippial female and male** unknown.

**Size**. Minimum length of female in studied material was 0.28 mm (but specimen was obviously not a juvenile female of instar I), minimum size of ovigerous female was 0.36 mm, maximum length of female was 0.42 mm.

**Differential diagnosis.** Unique features of *E. malaysiaensis sp. nov.* are presence of pigmented spots on the valves (it is unique character for the whole family Chydoridae) and postabdomen with 4–5 marginal denticles in anal group (in all other species of the genus, this group consists of 2–3 denticles only). Presence of pigmented spots should not be used as a main character for species identification, as pigment tends to gradually disappear in preserved specimens. Also, *E. malayaisensis sp. nov.* differs from *E. hybridus* and *E. acanthes* in presence of denticles on anterior margin of labrum; from *E. pinthonicus, E. tridentatus* and *E. archboldi*, in presence of single denticle on posteroventral corner of valves (*E. pinthonicus* and *E. tridentatus* lack such denticles, and in *E. archboldi* number of denticles varies from 4 to 8); from *E. quasimodo* in the absence of dorsal keel; and from *E. margalefi, E. ephiphantoii* and *E. barroisi* in greater size (in these species length of adult female is less than 0.3 mm).
A NEW SPECIES OF GENUS *EPHEMEROPORUS*

**Ephemeroporus barroisi** (Richard, 1894)

(Fig. 4)

Richard 1894, p. 375–377, figs. 9–12 (Pleuroxus Barroisi); Smirnov 1971, p. 301, fig. 328 (Chydorus); Idris 1983: 66, fig. 30 (Chydorus); Frey 1982, 234–237, Pl. 1: figs. 9–12; Smirnov 1996, 156–159, figs. 654, 658; Yalim & Ciplak, 2010: 551–588, fig. 1–5; Kotov *et al.* 2013: 99, fig. 29 (cf. barroisi).


**Description. Parthenogenetic female.** Body of preserved specimens colorless, relatively opaque, without pigmented spots. In lateral view body rounded (Fig. 4A–B); height/length ratio about 0.9, maximum height at midline. Body only weakly laterally compressed. Dorsal outline evenly curved, ventral margin of valves with bulge at the middle, convex in anterior half and straight or weakly concave in posterior half.

*Valves* (Fig. 4C) same as in the previous species, but denticle of posteroventral corner (Fig. 4D–E) shorter; length of denticle about 2 width of denticle base.

*Head*, rostrum (Fig. 4F), and head shield same as in the previous species. Labrum (Fig. 4G–I), similar to that of the previous species, but with larger denticles on anterior margin of keel.

*Postabdomen* (Fig. 4J–K) of same shape as in the previous species. Dorsal margin with two distinctive groups of narrow sharp denticles, followed by two groups of short setulae. Distal group consists of 5–6 shorter denticles, their length strongly decrease basally. Basal group consists of only 2, rarely 3 longer denticles. Postanal part with 3–4 clusters of 5–8 short thin setulae, similar to these in anal portion. Postabdominal claw similar to that of the previous species, but spine at the end of claw is longer, almost two times longer than shorter basal spine; its length exceed the width of claw base.

*Antennule* (Fig. 4L) and *antenna* (Fig. 4M), same as in the previous species.

*Limb I.* Similar to that of the previous species (Fig. 4N–O), but IDL seta 2 armed with long thin setules in distal part.

*Limb II.* Similar to that of the previous species (Fig. 4P), but scraping spines 6–8 longer than in previous species, almost as long as spine 5; spine 8 armed with thin short setules, same as on other spines.

*Limb III* (Fig. 4Q–R) Similar to that of the previous species, but inner setae (a–f) plumose, armed with symmetrical thin setules.

*Limb IV* (Fig. 4S–T). Epipodite oval, with projection as long as epipodite itself. Exopodite similar to that of the previous species, but seta 7 significantly shorter than seta 6. Inner portion of limb IV also similar, but distalmost flaming-torch setae (2) of same thickness along all length, not separated into basal and distal portions.

*Limb V* (Fig. 4U). Same as in the previous species.

**Ephippial female** of same proportions as parthenogenetic female, but dorsal outline different: dorsal portion of head shield almost straight, dorsal margin of ephippium evenly convex, posterooral angle defined. Ephippium dark brown, with prominent polygonal sculpture, margins of polygons much thicker, than on the rest of valve.

**Male** unknown for populations from South-East Asia; for description of male from West Asia see Yalim & Ciplak (2010).

**Size.** Length of females in studied material was from 0.16–0.26 mm.

**Taxonomic notes.** Our data fully agrees with previous description of this species from Turkey (Yalim & Ciplak, 2010), Iran (Alonso, 1987), and Laos (Kotov *et al.*, 2013), no significant differences from these populations were revealed.
A NEW SPECIES OF GENUS *EPHEMEROPORUS*

**Distribution and ecology.** Subtropical and tropical Asia, from Turkey and Syria to South China and Borneo Island. *E. barroisi* was also recorded in Korea, Africa and Australia (Jeong et al. 2014; Smirnov & Timms 1983; Smirnov 1996), but these records should be rechecked. Common species in South-East Asia.

