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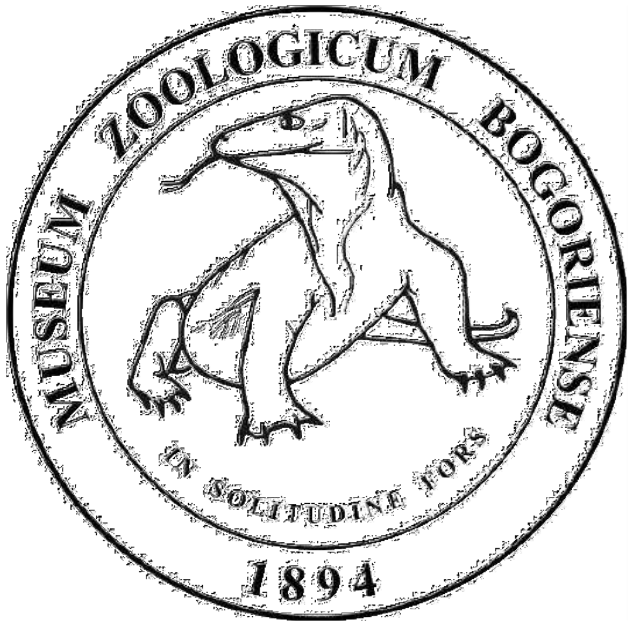

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CONTENT

TREUBIA

(A JOURNAL ON ZOOLOGY OF THE INDO-AUSTRALIAN ARCHIPELAGO)

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Date of issue: DECEMBER 2019

UDC: 595.76(594.53)

Yaheita Yokoi

Callidiopini beetles (Coleoptera: Cerambycidae) in the collection of Museum Zoologicum Bogoriense, Indonesia

TREUBIA, December 2019, Vol. 46, pp. 1–20.

Callidiopini species in the collection of Museum Zoologicum Bogoriense, Indonesian Institute of Sciences (LIPI) were examined. Three new species of the genus *Ceresium* Newman, 1842, are described, i.e. *C. clytinioides* sp. nov., *C. sugiartoi* sp. nov., both from Kalimantan, and *C. emarginatum* sp. nov. from Papua. One new species of the genus *Examnes* Pascoe, 1869, from Kalimantan, *E. subvermiculatus* sp. nov. is described.

(Yaheita Yokoi, Hiroshi Makihara and Woro A. Noerdjito)

Keywords: Asia, Kalimantan, longhorn beetle, New Guinea, taxonomy

UDC: 595.78.001.03(594.81)

R.I. Vane-Wright

The identity of *Euploea tulliolus goodenoughi* Carpenter, 1942, a crow butterfly (Lepidoptera: Nymphalidae, Danainae) from Papua New Guinea

TREUBIA, December 2019, Vol. 46, pp. 21–34.

The nominal taxon *Euploea tulliolus goodenoughi* Carpenter, 1942, based on a unique crow butterfly collected on Goodenough Island in 1913, is shown to represent a small, aberrant female of the locally common *Euploea leucostictos eustachius* (Kirby, 1889). This new synonymy invalidates the only previous record of the Purple Crow, *Euploea tulliolus* (Fabricius, 1793), from the islands of Milne Bay Province, Papua New Guinea. However, two female *Euploea tulliolus* collected from islands in the Louisiade Archipelago during 2010 are reported here, constituting the first valid records of the Purple Crow from the Milne Bay islands.

(R.I. Vane-Wright)

Keywords: *tulliolus* species complex, new synonymy, new records, Milne Bay islands, *Euploea leucostictos*

UDC: 595.762(594.31)

Raden Pramesa Narakusumo

Four new species of *Epholcis* Waterhouse (Coleoptera: Scarabaeidae: Melolonthinae: Maechidiini) from the Moluccas, Indonesia

TREUBIA, December 2019, Vol. 46, pp. 35–50.

Here, we provide the first record of the chafer beetle genus *Epholcis* Waterhouse, 1875 from the Moluccas, Indonesia. We describe four new species: *E. acutus* sp. nov., *E. arcuatus* sp. nov., *E. cakalele* sp. nov., and *E. obiensis* sp. nov. A lectotype is designated for *Maechidius moluccanus* Moser, 1920, which is redescribed and transferred to the genus *Epholcis* as *E. moluccanus* (Moser) comb. nov.

(Raden Pramesa Narakusumo and Michael Balke)

Keywords: Coleoptera, *Epholcis*, Maechidiini, Melolonthinae, Moluccas

UDC: 597.82(594.17)

Mediyansyah

A new tree frog of the genus *Kurixalus* Ye, Fei & Dubois, 1999 (Amphibia: Rhacophoridae) from West Kalimantan, Indonesia

TREUBIA, December 2019, Vol. 46, pp. 51–72.

Kurixalus absconditus sp. nov., a new species of tree frog of the genus *Kurixalus,* described from West Kalimantan on the basis of molecular phylogenetic and morphological evidence. The new species can be distinguished from its congeners by a combination of following morphological characters: having smaller body size, more prominent of mandibular symphysis, skin smooth on throat, vomerine odontophores two oblique series touching anterior corner of choanae and widely separated, vomerine teeth thick, buccal cavity narrow and deep, choanae with teardrop shaped, single vocal slit, weakly crenulated dermal fringe on fore- and hindlimbs.

