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Taxonomy of the termitophilous genus *Termitodonia* CAMERON (Coleoptera: Staphylinidae: Aleocharinae)

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Abstract

Termitodonia CAMERON, 1936 (Coleoptera: Staphylinidae: Aleocharinae: Lomechusini) is redescribed. The taxon was originally described as a subgenus of *Zyras* STEPHENS, 1835 but is treated as a distinct genus herein. The following species are recognized: *Termitodonia flava* (CAMERON, 1936), comb.n. (type species; Java, Indonesia), *T. thaiensis* sp.n. (Chiang Mai, Thailand), and *T. boothi* sp.n. (Java, Indonesia). The systematic position of *Termitodonia* is discussed.

Key words: Coleoptera, Staphylinidae, Aleocharinae, *Termitodonia*, *Zyras*, termitophily, new species.

Introduction

The genus *Zyras* STEPHENS, 1835 currently holds 54 subgenera (HLAVÁČ et al. 2011) but the genus is apparently not monophyletic. There are many problems concerning the systematic status of the subgenera (e.g., MARUYAMA 2006, HLAVÁČ & JÁSZAY 2009). CAMERON (1936) established the subgenus *Termitodonia* of the genus *Zyras*, for a single species, *Zyras flava*, described from Java. As the genus name implies, the type series was collected from termite nests, although the termite species was not specified. Since then, no further study of this subgenus or the type species has been undertaken. Recently, we had the opportunity to examine the type material and additional specimens of *Termitodonia* from Java, Indonesia, deposited at the Natural History Museum, London, and a few specimens from Chiang Mai, Thailand collected by our colleague K. Matsumoto. We recognized two undescribed species among these specimens. This paper redescribes *Termitodonia* as a distinct genus, and includes a redescription of the type species, *T. flava* (CAMERON, 1936). Two new species from Chiang Mai and Java respectively, are described. We also discuss the systematic position of *Termitodonia*.

Material and Methods

The collections of the following institutions and private collection were examined:

KUM M. Maruyama collection at the Kyushu University Museum (M. Maruyama)
NHM The Natural History Museum, London (R. Booth)

The methods used for dissection and making permanent slides and line drawings follow MARUYAMA (2004, 2006). Photographs were taken using a Canon EOS Kiss 60D with a Canon MP-E 65 mm 1–5 × macro lens, and were mounted using the automontage software CombineZP.

The following abbreviations are used for measurements: BL: body length; FBL: fore body length (apex of head to apices of elytra); HW: head width; PL: pronotal length; PW: pronotal width; HTL: hind tibial length. All measurements are in millimeters.

Termitodonia CAMERON, 1936

Termitodonia CAMERON 1936: 184 (original description, as subgenus of *Zyras*; type species: *Zyras flava* CAMERON, 1936: 184; gender feminine); HLAVÁČ et al. 2011: 111 (catalogue).

Body (Figs. 1–4) somewhat robust, subparallel-sided. Body length: 5.5–6.5 mm; fore body: 2.5–2.8 mm. Ground color yellowish brown.

Head transverse elliptical; occipital suture present, dorsally crossing hind part of head, continuing onto ventral side, and terminating on each side near posterior articulation of hypostoma; surface of temple sparsely to moderately covered with setae. Eyes large, prominent, without setae among facets. Antennae longer than head and pronotum combined, compressed dorsoventrally; all segments dilated apicad; each segment with erect black setae.

Mouthparts: Labrum much wider than long, roundly emarginate antero-medially, submembranous around antero-medial area; surface covered with numerous pseudopores except on posterior and lateral areas. Mandibles clearly asymmetric; right mandible with a small notch at middle of inner margin; left mandible with a small tooth at middle of inner margin. Maxilla (Fig. 5); cardo almost elliptical in ventral view, with 50–60 pseudopores; stipes small, triangular, with 1 seta at outer angle, with about 10 pseudopores; palpifer triangular in lateral view, with a large seta, some small setae and a few pseudopores near apex; lacinia with 50–60 pores and without setae medially; apical inner margin with a row of setae forming a comb; surface around comb densely pubescent; subgalea small, shorter than segment I of maxillary palpus; galea long, narrowed apicad, slightly curved around apical 1/3, with some pores near apex, densely pubescent apically; palpus without pseudopores except for segment I; segment I small, without seta, with some pseudopores; segment II gently curved, and much dilated apicad; segment III long, much longer than II, almost straight, widest around middle; segment IV small, conical. Mentum subtrapeziform; anterior margins rather deeply roundly emarginate; posterior margin largely rounded; around antero-lateral corner with a long seta; surface densely covered with pseudopores, with several setae laterally. Labium (Fig. 6): Prementum with two real pores mesolaterally, setal pore near base, and numerous pseudopores in U-shape mesally; internal ridge invisible; lateral lobe of apodeme, short, gently curved interiad, rounded at apex; ligula bilobed and each lobe rounded apically, with one apical seta. Labial palpus with segment I long, longer than II, dilated apicad; segment II thick, thicker than I, widest around middle; segment III long, slightly shorter than II.

