

**Description of two new species of *Dineutus* sensu stricto
from Southeast Asia (Coleoptera: Gyrinidae)
with a key to the known species of the subgenus**

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Abstract. Two new species of *Dineutus* Macleay, 1825 (Coleoptera: Gyrinidae) are described and illustrated: *Dineutus barong* sp. nov. from Bali, Indonesia and *Dineutus sitesi* sp. nov. from Thailand. A checklist to the species of the *Dineutus* s. str. is provided, as is a key to the species currently recognized in the subgenus together with illustrations of habitus, elytral apices and aedeagi of the species. *Dineutus lethicus* Guignot, 1957 syn. nov. is removed from *Dineutus* s. str. and it is synonymized with *Dineutus (Protodineutus) indus olivaceus* Régimbart, 1882.

Key words. Coleoptera, Gyrinidae, *Dineutus*, new species, new synonym, taxonomy, identification key, Thailand, Bali, Indonesia, Oriental Region

Introduction

Currently the genus *Dineutus* W. S. Macleay, 1825 comprises just under 100 species, and is predominantly distributed in the tropics, but notably absent from South America (MILLER & BERGSTEN 2012, GUSTAFSON & MILLER 2015). The species can be found in a variety of lotic and lentic situations, but most individuals are found in slower parts of streams and rivers.

The first revision of the species of *Dineutus* was done by RÉGIMBART (1882a) and updated in several treatments (RÉGIMBART 1886, 1892, 1907). The first subgeneric classifications for the genus were proposed almost simultaneously by HATCH (1926) and OCHS (1926). The constituents of the subgenera were rearranged by GUIGNOT (1950) until being redefined to current state by BRINCK (1955). As indicated by BRINCK (1955) final decisions about the subgenera would require much closer inspection, as many of the subgenera lack distinct morphological synapomorphies. The last treatment of the species of *Dineutus* s. str. was by

MOUCHAMPS (1949), but this was prior to the separation of species currently placed in the subgenus *Merodineutus* Ochs, 1955 and redefinition of *Dineutus* s. str. by BRINCK (1955). At present, *Dineutus* s. str. includes large southeast Asian species that have females with the ultimate protarsomere with a setose furrow posteriorly (a state shared with members of other subgenera), males with unmodified profemora and protibiae (another state shared with other subgenera), and both sexes lacking well-impressed coarse punctation on the parascutellar region of the elytra – the only character separating its members from the subgenus *Merodineutus* (BRINCK 1955, 1984). We would like to point out, that since the *Dineutus* s. str. is currently defined by absence of features present in other subgenera, specifically *Merodineutus*, this suggests a potential unnatural grouping of species. However, pending the results of an upcoming phylogenetic analysis of the Dineutini, we accept the provisional *Dineutus* subgeneric classification. Currently the subgenus *Dineutus* s. str. comprises seven species, two of which are polytypic. In this paper we describe additional two new species and provide a key to the known species of the subgenus.

Materials and methods

Exact label data are cited for the type material. A slash (/) separates different lines and a double slash (//) different labels of data. Authors' remarks and addenda are given in square brackets. Specimens examined in this study are housed in the following institutional and private collections:

- IRSB Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (P. Limbourg);
LHCM Lars Hendrich collection, Munich, Germany;
MNHN Musée National d'Histoire Naturelle, Paris, France (A. Mantilleri);
MSBA Museum of Southwestern Biology, University of New Mexico, Albuquerque, NM, U.S.A. (K. B. Miller);
MZBC LIPI Division of Zoology, Museum Zoologicum Bogoriense, Cibinong, Indonesia (H. Sutrisno);
MZLU Biological Museum of Lund University, Lund, Sweden (R. Danielsson, C. Fägerström);
NMPC National Museum, Prague, Czech Republic (J. Hájek);
NSMT Natural History Museum, National Science Museum, Ministry of Science and Technology, Pathum Thani, Thailand;
NSUB Nano Suprayitno collection, Ubud, Bali, Indonesia;
RMNH Naturalis Biodiversity Center [former Rijksmuseum van Natuurlijke Historie], Leiden, Netherlands (P. Ciliberti);
UMCE Enns Entomology Museum, University of Missouri, Columbia, Missouri, U.S.A (R. Sites);
USNM National Museum of Natural History, Washington D.C., U.S.A (C. Micheli);
ZSMG Zoologische Staatssammlung München, Munich, Germany (M. Balke).

Measurements were taken using a Cen-Tech 4 inch Digital Caliper (ITEM 47256). Total body lengths were measured from the anterolateral margin of the clypeus to the apex of the elytral apices. Width was taken from the widest point of the body. For each taxon an attempt was made to measure the largest and smallest specimens available for each sex.

Specimens for dissections and imaging were relaxed by placing them in lightly boiling water. The aedeagus was then dissected from relaxed males and placed in warm 10% KOH for about five minutes. Following removal from KOH the aedeagus was placed in vinegar to neutralize the base and washed in water. Female dissection follows MILLER (2001). Genitalia were drawn while in water and kept in glycerine, because allowing the genitalia to dry causes them to become distorted and brittle. After dissection and/or illustration, aedeagi, female

reproductive tracts, and abdomens were placed in microvials attached to the pin with the original specimens.

Illustrations were first drawn via a camera lucida attached to a Zeiss Discovery V8 stereo microscope, then scanned and traced in Adobe Illustrator. Dorsal habitus were taken using a Visionary Digital BK+ light imaging system (www.visionarydigital.com, R. Larimer). Habitus images were then edited using Adobe Photoshop to add scale bars and improve clarity and color.

Terminology of dineutine structures follows GUSTAFSON & MILLER (2015). The term “sculpticell” was first defined by ALLEN & BALL (1979) for referring to a single cell of microsculpture forming the meshes of reticulation found in Adephagan beetles. We here use the term to describe the shape of cells located within the meshes of reticulation in line with ALLEN & BALL (1979) and more recent taxonomic works on the Gyrinidae (i.e. OYGUR & WOLFE 1991, GUSTAFSON & MILLER 2015, GUSTAFSON & SITES 2016). The family-group name classification follows GUSTAFSON & MILLER (2013).