(Mediyansyah, Amir Hamidy, Misbahul Munir and Masafumi Matsui)

Keywords: *Kurixalus absconditus* sp. nov., new species, West Kalimantan

UDC: 594.34.001.03(594.11)

Mulyadi

New records and redescription of *Labidocera rotunda* Mori, 1929 (Copepoda, Calanoida, Pontellidae) from Sebatik Island, North Kalimantan, Indonesia, with notes on its species-group

TREUBIA, December 2019, Vol. 46, pp. 73–84.

During a plankton trip around Sebatik Island, North Kalimantan, a copepod *Labidocera rotunda* Mori, 1929 (Calanoida, Pontellidae) was collected for the first time in Indonesian waters. Both sexes are redescribed and compared to previous descriptions. The geographical distribution of the species confirms that it is of Indo-Pacific origin. There has been a mix-up between *L. rotunda* described by Mori (1929) from Pusan, Korea and *L. bipinnata* from Sagami Bay, described by Tanaka (1936). Fleminger et al. (1982) have argued that the minor difference is based on the presence or absence of cephalic hooks and had synonymized *L. bipinnata* with *L. rotunda*.

(Mulyadi)

Keywords: copepods, Indonesia, *Labidocera rotunda*, new record, Pontellidae

UDC: 595.78:57.01(594.53)

Djunijanti Peggie

Biological aspects of *Papilio peranthus* (Lepidoptera: Papilionidae) as observed at Butterfly Research Facility - LIPI, Cibinong, Indonesia

TREUBIA, December 2019, Vol. 46, pp. 85–102.

Papilio peranthus is endemic to Indonesia, where it occurs on several islands and island groups. This beautiful butterfly is extensively traded, thus efforts to breed this species are very desirable. Captive breeding research was conducted on *P. peranthus* during September 2016 to December 2018. In total, 221 individuals were available for observation. Data on the life cycle of the species, together with observations on females being approached for mating, and female oviposition after mating, are presented. The result demonstrate that *P. peranthus* is not monogamous. Observations on other biological aspects are also reported.

(Djunijanti Peggie)

Keywords: egg-laying, mating, life cycle, *Papilio peranthus*, parent stocks

UDC: 599.41:001.891(594)

Susan M. Tsang

Review - Indonesian flying foxes: research and conservation status update

TREUBIA, December 2019, Vol. 46, pp. 103–113.

Flying foxes are important ecological keystone species on many archipelagoes, and Indonesia is home to over a third of all flying fox species globally. However, the amount of research on this clade belies their importance to natural systems, particularly as they are increasingly threatened by anthropogenic development and hunting. Here, we provide a review of the literature since the publication of the Old World Fruit Bat Action Plan and categorize research priorities as high, medium, or low based on the number of studies conducted. A majority of the research priorities for Indonesian endemics are categorized as medium or high priority. Low priority ratings were in multiple categories for widespread flying fox species found throughout Southeast Asia, though much of the data were from outside of the Indonesian extent of the species range. These research gaps tend to highlight broader patterns of research biases towards western Indonesia, whereas significant research effort is still needed in eastern Indonesia, particularly for vulnerable island taxa.

(Susan M. Tsang and Sigit Wiantoro)

Keywords: bats, conservation, Pteropodidae, *Pteropus*, threats

Treubia 46: 73–84, December 2019

DOI: 10.14203/treubia.v46i0.3793

NEW RECORDS AND REDESCRIPTION OF *LABIDOCERA ROTUNDA* MORI, 1929 (COPEPODA, CALANOIDA, PONTELLIDAE) FROM SEBATIK ISLAND, NORTH KALIMANTAN, INDONESIA, WITH NOTES ON ITS SPECIES-GROUP

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ABSTRACT

During a plankton trip around Sebatik Island, North Kalimantan, a copepod *Labidocera rotunda* Mori, 1929 (Calanoida, Pontellidae) was collected for the first time in Indonesian waters. Both sexes are redescribed and compared to previous descriptions. The geographical distribution of the species confirms that it is of Indo-Pacific origin. There has been a mix-up between *L. rotunda* described by Mori (1929) from Pusan, Korea and *L. bipinnata* from Sagami Bay, described by Tanaka (1936). Fleminger et al. (1982) have argued that the minor difference is based on the presence or absence of cephalic hooks and had synonymized *L. bipinnata* with *L. rotunda*.

Keywords: copepods, Indonesia, *Labidocera rotunda*, new record, Pontellidae

ABSTRAK

Dalam penelitian plankton di sekitar pulau Sebatik, Kalimantan Utara, satu jenis kopepoda *Labidocera rotunda* Mori, 1929 (Calanoida, Pontellidae) ditemukan untuk pertama kalinya di perairan Indonesia. Kedua jenis kelamin dideskripsi ulang dan dibandingkan dengan beberapa deskripsi sebelumnya. Ditinjau dari sebaran geografinya jenis ini adalah jenis Indo-Pasifik. Terdapat kebingungan antara *L. rotunda* yang dideskripsi oleh Mori (1929) dari Pusan, Korea dan *L. bipinnata* dari Teluk Sagami yang dideskripsi oleh Tanaka (1936). Fleminger dkk. (1982) berpendapat bahwa perbedaan kecil pada ada atau tidaknya duri samping kepala menunjukan bahwa *L. bipinnata* adalah sinonim *L.rotunda*.