Thorax: Pronotum (Figs. 1–4) somewhat hexagonal, wider than long; disc weakly margined, somewhat convex but depressed mesally; surface glabrous or with sparse erect setae. Mesoventrite with process short, slightly projected posteriad, truncate at apex. Metaventrite large, three times as long as than mesoventrite; process well developed, narrowed apicad, its apex somewhat rounded; isthmus slightly depressed. Hind wings entire. Legs (Figs. 1–4) laterally compressed, especially tibiae of hind and mid legs elongate-foliaceous. Tarsi slightly compressed, narrowed apicad; empodium with a pair of setae.

Abdomen somewhat foliaceous, with lateral margins of sternites III–VII strongly raised upward; paratergites large, more or less convex apically; tergite VIII simple, its posterior margin rounded; apices of tergites IX and X (Fig. 9) and sternite IX with tufts of pubescence.

Male: Pronotum (Figs. 2, 4) more depressed; antero-medial margin submembranous. Eighth sternite (Figs. 7–8) with a projection postero-medially. Internal sac of median lobe with a pair of large projections (Figs. 10–11).

Female: Pronotum (Figs. 1, 3) less depressed. Eighth sternite with posterior margin rounded. Spermatheca (Figs. 12–13) simple, slightly constricted between basal and apical part.

COMMENTS: *Termitodonia* is elevated to generic rank herein since it is more closely related to the genus *Pedinopleurus* CAMERON, 1939 than the nominotypical subgenus of the genus *Zyras*. Their relationships are discussed below.

***Termitodonia flava* (CAMERON, 1936) comb.n.**

Zyras (*Termitodonia*) *flavus* CAMERON 1936: 184 (original description); HLAVÁČ et al. 2011: 111 (catalogue).

TYPE MATERIAL: **Lectotype** ♀, here designated: “C. J. LOUWEREMS / Java / Toeloengagoeng // IN THE NESTS OF WHITE ANTS // M. Cameron / Bequest / B.M. 1955-147 // *Termitodonia / flavus* Cam / TYPE // LECTOTYPE / *Zyras flavus* / Cameron, 1936 / des. Maruyama, 2013” (teneral, spermatheca not found, probably not sclerotized) (NHM).

In the original description, CAMERON (1936) described both male and female, so the description was based on at least two syntypes. However, in the NHM collection, only one syntype, a female, was found, which we here designate as lectotype.

ADDITIONAL MATERIAL EXAMINED:

INDONESIA: 1 ♀: “I. B. CORPORAAL / Java-Preanger / Tjigembong / III '15 [1915] // Collection / Wasmann // *Myrmedonia* / sp. // M. Cameron / Bequest / B.M. 1955-147” (NHM).

REDESCRIPTION: Body (Fig. 1) yellowish brown throughout, but mouthparts, antennae, legs paler. Head with dorsal surface almost glabrous, with a few thin setae; temple sparsely covered with setae. Eyes much shorter than length between antennal cavities, about 0.4 times as long as head width. Antennae with segment II 0.7 times as long as III. Pronotum with anterior margin slightly convex, gently narrowed posteriad; antero-lateral corners rounded; posterior margin rounded; ratio ≈ 1.24 ; surface sparsely covered with minute setae. Elytra with surface sparsely covered with short setae. Legs moderately covered with setae. Abdomen with postero-lateral corners of sternites III–VII produced posteriad; tergite VIII with 13 or 14 macrosetae; sternite VIII with eight macrosetae.