The following *Dineutus* s. str. specimens were studied for comparative purposes and illustrated in the present study:

Dineutus brownei Mouchamps, 1949. PARATYPES: **INDONESIA: SOUTHEAST SULAWESI:** ‘S O -Celebes / Berg Tangke Salokko / 1500m 1-15.1.1932 / G Heinrich // Celebes. / G.Heinrich. / B.M.1933-117. // Para-/ type // R. Mouchamps det 1949 / DINEUTUS / brownei n.sp. / (paratype)’ (1 ♂ 1 ♀ IRSB).

Dineutus fulgidus Régimbart, 1880. **INDONESIA: NORTH SUMATRA:** Deli (1 spec. RMNH); **WEST SUMATRA:** Solok, Alahan Panjank Road, 0°56.345’S 100°46.411’E, 1190 m, 24.ix.2009, leg. Balke & Amran, SUM03 (4 spec. ZSMG).

Dineutus mellyi Régimbart, 1882: **CHINA: FUJIAN PROV.:** Foochow [= Fuzhou], 17.vii.1936, MZLU2013 267 (1 spec. MZLU); Kwangtseh [= Guangze], 15.vii.1937, leg. J. Klapperich, MZLU2013 266 (1 spec. MZLU). **SICHUAN PROV.:** Tseo Jis Geo, Sof Suifu, 1929, MZLU2013 268 (1 spec. MZLU). **LAOS: HOUA PHAN PROV.:** Phou Pane Mt., 20°13’09–19°N 103°59’54” – 104°00’03”E, 1480–1510 m, 22.iv.-14.v.2008, leg. Vít. Kubáň, (1 spec. NMPC).

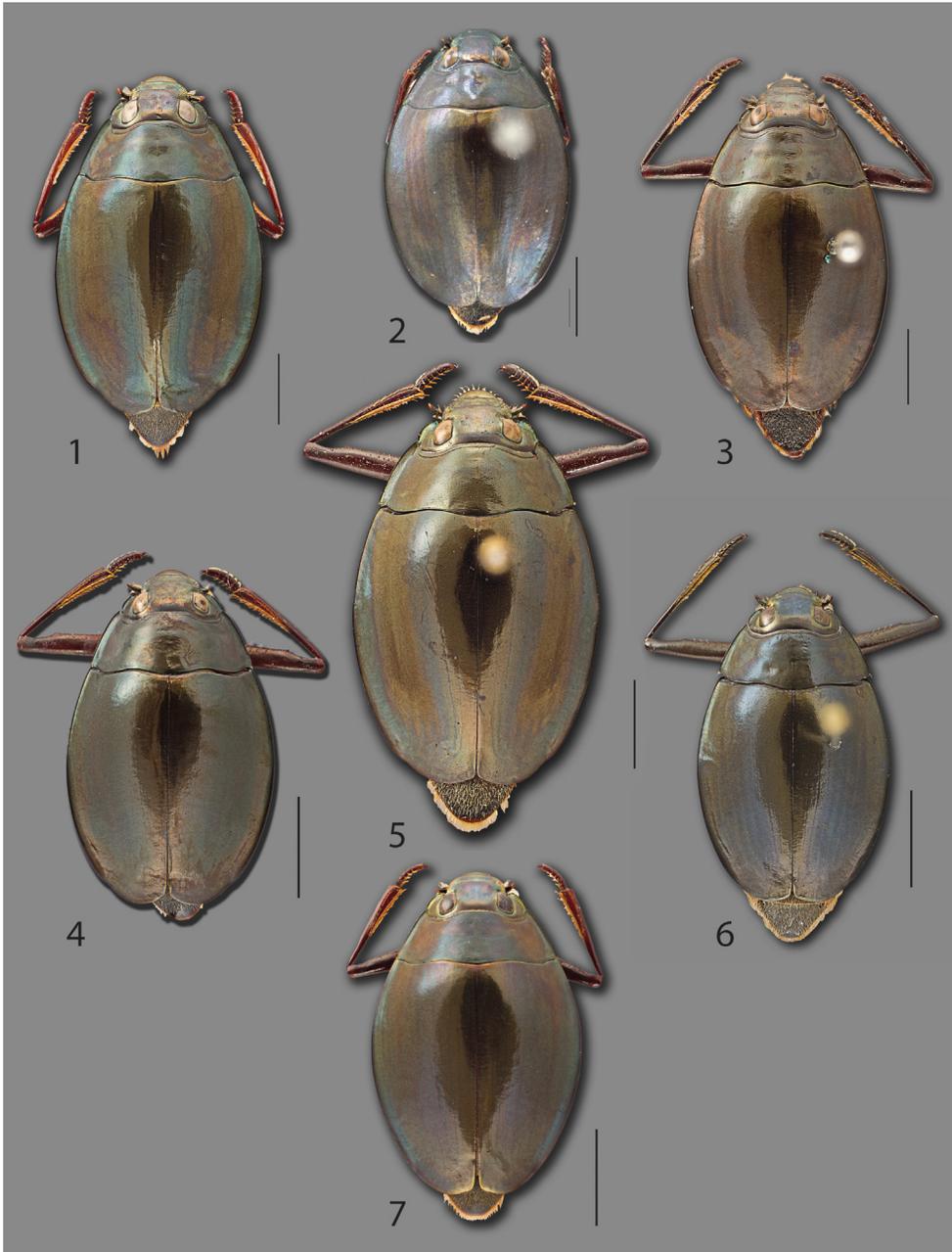
Dineutus politus W. S. Macleay, 1825: **INDONESIA: JAVA:** leg. Muller (2 spec. RMNH). **CENTRAL JAVA:** 1889, leg. Th. Lucassen (2 spec. RMNH). **EAST JAVA:** leg. M.G. Piepers (1 spec. RMNH); Pujon, Coban Rondo Waterfall, 3.x.2008, leg. Suputa (5 spec. UMCE). **WEST JAVA:** Bandung, Lembang, 1200 m, 25.v., leg. V. Itours, (9 spec. RMNH); Gunung Salak, Cigamea, 19.x.2009, leg. Balke & Amran, JVA002 (17 spec. ZSMG); Preanger, [= Parahyangan], leg. P.F. Sijthoff (1 spec. RMNH); Tjibodas [= Cibodas] (4 spec. UMCE). **EAST NUSA TENGGARA:** Flores, Danau Ranamese betw. Ruteng and Mborong, 1200 m, 28.viii.1991, leg. Balke (5 spec. ZSMG); West Flores, F.A.F. Ferheyen (2 spec. RMNH).