Kata kunci: copepoda, Indonesia, *Labidocera rotunda*, rekaman baru, Pontellidae

INTRODUCTION

The genus *Labidocera* Lubbock, 1853, at present comprises up to 62 species, inhabits the surface waters (0-30 m surface layer) from the tropical to the warm temperate regions (Sherman, 1963, 1964; Walter & Boxshall, 2019). The genus is divided into five species-group, such as *detruncata*, *kroyeri*, *minuta*, *pectinata*, and an unassigned group, on the basis of the included species morphological characteristics (Fleminger et al., 1982; Mulyadi, 1997, 2003). *Labidocera rotunda* belongs to the *L. pectinata* species group, which is composed of seven species of the Indo-Pacific region, i.e., *L. carpentariensis* Fleminger, Othman & Greenwood, 1982, *L. japonica* Mori, 1935, *L. javaensis* Mulyadi, 1997, *L. moretoni* Greenwood, 1978, *L.papuensis* Fleminger et al. 1982, *L. pectinata* Thompson & Scott, 1903, and *L. rotunda* Mori, 1929 (= *L. bipinnata* Tanaka, 1936).

Labidocera rotunda is relatively widespread in the inshore surface waters of East Asia from Okhotsk to the Malay Archipelago (Fleminger at al., 1982; Fleminger, 1986; Othman & Toda, 2006). The species displays some extreme morphological variability as reported by Chen & Zhang (1965), Fleminger at al. (1982), Othman & Toda (2006), and Jeong et al, (2014).

Tanaka (1936) described a member of the *L. pectinata* group, *L. bipinnata* from Sagami Bay, Japan. Sewell (1948) suggested that *L.rotunda* and *L. bipinnata* are synonymous with *L. pectinata.* However, Fleminger (1967) retained *L. rotunda* and *L. pectinata* as separate species, while *L. bipinnata* was synonymized with *L. rotunda* because of their minor difference in the presence or absence of lateral cephalic hooks (Fleminger et al. 1982).

During a study on the plankton copepods from the Indonesian seas, one newly recorded species of the genus *Labidocera, L. rotunda* Mori, 1929, was found in a plankton sample from Sebatik Island, East Kalimantan, which Nova Mujiono (Research Center for Biology LIPI) collected and kindly sent me.

This paper thus deals with redescriptions and illustrations of the female and male of *Labidocera rotunda*. The text further aims at clarifying some synonymy, and discusses the distribution of *L. pectinata* species group, in Indonesian waters, in adjacent waters, as well as throughout the world's oceans.

MATERIALS AND METHODS

Plankton samples were provided from the collection of the Research Center for Biology, Indonesian Institute of Sciences (LIPI), collected on 6 June 2011 at Sebatik Island, East Kalimantan (04°09'19.4" N, 117°54'06.2" E) by surface tows during the daytime, with a conical plankton net (mesh size 0.33 mm; mouth diameter 45 cm). Samples were fixed and preserved in 2% formaldehyde/seawater. Specimens of *Labidocera* were sorted from the original samples, stained with methylene blue, dissected with needles in 10% glycerol/ distilled water, and the body and appendages were observed under a compound microscope equipped with a drawing tube. The morphological terminology follows Huys & Boxshall (1991).

Abbreviations used in the text to describe morphological features are: A1, antennule; A2, antenna; Pdg1–Pdg5, pedigerous somites 1–5; P1-P5, swimming legs 1–5; Ur1–Ur5, urosomal somites 1–5; CR, caudal ramus/i; CO, coxa; BA, basis; Re1–Re3, exopodal segments 1–3; Ri1–Ri3, endopodal segments 1–3; Se, outer spine; Si, inner spine; St, terminal spine. Articulating segments of the antennule are designated by Arabic numerals, ancestral segments by Roman numerals. One seta and one aesthetasc on a segment of the A1 are designated as 1s + 1ae. The prosome length was measured from the anterior apex to the mid-posterior end of the prosome, and the urosome length from the mid-anterior end of the

urosome to the posterior end of the caudal rami, and all these were measured with a calibrated ocular micrometer.

All voucher specimens are formalin-preserved and deposited at the Museum Zoologicum Bogoriense (MZB), Research Center for Biology, Indonesian Institute of Sciences (LIPI), Cibinong, Indonesia.

RESULTS

There are many copepod species found from a short expedition to Sebatik Island, North Kalimantan (previously East Kalimantan) Province, Indonesia in June 2011. Among the copepod species, *Labidocera rotunda* Mori, 1929 was found. It is a first record for Sebatik Island and Indonesian waters as well.

The morphology of both sexes of the newly record *L. rotunda* shows some variations compare to those from Korea, Japan, China and Singapore waters mainly on the posterior corners of the last prosomal somite, the fifth legs and the ornaments on the urosome.

DESCRIPTIONS

Family Pontellidae Dana, 1853

Genus *Labidocera* Lubbock, 1853

Labidocera rotunda Mori, 1929 (Figs. 1-2)

Labidocera rotunda Mori, 1929: 177, 209, pl. 10, figs. 1–8 (type locality: Pusan, Korea); Sewell, 1948: 406; Mori, 1964: 35; Fleminger et al. 1982: 264–266, figs. 7F, 8F; Onbé et al. 1988: 79; Ohtsuka & Onbé, 1991: 214; Chihara & Murano, 1997: 868, pls. 148, 151; Othman & Toda, 2006: 314, figs. 16–17; Jeong et al. 2014: 181–191, figs. 1–4.

Labidocera rotundata Tanaka, 1964: 52.