Male: Tergite III with a tubercle at middle of posterior margin (after CAMERON 1936).

Female: Tergite III simple. Spermatheca (Fig. 12) basal part slightly swollen.

MEASUREMENTS: BL ≈ 5.5 – 5.7 ; FBL ≈ 2.3 – 2.4 ; HW 1.29 – 1.38 ; PL 1.18 – 1.19 ; PW 1.39 – 1.48 ; HTL 1.48 – 1.54 (N = 2).

DIAGNOSIS: This species is similar to *Termitodonia thaiensis* in body shape and setal arrangement but distinguished from it by the smaller eyes, the shorter antennal segment II, and the presence of a tubercle on male tergite III.

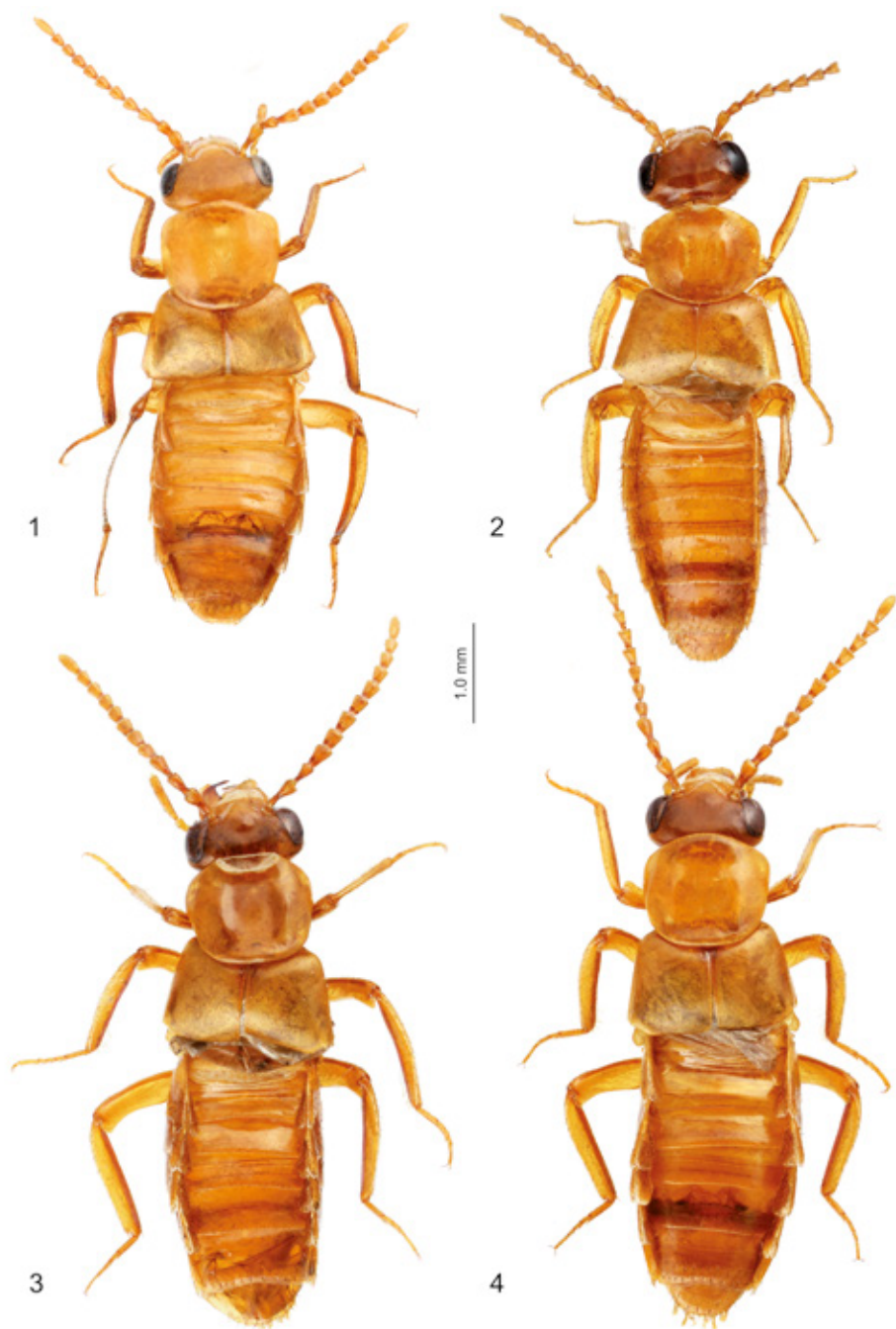
DISTRIBUTION: West Java, Indonesia.