According to Idris (1983), *E. barroisi* is a very common species in Malaysia, found in any type of water bodies and especially frequent in ponds and rice fields. During our survey of Sabah state of Malaysia (Borneo Island) (Sinev & Yusoff 2015) *E. barroisi* was found in four locations of 28 where cladocera were found; two lakes and a pond with abundant submerged macrophytes, and in an area of flooded forest.

**Discussion**

*Ephemeroptus malaysiaensis* sp. nov. clearly differs from all other species of the genus (see differential diagnosis). Its unique feature is the presence of four-five large denticles on anal margin of postabdomen instead of two-three. Pigmented spots on the valves were never recorded for any species of family Chydoridae. Number and position of these spots was same in two different populations of *E. malaysiaensis* sp. nov., situated at more than 400 km from each other and separated by a mountain range (Titiwangsa range). Thus, this is a stable species-level character and not a local variability. An adaptive significance of these spots is unclear, they can be a kind of protective coloration. During our sampling, we observed several populations of *Simocephalus* sp. with spots and patterns on valves, formed by pigmented hypodermic cells as in *E. malaysiaensis* sp. nov., but in *Simocephalus* number of spots and their position varied from specimen to specimen.

*E. malaysiaensis* sp. nov. seems to be another endemic Chydoridae species of South-East Asia. It is more rare than its Paleotropical congener, *E. barroisi*. *E. malaysiaensis* sp. nov. is confined to the specific habitat: large lakes or reservoirs with *Pandanus* stands, while *E. barroisi* is eurybiotic. Situation when local endemics are much less common than their widely distributed congeners is observed in several genera of subfamily Aloninae. In South-East Asia, this is observed within *Karualona* Dumont & Silva-Briano, 2000 and *Anthalona* Van Damme, Sinev & Dumont 2011. Palaeotropical *Anthalona hartii hartii* Van Damme, Sinev & Dumont 2011 and Australasian *Karualona karua* (King, 1853) are common species, whereas endemic *Anthalona sanoamuangae* Sinev & Kotov, 2012 and *Karualona serrata* Van Damme, Maiphae & Sa-ardrit, 2013 are rare species confined to specific habitats (Sinev & Kotov 2012; Van Damme et al. 2013; Sinev & Korovchinsky 2013). This suggests that these local endemics may be relict forms of local origin, out-competed by their more advanced congeners invading the area from other regions.

Our data confirms that populations from South-East Asia belong to *E. barroisi* s. str. The species redescription by Yalim & Ciplak (2010) revealed two important characters of the species: (1) postabdominal claw with very long apical spine, its length exceeding the width of postabdominal claw base; (2) IDL seta 2 armed with long setulae. These characters are shared by the studied populations (see Fig. 4J and O) but are not present in two other Old World species with denticulated labrum, *E. margalefi* and *E. ephiaphantoi* (see Alonso 1987), and in *E. malaysiaensis* sp. nov. as well. In these species, the apical spine of claw is shorter, its length much less than width of postabdominal claw base, and IDL seta 2 lacks long setulae. Also, *E. barroisi* s. str. have peculiar morphology of the distalmost flaming-torch setae (2) of limb IV and it is of same thickness along all length, not separated into basal and distal portions (Yalim & Ciplak 2010); this character is also present in studied populations (see Fig 4T).

Laos Populations (Kotov et al., 2013) also have postabdominal claw with very long apical spine and belong to *E. barroisi* s. str. The earlier records of *E. barroisi* from from Vietnam (Sinev & Korovchinsky 2013), Borneo Island (Sinev & Yusoff 2015) and Hainan Island (Sinev et al. 2015) belong to *E. barroisi* s. str. Our data suggests that *E. barroisi* s. str. is a widely distributed species, ranging from Turkey and Syria to East and South-East Asia. A record of *E. cf. barroisi* from basin of Zeya River, a tributary of Amur River, Far East of Russia (Kotov et al. 2011) did not belong to *E. barroisi* s. str., as length of female here was 0.51 mm, and records from South Korea (Jeong et al., 2014) lack description and need to be rechecked.

Most of the records of *E. barroisi* from Africa were not accompanied by detailed descriptions, and taxonomic status of these populations should be rechecked. But specimens from Mali studied by Dumont et al. (1981) and South Africa studied by Sars (1895, 1916) are more similar to *E. barroisi* s. str. than to any other Old World species, so presence of the species at most of the territories of Africa is quite probable. Records of *E. barroisi* from Australia (Smirnov & Timms 1983) also lack descriptions, and should be verified.
Comparison of limb morphology of studied species with literature data confirms low level of differences between species of the genus. *E. malaysiaeensis* sp. nov. differs from *E. barroisi* in a few characters only, most significant of them are armament of IDL seta 2 and morphology of flaming-torch seta 2 on inner portion of limb IV. Similar situation is observed within the majority of genus *Chydorus* (Sinev, 2014). This suggests that uniform limb morphology, as well as morphology of head pores, should be an important criteria for clarification of the taxonomic position of deviating groups of *Chydorus* s. lato.

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