Labidocera bipinnata Tanaka, 1936: 31, pl. 2, figs. 1–10, pl. 3, figs. 1–7; Brodsky, 1948: 66, pl. 20, figs. 1–5; 1950: 410, fig. 291; Shen & Bai, 1956: 191–192, pl. 5, figs. 36–41; Shen & Lee, 1963: 581; Tanaka, 1964: 25–29; Mori, 1964: 94, pl. 43, figs. 1–8; Chen & Zhang, 1965: 97, pl. 39, figs. 10–13, pl. 40, figs. 1–5; Silas & Pillai, 1973: 814; Kim, 1985: 118–119, pl. 38, figs. e–g, pl. 39, figs. a–b.

Material examined.–Ten adult females (1.96–2.30 mm) and 10 adult males (1.58–2.14 mm) collected at Sebatik Island, East Kalimantan (04°09’19.4”N, 117°54’06.2’E) on 6 June 2011.

Female.–Body (Fig. 1a) elongated, with prosome approximately 3.6 times as long as urosome. Cephalosome rounded anteriorly, distinctly separated from Pdg1; Pdg4 and Pdg5 completely fused, posterior corners of prosome produced into asymmetrical spiniform processes, left side slightly wider than right and reaching to 1/4 length of the genital compound somite (Fig. 1a–e). Cephalosome with lateral hooks and pair of dorsal lenses, lenses spherical, small and situated apart; rostrum bifid, gap between rostral rami narrow.

Urosome (Fig. 1a–e) with 3 free somites; genital compound somite with wide spur on right antero-laterally, 1 antero-lateral spiniform process and 2 unequal spiniform processes ventro-laterally; genital operculum concaved on central part of tip (Fig. 1e). Right antero-

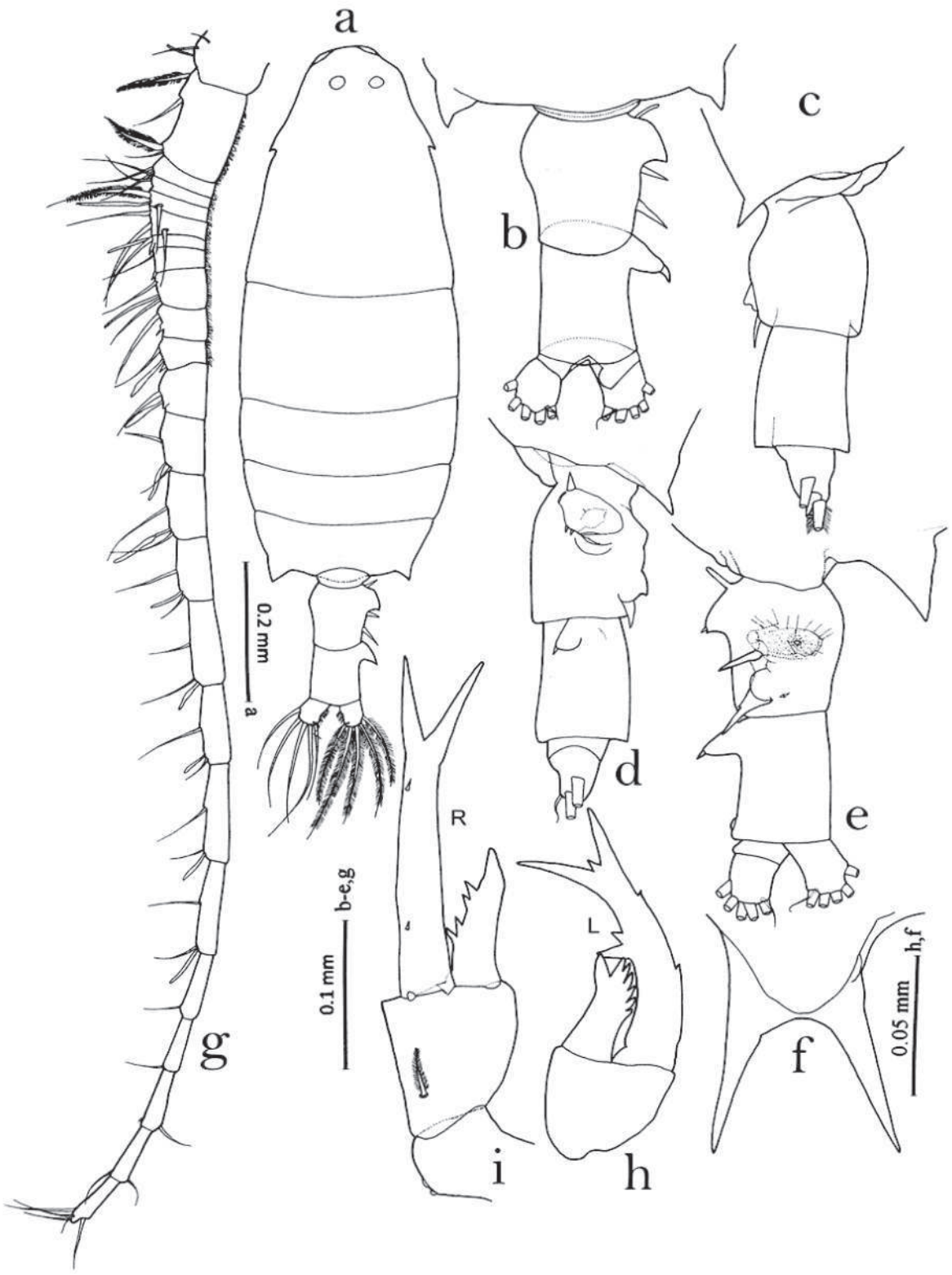

Figure 1. *Labidocera rotunda* Mori, 1929. Female. a, whole animal, dorsal view; b, Pdg5 and urosome, dorsal view; c-d, Pdg5 and urosome, dorsal view; e, Pdg5 and urosome, ventral view; f, rostrum, frontal view; g, antennule; h, left P5; i, right P5.

lateral of Ur2 with expanded spiniform process pointing posteriorly, disto-lateral of Ur2 without any processes. Anal somite and caudal rami partly fused and exceedingly short, only 0.1 length of Ur1; caudal rami asymmetrical, approximately 1.5 times as long as wide, left ramus slightly wider than right, and without any processes, each ramus carrying five plumose setae along distal margin and reduced seta (seta VII) located on dorsal surface near medial distal angle (Fig. 1a, b).