***Termitodonia thaiensis* sp.n.**

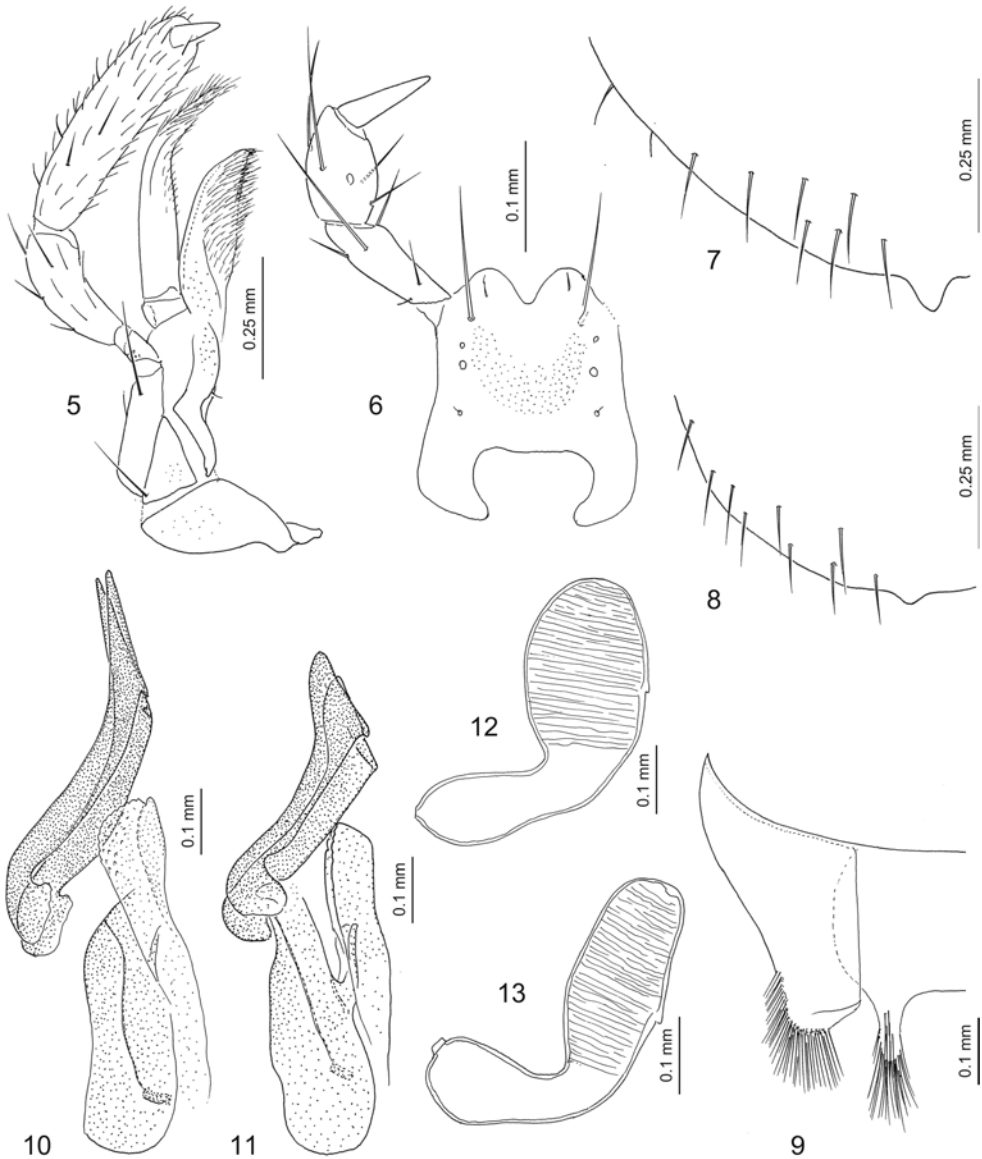
TYPE MATERIAL: **Holotype** ♂: “Thai[land]: Chiangmai / Doi Saket / Ban Pan Haen / 28. V. 2004 / Kei. Matsumoto // HOLOTYPE / *Termitodonia / thaiensis* / des. Maruyama, 2013” (teneral, median lobe not sclerotized except for sclerites of internal sac) (KUM). **Paratype** ♀: “Thai[land]: Chiangmai / Doi Saket / Ban Pan Haen / 29. V. 2004 / Kei. Matsumoto // PARATYPE / *Termitodonia / thaiensis* / des. Maruyama, 2013” (teneral) (KUM).