Dineutus regimbarti Régimbart, 1882: **INDONESIA: EAST NUSA TENGGARA:** Timor, leg. Wallace, 67.56 (2 spec. RMNH); Timor, leg. Macklot (7 spec. RMNH); Timor central, leg. Dr. H. Tenkate (1 spec. RMNH); South Central Timor Regency, Mt. Mutis, 09°38.124’S 124°12.800’E, 1580 m, leg. Balke, creeks and streams, TIM04 (4 spec. ZSMG).

Taxonomy

Subgenus *Dineutus sensu stricto* W. S. Macleay, 1825

The *Dineutus* s. str. species share the following features: generally large (normally at least 14 mm in length, up to 20 mm); coloration dorsally olive greenish, ventrally dark reddish brown; elytra typically with a narrow region of effaced reticulation in scutellar and sutural regions, apices regularly rounded with at least some form of apicolateral situation; prothorchanters smooth and unmodified, without setae distally on ventral surface; profemora of male with two sub-apicoventral teeth; female ultimate protarsomere posteriorly with setose furrow;



Figs 1–7 dorsal habitus of *Dineutus* s. str. species. 1 – *D. politus* W. S. Macleay, 1825; 2 – *D. mellyi* Régimbart, 1882; 3 – *D. browni* Mouchamps, 1949; 4 – *D. barong* sp. nov.; 5 – *D. regimbarti* Régimbart, 1882; 6 – *D. sitesi* sp. nov.; 7 – *D. fulgidus* Régimbart, 1880. Scale bars = 5 mm.

male mesotarsal claws similar among species, ventral margin strongly curved, narrowed in apical third.

Species of the subgenus exhibits very little sexual dimorphism (unlike the North American species assigned to subgenus *Cyclinus* Kirby, 1837, or some African species of the subgenus *Protodineutus* Ochs, 1926 (BRINCK 1955, GUSTAFSON & MILLER 2015)). The only known sexual dimorphism, in addition to obligate enlarged male protarsomeres with adhesive setae, is general size with males larger than females and often with the elytra slightly laterally expanded near midlength, giving them a somewhat more attenuated appearance anteriorly. There is no conspicuous sexual dimorphism in the shape of the elytral apices.

The species are found from southwestern China, through most of eastern China south of Beijing to Taiwan and the Ryukyu Islands, south through southeast Asia and the lesser Sunda Islands as far east as Timor.

Dineutus barong sp. nov.

(Figs 4, 11, 20, 23–24, 26–27)

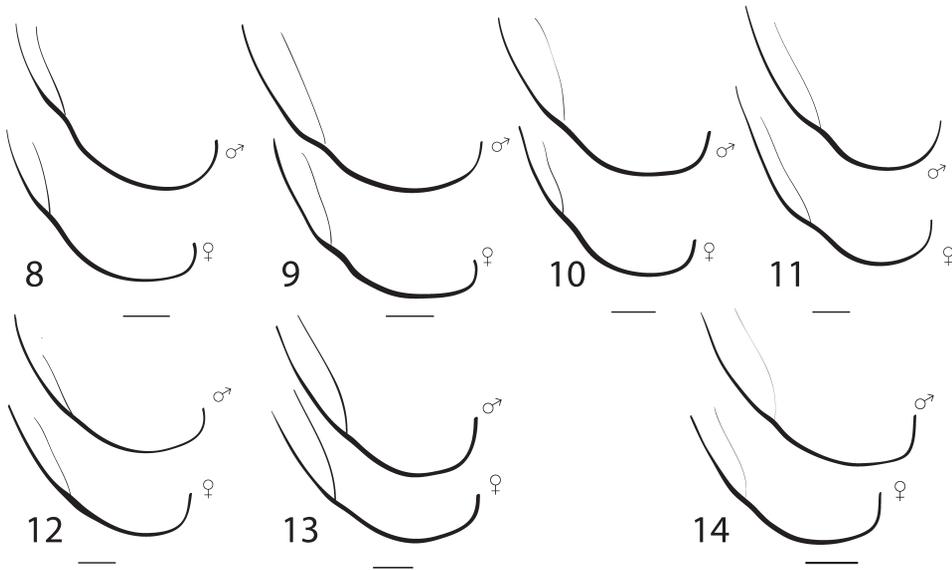
Type material. HOLOTYPE: ♂ (card mounted; aedeagus in microvial), 'INDONESIA. BALI / Bedugul Distr., 1200 m / Tamblingan lakes / Local collectors, vii 2004' [white label, typed, black ink] // 'HOLOTYPE / *Dineutus barong* sp. nov. / Gustafson, Hájek & Miller, 2015' [red label, typed, black ink] (deposited in NMPC). PARATYPES (27 specimens): **INDONESIA: BALI:** same label data as holotype (9 spec. NMPC, 1 spec. MSBA); 'INDONESIA, BALI: Buleleng Distr. / Munduk - Air Terjun Melanting / stream + hygropetric below waterfall / 08°15.5'S, 115°04.2'E; 940 m / 21.ii.2015' [white label, typed, black ink] (13 spec. NMPC); 'Indonesia: Bali, Telaga forest, / BLI007' [white label, typed, black ink] (2 spec. ZSMG); 'Indonesia/Bali / BA 8 / 3km NE of Candi Kuning / Waldbach, 1320 m, 11.7.1991 / leg: Balke & Hendrich' [white label, typed, black ink] (1 spec. LHCM); Indonesia / Bali / 5 km nördl. Bedugul / 27.&28.8.1990, 1300m/BA 4&5 / leg: Balke & Hendrich [white label, typed, black ink] (1 spec. LHCM); 'INDONESIA, BALI: Buleleng Distr. / ca. 9 km SW Singaraja / 8°11'34.3"S, 115°03'59.2"E, 465 m / N. Suprayitno leg., 29.ix.2016' [white label, typed, black ink] (26 spec. MZBC, NMPC, NSUB, ZSMG). All paratypes provided with additional label 'PARATYPE / *Dineutus barong* sp. nov. / Gustafson, Hájek & Miller, 2015' [red label, typed, black ink].