Antennule (Fig. 1g) 24-segmented, posterior margin of 2nd to 12th segments (ancestral segments II–XVI) fringed with fine settles; ancestral segment II–IV, XXVII–XXVIII completely fused, whileVIII–IX incompletely fused. Fusion pattern and setal formula as follows: I, 3s + 1ae (aesthetasc); II–IV, 4s + 1ae; V, 2s + 1ae; VI, 2s; VII, 2s + 1ae; VIII–IX, 4s + 1ae; X, 2s; XI, 2s + 1ae; XII, 2s + 1ae; XIII, 2s + 1ae; XIV, 2s+ 1ae; XV, 2s + 1ae; XVI, 2s + 1ae; XVII, 2s + 1ae; XVIII, 2s + 1ae; XIX, 2s + 1ae; XX, 2s + 1ae; XXI, 2s + 1ae; XXII, 1s; XXIII, 1s; XXIV, 1s + 1s; XXV, 1s + 1s + 1ae; XXVI, 1s + 1s; XXVII–XXVIII, 4s + 1ae.

P1–P4 with 3-segmented exopods and 2-segmented endopods, coxa bearing inner plumose seta; basis of P4 with plumose seta on posterior side. P5 (Fig. 1h–i) asymmetrical, left leg longer than right; coxa and intercoxal sclerite completely fused; basis with outer seta on posterior face near proximal end; right Re with small intercalary denticle between unequal apical processes; inner margin with 2 medial unequal processes and 2 minute prominences on outer margin; Ri with 7 denticles (Fig. 1h). Left leg (Fig. 1i) exopod similar to that in *L. pectinata*, segment with 2 unequal processes distally and 2 minute prominences on outer margin; Ri pectinate with 5 denticles (Fig. 1h, i).

Male.– Prosome more compact than in female (Fig. 2a), dorsal eye lenses larger than those of female and in contact with each other. Length ratio of prosome to urosome 3.13 : 1. Posterior corners of Pdg5 produced into asymmetrical acuminate processes in dorsal view. Left side terminates into simple sharp apex, but right side bifurcate with acuminate denticles between processes in dorsal view, in lateral view right side trifurcate with minute denticles between outer and middle processes, outer process reaching beyond posterior end of Ur1, inner one reaching middle of Ur1 (Fig. 2b–d). Urosome composed of 5 free somites; proportional lengths of urosomites and caudal ramus 47.2 : 21.7 : 12.3 : 9.4 : 9.4 (=100) (Fig. 2a), genital somite (Fig. 2a–e) wider than long, with long acicular process ventrally, reaching middle of Ur2; anal somite and caudal rami completely fused.

Right antennule geniculate, indistinctly 13-segmented; segments XII–XIV with arthrodial membranes incompletely formed, segments II–IV, XV and XVI, XXI–XXIII completely fused. Fusion pattern and setal formula as follows: I, 3s + 1ae; II–IV, 4s + 1ae; V–XI, 14s + 4ae; XII–XIV, 6s + 2ae; XV–XVI, 4s + 2ae; XVII, 2s + 1ae; XVIII, 2s + 1ae; XIX, 1s + p (hooked process) + 1ae; XX, 1s + p + 1ae; XXI–XXIII, 2s + p + 1ae; XXIV, 1s + 1s + p; XXV, 1s + 1s + 1ae; XXVI–XXVIII, 6s + 1ae. Segment XIX with anterior setiform process, segment XX and compound segment XXI–XXIII with toothed ridge provided with