DESCRIPTION: Body (Figs. 2–3) yellowish brown throughout, but mouthparts, antennae, legs paler. Head with dorsal surface almost glabrous, with several thin setae; temple sparsely covered with setae. Eyes longer than length between antennal cavities, 0.43 times as long as head width. Antennae with segment II 0.9 times as long as III. Pronotum with anterior margin slightly convex, gently narrowed posteriad; antero-lateral corners rounded; posterior margin rounded; ratio ≈ 1.11 ; surface sparsely covered with minute setae. Elytra with surface sparsely covered with short setae. Legs moderately covered with setae. Abdomen with postero-lateral corners of sternites III–VII produced posteriad; tergite VIII with 13 or 14 macrosetae; sternite VIII with eight macrosetae.

Male: Anterior margin of pronotum largely submembranous. Tergite III simple; posterior margin of sternite VIII (Fig. 7) with a large projection medially. Internal sac of median lobe (Fig. 10) with a pair of long, slightly curved sclerites.



Figs. 1–4: Habitus of *Termitodonia* spp., 1) lectotype female of *T. flava*, 2) holotype male of *T. thaiensis*, 3) paratype female of *T. thaiensis*, 4) holotype male of *T. boothi*.



Figs. 5–13: Body parts of *Termitodonia* spp., 5) maxilla of *T. thaiensis*, 6) labium of *T. boothi*, 7) apex of sternite VIII of holotype male of *T. thaiensis*, 8) ditto, holotype male of *T. boothi*, 9) tergites IX and X of lectotype female of *T. flava*, 10) sclerites of internal sac of holotype male of *T. thaiensis*, 11) ditto, holotype male of *T. boothi*, 12) spermatheca of *T. flava*, 13) ditto, paratype female of *T. thaiensis*.

Female: Tergite III simple. Spermatheca (Fig. 13) basal part roundly swollen.

MEASUREMENTS: BL \approx 5.9–6.2; FBL \approx 2.9–3.0; HW 1.35–1.37; PL 1.18–1.19; PW 1.42–1.43; HTL 1.49–1.51 (N = 2).

DIAGNOSIS: This species is similar to *Termitodonia flava* in body shape and setal arrangement but distinguished from it by the larger eyes, the longer antennal segment II, and the absence of a tubercle on male tergite III.

DISTRIBUTION: Northern Thailand.

ETYMOLOGY: Named after Thailand where the type locality is located.

Termitodonia boothi sp.n.

TYPE MATERIAL: **Holotype** ♂: “F. C. DRESCHER / G. Raoeng, Java / „Bajoekidoel“ / 450-700 Mt. / 22. XI. 1921 // M. Cameron / Bequest / B.M. 1955-147 // HOLOTYPE / *Termitodonia* / boothi / des. Maruyama, 2013” (teneral, median lobe not sclerotized except for sclerites of internal sac) (NHM).

DESCRIPTION: Body (Fig. 4) yellowish brown throughout, but mouthparts, antennae and legs paler. Head with dorsal surface sparsely covered with erect setae; temple moderately covered with long setae. Eyes longer than length between antennal cavities, 0.44 times as long as head width. Antennae with segment II 0.7 times as long as III. Pronotum with anterior margin slightly convex, gently narrowed posteriad; antero-lateral corners rounded; posterior margin rounded; ratio \approx 1.20. Elytra with dorsal surface sparsely covered with erect setae; lateral margin moderately with suberect setae. Legs sparsely covered with suberect setae. Abdomen with antero-lateral corners of sternites III–VII simple, not produced; tergite VIII with 13 or 14 macrosetae; sternite VIII with eight macrosetae.

Male: Anterior margin of pronotum submembranous. Tergite III with a tubercle at middle of posterior margin; posterior margin of sternite VIII (Fig. 8) with a small projection medially. Internal sac of median lobe (Fig. 11) with a pair of rather short, slightly curved sclerites.