Diagnosis. Body form (Fig. 4) elongate oval, males laterally slightly expanded just posterior to midlength, in lateral view dorsoventrally strongly convex, greatest convexity just posterior to scutellar region; antenna with six antennomeres; elytral apices with apicolateral situation present (Fig. 11), apex broadly rounded, preapical sericeous patch of reticulation absent, lateral marginal depression narrow; male protarsus (Fig. 23) narrow. Aedeagus (Fig. 20): median lobe parallel sided for 3/4 its length, strongly acuminate in apical fourth with rounded lateral margins, apex with tip narrowly rounded, in lateral view apex slightly constricted, weakly dorsally curved. Female reproductive tract (Fig. 24): spermatheca relatively elongate and broad, gonocoxae with lateral margins appreciably straight, apex nearly obliquely truncate.

Description of male holotype. *Habitus.* Larger member of genus; body form elongate oval, weakly attenuated anteriorly, widest point just posterior to midlength of elytra (Fig. 4); in lateral view greatest convexity just posterior to scutellar region, strongly convex relative to other species in *Dineutus* s. str.

Coloration. Dorsally head, pronotum, elytra olive-green, venter reddish brown, elytral epipleuron, middle- and posterior legs, and abdomen lighter.

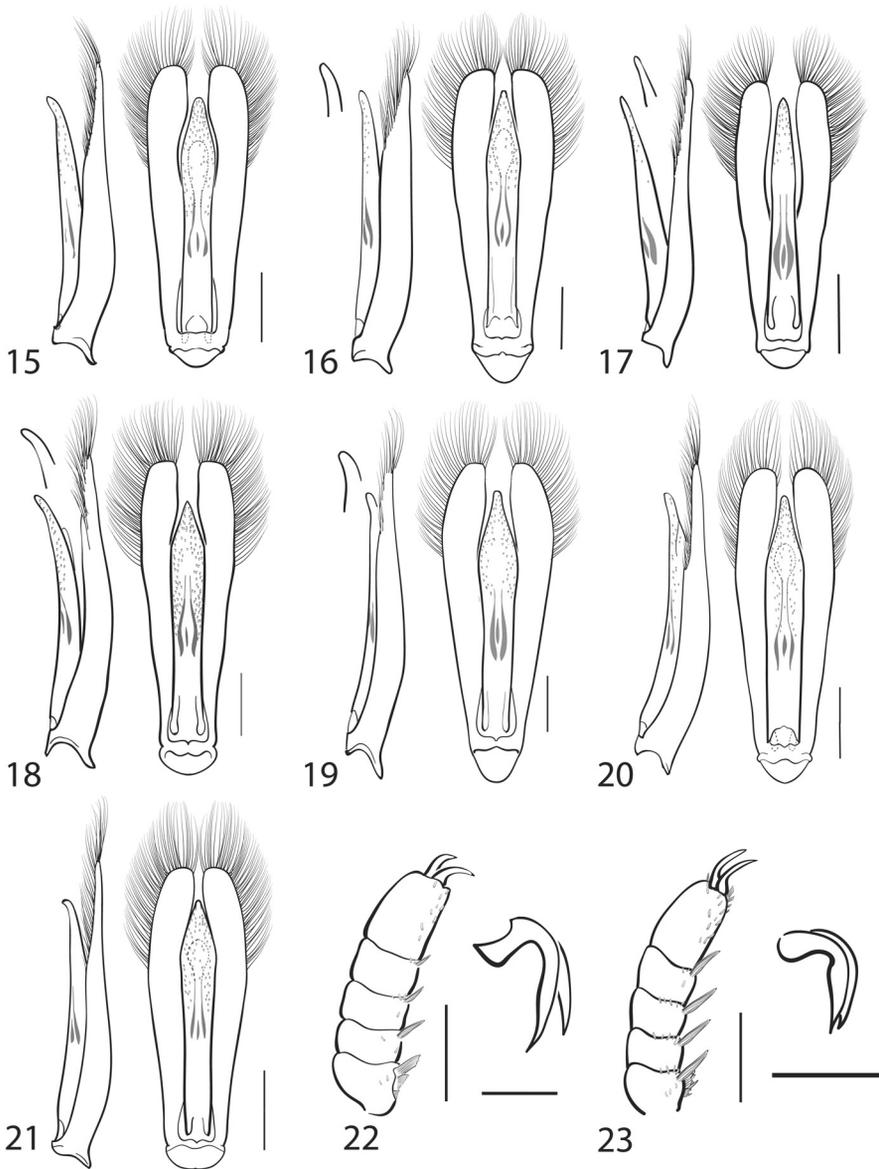
Head. Dorsally, vertex with reticulation mostly effaced; frons with reticulation composed of very small ovoid sculpticells, with sparse and shallow punctation, almost imperceptible medi-



Figs 8–14 elytral apex of *Dineutus* s. str. species. 8 – *D. brownei* Mouchamps, 1949; 9 – *D. regimbarti* Régimbart, 1882; 10 – *D. politus* W. S. Macleay, 1825; 11 – *D. barong* sp. nov.; 12 – *D. mellyi* Régimbart, 1882; 13 – *D. fulgidus* Régimbart, 1880; 14 – *D. sitesi* sp. nov. Scale bars = 1 mm.

ally – mostly effaced by uniform reticulation, laterally punctation more impressed, separated by ca. 4–5× diameter of a puncture, some shallow wrinkles present paramedially, apicolateral corners of frons wrinkled, frontoclypeal suture with posterior margin weakly arched, lateral margins obtusely angled, almost arcuate; clypeus shallowly emarginate anteriorly, nearly truncate in dorsal view, with faint wrinkles laterally, strong reticulation composed of round sculpticells, effaced at extreme anterior margins, with sparse punctation, punctures appear shallow in reticulation – more impressed at anterior margin where reticulation imperceptible; labrum with dense punctation marginally, punctures well-impressed, separated by ca. 1.0–1.5× diameter of a puncture, punctation absent basomedially in small circular area, replaced by faint reticulation, composed of elongate ovoid sculpticells; ultimate palpomere of labial palps with asymmetrical anterior and posterior margins, anterior margin weakly curved, nearly straight, posterior margin evenly curved towards broadly rounded apex.