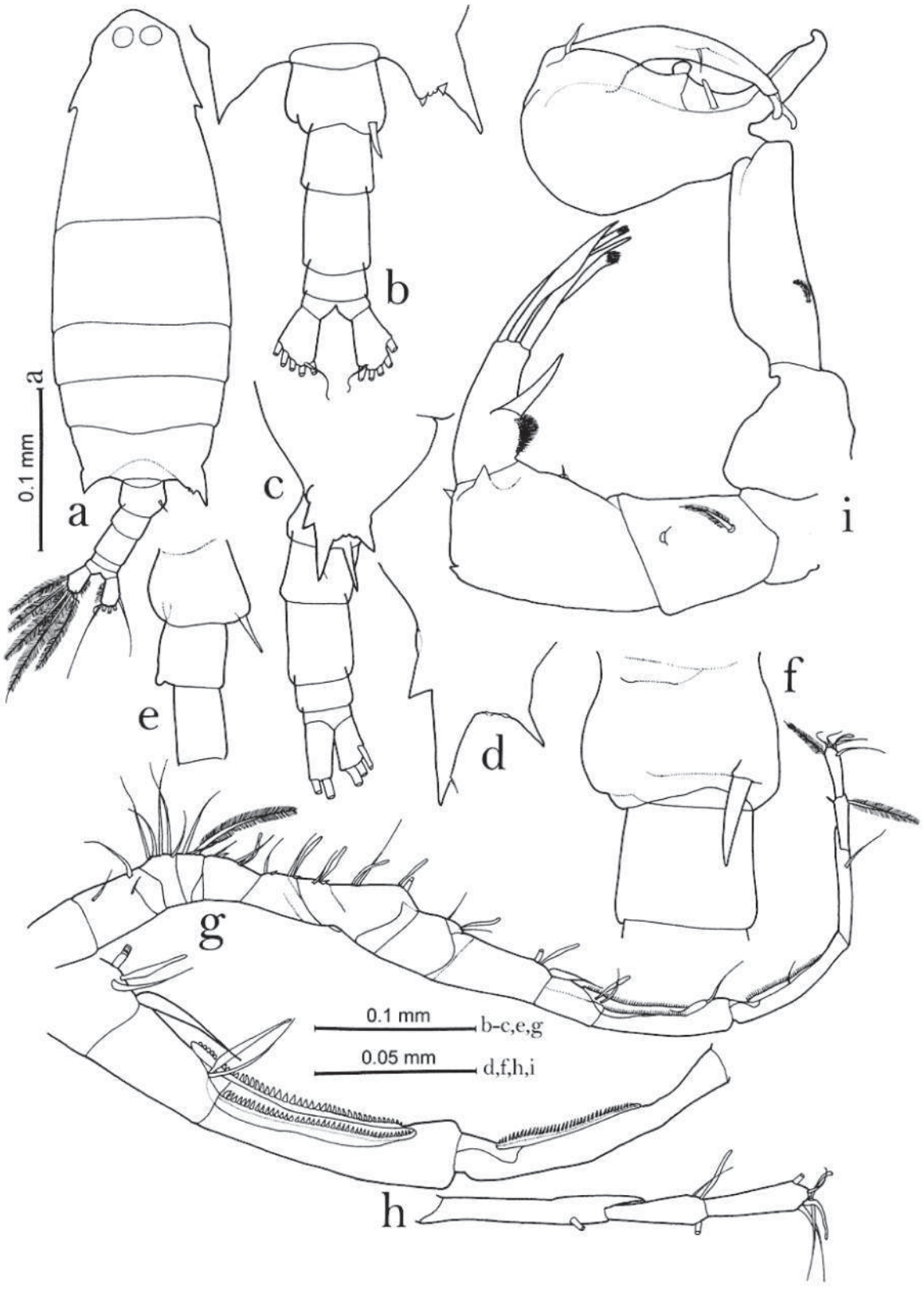

Figure 2. *Labidocera rotunda* Mori, 1929. Male. a, whole animal, dorsal view; b, Pdg5 and urosome, dorsal view; c, Pdg5 and urosome, lateral view; d, posterior corner of right Pdg5; e, Ur1-Ur3, dorsal view; f, Ur1 and Ur2 ventral view; g, right A1; h, geniculate region of right A1.

serrated denticles, respectively, and segment XXIV with spur-like process distally, expanding to middle of next segment (Fig. 2h).

P5 (Fig. 2i) uniramous and asymmetrical; coxa of left Re coalescent with intercoxal sclerite; right Re 2-segmented, Re1 (chela) broadened with convex inner margin, slightly longer than its maximum width (except thumb), thumb at proximal end terminating into inwardly curved, pointed hook, outer surface of chela between thumb and distal end of Re1 with 1 stout process near base and 1 small median anvil-shaped lamella, single seta present on posterior surface near base of Re2. Re2 (finger) slightly longer than Re1, curved inwards, and terminating into 2 subequal round-tipped spines and 1 median seta on concave surface. Left leg with coxa very short, basis 2.5 times as long as coxa, bearing 1 small seta on posterior surface; Re1 broadly rectangular, with 2 small triangular spines arising on and near outer distal corner; Re2 about half length of Re1, bulb-shaped, inner margin divided into 2 parts by strong projection extending beyond distal margin of segment, proximal part hirsute, distal part narrowing abruptly just behind projection and unarmed; distal end with 2 stout, round-tipped spines and 2 aesthetasc-like setae, these spines and setae longer than their own segment.

Remarks.–The general morphological characteristics of the *Labidocera* species collected from Sebatik Island were close to those of *L. rotunda* described from Pusan, Korea by Mori (1929). In Indonesian waters, some female specimens of *L. rotunda* exhibited morphological differences with the Korean specimens such as: 1) posterior corners of prosome with triangular processes are extending to 1/4 of the genital compound somite (Fig. 1a–e) (vs. reaching 1/3 of Ur1), 2) the genital compound somite with wide spur on right antero-laterally and three spiniform processes ventro-laterally (Fig. 1e) (vs. Ur1 with four spiniform processes ventro-laterally) , 3) the Ur2 is having a long spine-like process on the right antero-lateral surface (Fig. 1a, b) (vs. the Ur2 with a small knob on the right antero-lateral surface), 4) the CR is asymmetrical (Fig. 1b, e) (vs. the CR symmetrical), and 5) inner margin of the right Re with two unequal spines (vs. inner margin of the right Re with four unequal spines).