Female: Unknown.

MEASUREMENTS: BL \approx 5.2; FBL \approx 2.8; HW 1.29; PL 1.13; PW 1.35; HTL 1.12 (N = 1).

DIAGNOSIS: This species is easily distinguished from the other two congeners by the denser setae on body surface; the wider pronotum, the shorter legs and the simple postero-lateral corners of sternites III–VII.

DISTRIBUTION: East Java, Indonesia.

ETYMOLOGY: Dedicated to Dr. Roger Booth, curator at NHM, for his large contribution to the rove beetle fauna through lending specimens to researchers from all over the world.

Systematic position of *Termitodonia* and non-monophyly of *Zyras*

Termitodonia may be closely related to *Pedinopleurus* in sharing tufts of pubescence at the apices of tergites IX and X (Fig. 9) and sternite IX, although this derived character is not obvious in some *Pedinopleurus* species. This character state is unique within Lomechusini and suggests a sister group relationship between *Termitodonia* and *Pedinopleurus*. Some other character states are also very similar between the genera, except for body shape: *Termitodonia* has a slender body, and a pronotum that is slightly wider than long, typical of Lomechusini; in contrast, *Pedinopleurus* has a broad, foliaceous body with a much more strongly transverse pronotum. These character states of *Pedinopleurus* are apparently apomorphic, and together with some other character states, support the monophyly of *Pedinopleurus* (MARUYAMA, in prep.). In

Termitodon, males are known in two of the three species, *T. thaiensis* and *T. boothi*. These males possess a submembranous area at the anterior margin of the pronotum that is absent in females. This is a unique character state in Lomechusini. Although we could not examine males of *T. flava*, it is obviously more closely related to *T. thaiensis*, in which this character state is distinct, than *T. boothi*, and is therefore expected to also exhibit this character. We suspect this character state will support monophyly of *Termitodon*, and await the discovery of a male *T. flava* to confirm this hypothesis.

Although termitophily has been confirmed only in *T. flava*, the other species may also be associated with termites because they are very similar to *T. flava* with character states frequently observed in other termitophilous aleocharines: a smooth body surface with flattened legs. For this same reason, *Pedinopleurus* may also be termitophilous, even though termitophily is confirmed only for *P. notabilis* (SILVESTRI, 1946) (see SILVESTRI 1946), one of 14 congeners. As mentioned below, members of some other subgenera of *Zyras* are also related to *Pedinopleurus* and they are also termitophilous (at least some of the members have been collected from termite colonies). Termitophily may therefore have been the ancestral lifestyle of these taxa.

The sister-group relationship between *Pedinopleurus* and *Termitodon* also provides an example of non-monophyly within the genus *Zyras*. Some of the other subgenera are also closely related to *Pedinopleurus*, such as *Diaulaconia* BERNHAUER, 1928, *Glossacantha* GEMMINGER & HAROLD, 1868 and *Termitodon* MOTSCHULSKY, 1860. They are apparently distantly related to the nominotypical subgenus of *Zyras*. These genera/subgenera share the following character states: 1) antennal segment I elongate (with some exceptions), and 2) laterally compressed; 3) antennal segment IV–X dilated apicad, 4) compressed; 5) lateral lobe of labial apodeme short, 6) rounded apically, 7) segment I of labial palpus elongate, 8) dilated apicad; 9) sclerites of internal sac of median lobe bear a pair of apical sclerites. Of these states, 5), 6) and 9) are unique within Lomechusini and strongly support their monophyly. The subgenera of *Zyras* belonging to this clade can potentially be elevated to generic rank. However, there are more than 50 subgenera in *Zyras*, and their taxonomic status is highly confusing; some of them could be synonyms, and some are apparently non-monophyletic, e.g., *Glossacantha* (see MARUYAMA 2006). Thus, to change their taxonomic rank, a comprehensive revision and re-examination of the type species of each subgenus is needed, as has been done by PACE (2004: *Zyrastilbus* CAMERON, 1939), KLIMASZEWSKI et al. (2005: *Platyusa* CASEY, 1885), MARUYAMA (2006: *Pella* STEPHENS, 1843), ASSING (2009: *Peltonodon* BERNHAUER, 1936) and in the present study.

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