Thorax. Pronotum with strong regular reticulation laterally, composed of round sculpticells, these slightly larger and more regularly rounded laterally, medially reticulation much less impressed, composed of smaller, round sculpticells; punctation evenly distributed, punctures shallowly impressed, nearly imperceptible laterally except upon close examination, medially punctures separated by ca. 4–5× diameter of a puncture; pronotal transverse line well-impressed and nearly complete, medially weakened and irregular, but still



Figs 15–23. 15–21 lateral and dorsal view of the aedeagus of *Dineutus* s. str. species. 15 – *D. fulgidus* Régimbart, 1880; 16 – *D. regimbarti* Régimbart, 1882; 17 – *D. mellyi* Régimbart, 1882; 18 – *D. brownei* Mouchamps, 1949; 19 – *D. politus* W. S. Macleay, 1825; 20 – *D. barong* sp. nov.; 21 – *D. sitesi* sp. nov. Scale bars = 1 mm. 22–23 male protarsus and mesotarsal claw: 22 – *D. sitesi* sp. nov.; 23 – *D. barong* sp. nov. Scale bars of protarsus = 1 mm, mesotarsal claw scale bars = 0.5 mm.

traceable; lateral marginal depression of pronotum narrow, widest anteriorly, attenuated posteriorly; posterior margin of pronotum fairly strongly sinuate. Profemora with two sub-apicoventral teeth, one on anteroventral margin, one on posteroventral margin; teeth relatively small and similar in size; protibial distolateral margin broadly rounded, indistinct; protarsus relatively narrow, with lateral margins weakly rounded, ultimate protarsomere slightly less than $2\times$ longer than wide; protarsomeres on ventral side with numerous thin adhesive setae terminated with round sucker cups; mesotarsal claws with anterior claw narrow, sharply curved, with ventral margin nearly straight, weakly narrowing in apical third (Fig. 23). Elytra completely cover scutellar shield, lateral marginal depression narrow in basal third, interrupted by swelling created by ventral depression where fore legs received, then broadened to nearly twice width in apical $2/3$; sericeous preapical patch of reticulation completely absent; punctation present, nearly imperceptible laterally due to strong reticulation, double punctation evident in scutellar area, where reticulation barely perceptible: dense micropunctures between sculpticells ca. $1/3\times$ size of larger punctures, and larger punctures of approximately size of sculpticells separated by ca. $3\text{--}4\times$ diameter of a puncture; reticulation composed of round sculpticells; all elytral striae faintly evident; apicolateral situation present; elytral apices narrowly rounded.

Genitalia. Aedeagus (Fig. 20) with median lobe shorter than parameres, parallel sided for $3/4$ its length, strongly acuminate in apical fourth with rounded lateral margins, apex with tip narrowly rounded; in lateral view tip of median lobe slightly constricted, weakly dorsally curved, dorsally apical half with short spine-like setae; parameres weakly laterally expanded in apical third, apex flatly rounded.

Variability. *Sexual dimorphism.* Male broader and more attenuated anteriorly, female much more regularly oval in body form. Female protarsomeres not expanded, on ventral side without adhesive setae; female profemora without sub-apicoventral teeth. Female reproductive tract (Fig. 24) with lateral margins of gonocoxae weakly expanded, apex somewhat obliquely truncate; laterotergites apically weakly laterally expanded, spermatheca relatively elongate and curved to left after fertilization duct.

Measurements. Male: length = 15.5–20.0 mm (holotype = 17.0 mm), width = 9.5–12.0 mm (holotype = 10.5 mm). Female: length = 15.5–18.0 mm width = 9.5–11.0 mm.

Differential diagnosis. *Dineutus barong* sp. nov. is most similar to *D. politus* in having the elytra with an apicolateral situation (cf. Figs 10 and 11) and absence of a preapical sericeous reticulation patch. However, it can be distinguished from that species by the much more regularly elongate oval body form (cf. Figs 1 and 4) and increased dorsoventral convexity. The aedeagus will unambiguously separate the two species, as *D. barong* sp. nov. has a longer and more acuminate apex of the median lobe (cf. Figs 19–20).

Collection circumstances. The specimens from Tamblingan were collected in the inflow of a temporary stream to the lake; in Munduk, the specimens were observed in a partly shaded stream, ca. 2 m wide, below the waterfall (Figs 26–27).

Etymology. This species is named after Barong, the benevolent Balinese lion-like king of the spirits; it is a noun in the nominative case, standing in apposition.

Distribution. This new species is currently only known from a mountainous area in northern Bali.

***Dineutus sitesi* sp. nov.**

(Figs 6, 14, 21, 22, 25)