Labidocera rotunda displays some extreme morphological variability as reported by Chen & Zhang (1965), Fleminger et al. (1982), Othman & Toda (2006) and Jeong et al. (2014). Fleminger et al. (1982) and Othman & Toda (2006) found some discrepancies in individuals of female *L. rotunda. Labidocera rotunda* is readily distinguishable from the other species by the following characteristics: 1) cephalosome with lateral hooks, 2) distal segment of male left P5 with long tuberculate papillae, 1 claw-like process, and 2 unequal spines, and 3) right posterior corner of Pdg5 bearing 2 unequal processes with a narrow gap between these processes. Mori (1929) described this species from Pusan, Korea, but the male fifth leg depicted showed minor morphological differences with Indonesian specimens. In

Mori's (1929) figure, the genital compound somite has a long finger-like process, and the posterior corner of the right Pdg5 is trifurcate in the male.

Distribution.–*Labidocera rotunda* clearly belongs to the *L. pectinata* species-group, which is recognized as a unique monophyletic lineage within the primarily tropical Indo-West Pacific radiation of coastal water species encompassed by the *Labidocera kröyeri* (Brady, 1883) species complex. *Labidocera rotunda* is widely distributed in inshore surface waters in the East Asia from Okhotsk to the Malay Archipelago (Singapore Strait) (Fleminger et al., 1982; Fleminger, 1986; Othman & Toda, 2006). In the Inland Sea of Japan, the copepod commonly occurs in the warmer season in the temperature range of 19°–29°C and at salinities range of 29–34 ppm; it disappears from the plankton community during the colder months (Hirota, 1964, 1968; Onbé et al., 1988).

The published records of *L. rotunda* as listed above delineate a relatively widespread geographical distribution in inshore surface waters off East Asia. The northern limits are in the Sea of Japan and the Okhotsk and Pacific coasts of Japan. The distribution range of *L. rotunda* in the Sea of Japan and off eastern Japan overlaps with that of *L. japonica*, and indeed the two species have been collected together in a tow taken off the southeast coast of Hokkaido (latitude 41°49' N, longitude 141°46' E). Records of this species from the Andaman Sea, and the waters off southern Burma and Singapore, suggest that *L. rotunda* extends to the west, following the Strait of Malacca (Fleminger unpubl.; Othman & Toda, 2006). The presence of *L. rotunda* at Sebatik Island, East Kalimantan is the first record for Indonesian waters.

DISCUSSION

At least, 26 species of *Labidocera* are recorded from the Indo-Pacific region, including eight species from Australian waters, i.e., *L. carpentariensis* Fleminger, Othman & Greenwood, 1982; *L. caudata* Nicholls, 1944; *L. cervi* Krämer, 1895; *L. dakini* Greenwood, 1978; *L. farrani* Greenwood & Othman, 1979; *L. moretoni* Greenwood, 1978; *Labidocera* sp. female (Greenwood, 1978); and *L. tasmanica* Taw, 1974, that have all until now been reported from Australian waters only (Dakin & Colefax, 1940; Nicholls, 1944; Taw, 1974; Greenwood, 1978).

Indonesia is the country with the richest fauna of the family Pontellidae in terms of species and species-groups. These comprise at least 16 species of *Labidocera* from 5 species-groups (the *detruncata*-, *kroyeri*-, *minuta*-, *pectinata*-group, and an unassigned group) (Fleminger, 1967, 1986; Mulyadi, 1997, 2002). Later Mulyadi (2014) divided the *L. detruncata* species-group into 5 species-subgroups, namely the *L. detruncata cervi*-, *L. d. detruncata*-, *L. d. farrani*-, *L. d. kaimanaensis*-, and *L. d. sinilobata*-subgroups.

The present female specimens differ from the original female *L. rotunda* as described by Mori (1929) in having (1) the A1 24-segmented (vs. *L. rotunda* 21-segmented), (2) the left

Table 1. *Labidocera rotunda* Mori, 1929, variabilities according to its localities and authors.