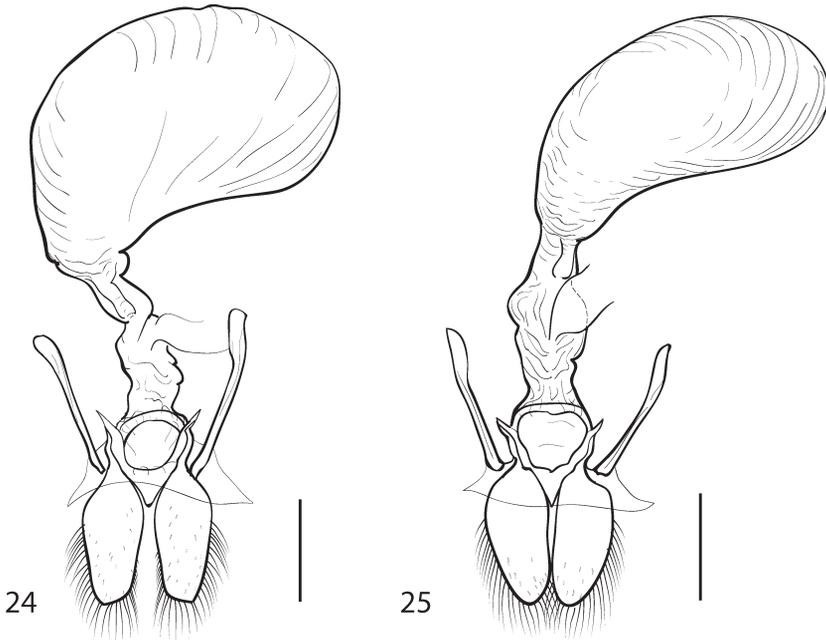
Type material. HOLOTYPE: ♂ (pinned, with aedeagus in microvial), 'THAILAND: Phitsanulok Prov. / Phu Hin Rongkla Natl. Park. / 16°59'N 101°00'E 1280m / 15Nov.2002. CMU Team / Waterwheel Falls' [white label, typed, black ink] // 'HOLOTYPE / *Dineutus sitesi* sp. nov. / Gustafson, Hájek & Miller, 2015' [red label, typed, black ink] (deposited at the MSBA). PARATYPES (15 specimens): **THAILAND: PHITSANULOK:** same label data as holotype (5 spec. UMCE); same as previous except: '6.v.2003. colls: Vitheepradit, / Prommi, Ferro. Water surface. / L-285' [white label, typed, black ink] (2 spec. USNM); same as previous except: '21April2002. / Kick pool. coll.N.Changthong' [white label, typed, black ink] (1 spec. NSMT); same as previous except '10.III.2002. colls: Sites, AV, / Kirawanich' [white label, typed, black ink] (1 spec. UMCE); 'THAILAND: Phitsanulok Prov. / Phu Hin Rongkla Natl. Park. / Namtok Huai Khamuen Noi. / Pool 16°59'N 101°60'E 1220m / 22May2002. CMU Team' [white label, typed, black ink] (1 spec. UMCE); same as previous except: '15July2002' [white label, typed, black ink] (2 spec. USNM, 1 spec. MSBA, 1 spec. NMPC); same as previous except '10April2003' (1 spec. NSMT). All paratypes provided with additional label 'PARATYPE/ *Dineutus sitesi* sp. nov. / Gustafson, Hájek & Miller, 2015' [red label, typed, black ink].

Diagnosis. Body form (Fig. 6) evenly elongate oval, males laterally slightly expanded just posterior to midlength, in lateral view dorsoventrally evenly convex; antenna with six antennomeres; elytral apices without significant apicolateral sinuation present (Fig. 14), apex broadly rounded, preapical sericeous patch of reticulation absent, lateral marginal depression relatively broad; male protarsus (Fig. 22) relatively broad. Aedeagus (Fig. 21): median lobe parallel sided for 3/4 its length, narrowed in apical fourth with straight lateral margins, apex triangular, tip with distinct constriction, in lateral view apex strongly dorsally curved. Female reproductive tract (Fig. 25): spermatheca relatively short and broad, gonocoxae slightly laterally expanded, apex broadly rounded.

Description of male holotype. *Habitus.* Larger member of genus; body form elongate oval, attenuated anteriorly, widest point just posterior to midlength of elytra; in lateral view greatest convexity just posterior to scutellar region, evenly convex relative to other *Dineutus* s. str. species.

Coloration. Head dorsally, pronotum, and elytra bronzy-olive-green, elytra and pronotum uniformly bronzed in appearance, elytra without sericeous patch preapically, venter reddish brown with elytral epipleuron, middle- and posterior legs, and abdomen lighter.

Head. Dorsally, vertex with reticulation composed of round to ovoid sculpticells; frons with reticulation composed of ovoid sculpticells, punctation sparse and shallow, almost imperceptible, mostly effaced by uniform reticulation, some shallow wrinkles present medially, apicolateral corners of frons wrinkled, frontoclypeal suture with posterior margin straight, lateral margins obtusely angled, almost arcuate; clypeus shallowly emarginate anteriorly, appearing truncate in dorsal view, with faint wrinkles laterally, strong reticulation composed of round sculpticells, effaced at extreme anterior margins, punctation sparse, punctures appear shallow in reticulation but more impressed at anterior margin where reticulation imperceptible; labrum with regular punctation marginally, extending posteriad to basomedial half, punctures well impressed, reticulation present basomedially, composed of elongate ovoid sculpticells, faintly impressed; labial palps with ultimate palpomere with asymmetrical anterior and posterior margins, anterior margin weakly curved, nearly straight, posterior margin evenly curved towards apex, apex broadly rounded.



Figs 24–25. Female reproductive tract of new *Dineutus* s. str. species. 24 – *D. barong* sp. nov.; 25 – *D. sitesi* sp. nov. Scale bars = 1 mm.

Thorax. Pronotum with medial narrow darkly pigmented strip on disc, running nearly length of pronotum, strong regular reticulation over entirety of pronotum composed of round sculpticells, these slightly larger and more regularly rounded laterally, punctation regular, punctures shallowly impressed, nearly imperceptible except upon close examination; pronotal transverse impressed line well impressed and nearly complete, medially weakened and irregular, but still traceable, lateral marginal depression of pronotum narrow with shallow and short wrinkles present, especially in anterolateral corners, posterior margin of pronotum fairly strongly sinuate. Profemora with two sub-apicoventral teeth, one on anteroventral margin, one on posteroventral margin, teeth relatively small and similar in size; protibial distolateral margin broadly rounded, indistinct; protarsus relatively broad, with lateral margins flatly rounded, ultimate protarsomere slightly less than $2\times$ longer than wide; mesotarsal claws with anterior claw narrow, sharply curved, with ventral margin nearly straight, weakly narrowing in apical third. Elytra completely cover scutellar shield, lateral marginal depression weakly evident, narrow in basal third, interrupted by swelling created by ventral depression where forelegs are received, then broadened to nearly twice width in apical $2/3$; sericeous preapical patch of reticulation completely absent; reticulation dense and regular throughout, composed of round sculpticells; all elytral striae faintly evident, apicolateral situation feebly present.



Figs 26–27. Habitat of *D. barong* sp. nov. 26 – Jan Šumpich in general habitat; 27 – *D. barong* sp. nov. in habitat, individuals demarcated by circles.

Genitalia. Aedeagus (Fig. 21) with median lobe just shorter than parameres, parallel sided for 3/4 its length, narrowed in apical fourth with straight lateral margins, apex triangular, with tip constricted; in lateral view tip of median lobe strongly dorsally curved; dorsally apical half with setigerous punctures; parameres laterally expanded in apical third, apex flatly rounded.

Variability. Apicolateral situation of elytra almost appearing absent in some individuals.

Sexual dimorphism. Male broader and more attenuated anteriorly, female much more regularly oval in body form. Female reproductive tract with lateral margins of gonocoxae weakly expanded, apex broadly rounded, laterotergites apically weakly laterally expanded, spermatheca smaller and rounder, not strongly elongate and curved to left after fertilization duct.

Measurements. Male: length = 15.0–17.0 mm (holotype = 17.0 mm), width = 10.0–11.0 mm (holotype = 10.5 mm). Female: length = 14.0–16.0 mm width = 9.0–10.0 mm.

Differential diagnosis. *Dineutus sitesi* sp. nov. is most similar to *D. fulgidus* in having the elytra with weak apicolateral situation (cf. Figs 13–14), absence of a preapical sericeous reticulation patch, and more brownish olive green coloration. However, it can be distinguished from that species by the much more regularly elongate oval body form (much more narrow in habitus) (cf. Figs 6–7), the broader protarsi (Fig. 22), and the form of the aedeagus (cf. Figs 15 and 21) and female reproductive tract. The aedeagus differs in having a more narrowly rounded tip and less acuminate apex of median lobe (Fig. 21), the female reproductive tract differs in having narrow gonocoxae that are less laterally expanded.

Etymology. This new species is named in honour of the aquatic hemipterist Robert Sites, leader of the CMU Team who collected most of the specimens of this new species and who, in collaboration with Akekawat Vitheepradit, is working on a project to make the aquatic insects of Thailand known. The name is a noun in the genitive case.

Distribution. This species is currently only known from Phu Hin Rongkla National Park, Phitsanulok Province, Thailand; an area that appears to exhibit high levels of endemism for aquatic insects (SITES & POLHEMUS 2001, VITHEEPRADIT & SITES 2007). It may be that this new species is only found within this region.

Key to the species of the *Dineutus* sensu stricto

Dineutus collarti Mouchamps, 1949 was originally described from specimens purported to be from northern Vietnam. In the original description MOUCHAMPS (1949) acknowledged that his species is nearly identical to *D. regimbarti*, but given their broadly separated localities, described the specimens as a new species. This species is very likely *D. regimbarti* but with specimens incorrectly localized. For this reason we have not included *D. collarti* in the key and suspend formal synonymization until examination of more *D. regimbarti* material.

- 1 Apicolateral sinuation of elytral apex distinct (Figs 8–11), apex in most species produced due to strong sinuation. 2
- Apicolateral sinuation of elytral apex very weak to imperceptible (Figs 12–14), apex not produced. 5
- 2 Species very robust in appearance, broadly oval with widest point just posterior of middle (Fig. 5); dorsoventrally very strongly convex especially in scutellar region; elytra with distinct preapical sericeous reticulation patch, elytral apices broadly rounded. Known from Lesser Sunda Islands Sumba and Timor. *D. regimbarti* Régimbart, 1882
- Species less robust in overall appearance, more elongate oval; elytra with or without preapical sericeous reticulation patch. 3
- 3 Habitus more elongate (Fig. 3). Elytra with distinct preapical sericeous reticulation patch, reticulation strongly impressed, sculpticells usually slightly transverse; pronotum with much less distinct lateral marginal depression. Apex of median lobe of aedeagus triangular, strongly pointed (Fig. 18). Species only known from Sulawesi.
- Habitus more oblong (Figs 1, 4). Elytra without distinct preapical sericeous reticulation patch, reticulation moderately impressed, sculpticells usually round; pronotum with well-developed lateral marginal depression. Apex of median lobe of aedeagus narrowly rounded (Figs 19–20). Species not known from Sulawesi. 4
- 4 Body form more attenuated anteriorly, especially in males (Fig. 1); in lateral view somewhat depressed, dorsoventrally not strongly convex; elytral apices broadly rounded with weaker apicolateral sinuation (Fig. 10). Apex of median lobe of aedeagus less acuminate (Fig. 19). Widely distributed species in Sunda Islands.
- Body form more evenly oval, broader in appearance (Fig. 4); in lateral view dorsoventrally much more convex, especially in scutellar region; elytral apices narrowly rounded with stronger apicolateral sinuation (Fig. 11). Apex of median lobe of aedeagus more acuminate (Fig. 20). Species known only from Bali. *D. barong* sp. nov.

- 5 Habitus elongate oval, dorsoventrally flat. Body coloration green bronzy. Small species, body length 13.2 mm, known from single female from Sumatra [not studied].
 *D. puellaris* Mouchamps, 1949
- Habitus oblong, dorsoventrally convex. Body coloration olivaceous or blackish with bronzy lustre. 6
- 6 Habitus more regularly rounded (Fig. 2); elytra with indistinct preapical sericeous reticulation patch; elytral apices almost without apicolateral sinuation (Fig. 12). Median lobe of aedeagus narrow, regularly attenuated to broadly pointed apex (Fig. 17). Species known from China, Laos, Vietnam and Japan. *D. mellyi* Régimbart, 1882
- Habitus rhomboid, distinctly attenuated anteriorly and posteriorly (Figs 6, 7); elytra without preapical sericeous reticulation patch; elytral apices with feeble apicolateral sinuation (Figs 13, 14). Species known from Thailand and Sumatra. 7
- 7 Elytra distinctly expanded laterally just anterior to middle, giving dorsal habitus broadly rhomboid appearance (Fig. 7); in lateral view dorsoventrally relatively more depressed, strongest convexity in scutellar region, strongly depressed posteriorly, creating strong slope. Apex of median lobe of aedeagus broadly rounded (Fig. 15). Species known from Sumatra. *D. fulgidus* Régimbart, 1880
- Elytra not expanded laterally, much more regularly oval in dorsal habitus (Fig. 6); in lateral view dorsoventrally fairly strongly convex, convexity evenly distributed anteriorly and posteriorly. Apex of median lobe of aedeagus narrowly rounded (Fig. 21). Species known only from northern Thailand. *D. sitesi* sp. nov.