Author(s)	Locality	Morphological feature	
		Female	**Male**
Mori, 1937	Off Pusan, Korea	1.Posterior corners of Pdg5 produced into asymmetrical spiniform processes reaching beyond middle length of Ur1. 2. Antero-lateral margin of right Ur1 with spur-like process and 2 unequal postero-lateralspines. 3. Antero-lateral margin of right Ur2 with long spur-like process, and postero-lateral margin with knob-like process. 4. CR asymmetrical, right ramus longer than left; inner margin of right ramus with knob-like process 5. P5 asymmetrical, right Re with small intercalary denticle between 2 unequal distal spines, 2 unequal Si and 2 small Se; Ri with 8 spines (apex bifurcate). Left Re with 2 unequal St and 2 small Se; Ri with 7 spines.	1. Posterior corner of right Pdg5 bifurcate with minute denticle between processes. 2. Acicular spine on right margin of Ur1 short reaching about ¼ length of Ur2. 3. P5, right Re1 with pronounced thumb, concave surface with 2 setae and 2 conical processes; Re2 elongated, curved inwards with 2 inner and 2 distal spines.Left Re1 with 2 unequal disto-lateral spines and inner seta; Re2 with spine-like process proximally, 2 spiniform processes and 2 setiform processes distally, inner margin hirsute.
Fleminger et al., 1982	Ariake Bay, Kyushu, Japan	1. Posterior corners of Pdg5 produced into symmetrical spiniform processes, reaching about 1/3 length of Ur1. 2. Antero-lateral face of right Ur1 with spur-like process,1 anterior spine and 2 ventral spines. 3. Antero-lateral face of right Ur2 with spur-like process, and without postero-lateral knob-like process. 4. CR asymmetrical, right ramus longer than left; inner margin of right ramus without knob-like process. 5. P5, left Re with 2 unequal St and 2 small Se. Right Re with small intercalary denticle between 2 unequal distal spines, 2 unequal Si and 2 small Se. Left and right Ri with about 8 denticles.	1. Right corner of Pdg5 bifurcate with 2 or 3 minute denticles between processes. 2. Acicular process on right margin of Ur1 short, extending posteriad to about ¼ length of Ur2. 3. P5, thumb of right Re1with pronounced hook at distal end, concave surface with 2 setae and 1 conical process; Re2 elongated, curved inwards with 2 inner and 2 distal spines. Left Re1 with 1 small distolateral spine; Re2 with medio-distal spur and rounded notch, 2 spine-like processes and 2 setiform elements, inner margin hirsute.
Othman & Toda, 2016	Singapore Strait	1. Posterior corners of Pdg5 produced into symmetrical spiniform processes reaching middle length of Ur1. 2.Antero-lateral face of right Ur1 with knob-like process, 1 anterior spine and 3 unequal ventral spines. 3. Antero-lateral face of right Ur2 with spine -like process,postero-lateral side with knob-like process. 4. CR asymmetrical, right ramus longer and wider than left; inner margin of right ramus without knob-like process. 5. P5 asymmetrical, left Re slightly longer than right, with 2 unequal distal spines and 2 small Se. Right Re with small intercalary denticle between 2unequal distal spines and 2 small Se, medial margin with 2 unequal spines.Left Ri with 6 spines and right Ri with 9 spines.	1. Posterior corner of right Pdg5 bifurcate with minute denticles between processes. 2. Ur1 wider than long, with long ventral spine reaching slightly beyond middle of Ur2. 3. P5, right Re1 with pronounced thumb at distal end, concave surface with 1 long and 1 short spines and 1 conical process; Re2 elongated, curved inwards with 2 spines on concave surface and 2 spines at apex. Left Re1 with disto-lateral spine;Re2 with spine -like process proximally, 2 unequal spiniform process, 2 unequal setiform processes distally, inner margin hirsute.
Jeong et al. 2014	Yellow Sea, China and Japan Sea	1. Posterior corners of Pdg5 produced into symmetrical spiniform processes reaching 1/3 length of Ur1, 2. Antero-lateral face of right Ur1 with wide spur and 3 spines along lateral margin. 3. Antero-lateral face of right Ur2 with short spur, and without postero-lateral knob-like process. 4. CR asymmetrical, inner margin of left ramus without blunt process. 5. P5 asymmetrical, right Re with small intercalary denticle between unequal apical spines, 3 unequal Siand 2 small Se; left Re with 2 unequal distal spinesand 2 Se. Both Ri's with 9 denticles or, sometime, reductions.	1.Posterior corner of right Pdg5 bifurcate with minute denticle between processes. 2. Ur1 wider than long, with short ventral spine, not reaching middle of Ur2. 3. P5, right Re1 with pronounced thumb at proximal end, concave surface with 2 spines and 1 conical process; Re2 elongated, curved inwards with 2 spines on concave surface and 2 spines at apex. Left Re1 with bluntly triangular process postero -laterally, Re2 with spine-like process proximally, 2 unequal spiniform process, 2 unequal setiform processes distally, inner margin hirsute.

posterior corner of Pdg5 shorter, (3) the right CR without dorsolateral semi-circular process, (4) the right margin of the genital double somite with an anterior spine, and (5) the right Ri of P5 without 2 inner spines (vs. *L. rotunda* with 2 spines).The male is distinguished from the typical *L. rotunda* in having (1) the right margin of Ur1 with a long spine-like process (vs. short spine) and (2) the right posterior corner of Pdg5 trifurcated.

Labidocera rotunda was described by Mori (1929) from two male specimens collected off Pusan, Korea. Later Tanaka (1936) described the female and male of this species as *L. bipinnata* based on 91 specimens collected from Sagami Bay, Honshu. Tanaka (1936) indicated awareness of Mori's description of *L. rotunda* but without explanation chose to stress the resemblance of *L. bipinnata*'s male to that of *L. kroyeri*. Mori also dealt with both species (1937: 94–95, pl. 43, figs. 1–8) in his account of the pelagic copepods in Japanese waters, but without discussing their morphological similarities and differences. Tanaka (1964) subsequently did not indicate any change in his view of *L bipinnata* vis-a-vis *L. rotunda*. Comparison of *L. bipinnata* males with Mori's description of *L.rotunda* shows, that they have similar character states with respect to all complexes, sexually modified structures and that the only known morphological difference between them is the presence or absence of cephalic hooks. Cephalic hooks are plesomorphic in the Pontellidae and have been modified by secondary loss in a number of advanced pontellid genera. Intragenerically they may be absent from some member species of a species-group (Greenwood, 1978), and they may be uniformly lost within a species during ontogenetic development (*L. diandra* Fleminger, 1967) as well as among isolated individuals as in *L. kroyeri* (cf. Fleminger, 1967).

The absence of lateral cephalic hooks in the two known specimens of *L. rotunda* may be accounted for by several likely possibilities. Their absence may be due to a common mutation, a relatively rare allele, or aberrant development. On the other hand, being quite small, it is also reasonable to consider that Mori (1929) inadvertently overlooked the cephalic head-hooks in *L. rotunda.*

Following the rules of priority of the ICZN (1999), *L. rotunda* must be the valid name, and *L.bipinnata* is the junior synonym.

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VOL. 46, DECEMBER 2019

CONTENT