Species incorrectly placed in the *Dineutus* sensu stricto

Dineutus lethicus Guignot, 1957: 101

This species was described from Réunion Island and placed within *Dineutus* s. str. by GUIGNOT (1957). By this point in time, however, BRINCK (1955) had presented a diagnosis for members of the subgenus *Protodineutus* Ochs, 1926 as species with females without the setose furrow on the posterior surface of the ultimate protarsomere and distribution primarily in Africa. Therefore, the African distribution of *D. lethicus* suggests the species may belong to *Protodineutus*. The first author was able to examine the holotype and paratypes of *D. lethicus* (MNHN) and found that not only is it member of *Protodineutus*, but it is also identical with *D. indus* (Fabricius, 1798). The population from Réunion was described by RÉGIMBART (1882a) as separate subspecies *D. indus olivaceus* Régimbart, 1882. Although its status was subsequently doubted by some authors, e.g. PESCHET (1917), we follow the only revisional work of BRINCK (1955) and consider the subspecies as valid. Therefore, *Dineutus lethicus* Guignot, 1950 syn. nov. is here formally synonymized with *D. indus olivaceus* Régimbart, 1882. It appears that Guignot (1950) was unaware of *D. indus*, a widespread endemic to the Mascarenes, since he only compared his new species to *D. proximus* Aubé, 1838, present only on Madagascar, and none of the species known from the Mascarenes.

Checklist of the *Dineutus* sensu stricto

<i>Dineutus barong</i> sp. nov.	Bali
<i>Dineutus brownei</i> Mouchamps, 1949	Sulawesi
<i>Dineutus collarti</i> Mouchamps, 1949	?Vietnam
<i>Dineutus fulgidus</i> Régimbart, 1880	Sumatra
<i>Dineutus mellyi annamensis</i> Mouchamps, 1949	southern Laos and Vietnam
<i>Dineutus mellyi mellyi</i> Régimbart, 1882a = <i>Dineutes sauteri</i> Uyttenboogaart, 1915	China (incl. Taiwan), northern Laos
<i>Dineutus mellyi insularis</i> Régimbart, 1907	Ryukyu Islands (Japan)
<i>Dineutus politus</i> W. S. Macleay, 1825 = <i>Gyrinus kollmanni</i> Perty, 1831 = <i>Dineutes caliginosus</i> Régimbart, 1882a = <i>Dineutes hypomelas</i> Régimbart, 1882a	Sumatra, Java, Flores ¹
<i>Dineutus puellaris</i> Mouchamps, 1949	Sumatra
<i>Dineutus regimbarti regimbarti</i> Régimbart, 1882b	Timor
<i>Dineutus regimbarti sumbaensis</i> Ochs, 1953	Sumba
<i>Dineutus sitesi</i> sp. nov.	Thailand

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References

- ALLEN R. T. & BALL G. E. 1979: Synopsis of Mexican taxa of the *Loxandrus* series (Coleoptera: Carabidae : Pterostichini). *Transactions of the American Entomological Society* **105**: 481–575.
- AUBÉ C. 1838: *Species général des hydrocanthares et gyriniens; pour faire suite au species général des coléoptères de la collection de M. le Comte Dejean*. Méquignon Père et Fils, Paris, xvi + 804 pp.
- BRINCK P. 1955: A revision of the Gyrinidae (Coleoptera) of the Ethiopian region. I. *Lunds Universitets Årsskrift (Ny Följd) (Avd. 2)* **51(16)** / *Kungliga Fysiografiska Sällskapets Handlingar (Ny Följd)* **66(16)**: 1–141.
- BRINCK P. 1984: Evolutionary trends and specific differentiation in *Merodineutus* (Coleoptera: Gyrinidae). *International Journal of Entomology* **26**: 175–189.
- FABRICIUS J. C. 1798: *Supplementum Entomologiae Systematicae*. Apud Proft and Storch, Hafniae, 572 pp.

¹ The previously published distribution in Ambon Island (the Moluccas) [*D. hypomelas*] and Australia [*D. caliginosus*] is considered to be based on erroneously localized specimens, see OCHS (1926: 192) and MOUCHAMPS (1949: 674).

- GUIGNOT F. 1950: Sur la systématique des Dineutus (Col. Gyrinidae). *Bulletin Mensuel de la Société Linnéenne de Lyon* **19**: 124–127.
- GUIGNOT F. 1957: Dytiscides et Gyrinides de l'île de la Réunion. *Mémoires de l'Institut Scientifique de Madagascar, Série E* **5**: 97–101.
- GUSTAFSON G. T. & MILLER K. B. 2013: On the family- and genus-series nomina in Gyrinidae Latreille, 1810 (Coleoptera, Adephaga). *Zootaxa* **3731**: 77–105.
- GUSTAFSON G. T. & MILLER K. B. 2015: The New World whirligig beetles of the genus *Dineutus* Macleay, 1825 (Coleoptera, Gyrinidae, Gyrininae, Dineutini). *ZooKeys* **476**: 1–135.
- GUSTAFSON G. T. & SITES R. W. 2016: A North American biodiversity hotspot gets richer: A new species of whirligig beetle (Coleoptera: Gyrinidae) from the Southeastern Coastal Plain of the United States. *Annals of the Entomological Society of American* **109**: 42–48.
- HATCH M. H. 1926: The phylogeny and phylogenetic tendencies of Gyrinidae. *Papers of the Michigan Academy of Science, Arts and Letters* **5** (1925): 429–467.
- MACLEAY W. S. 1825: *Annulosa javanica, or an attempt to illustrate the natural affinities and analogies of the insects collected in Java by Thomas Horsfield and deposited by him in the Museum of the Honourable East-India Company*. Kingsbury, Parbury and Allen, London, xii + 150 pp.
- MILLER K. B. 2001: Descriptions of new species of *Desmopachria* Babington (Coleoptera: Dytiscidae: Hydroporinae: Hyphdrini) with a reassessment of the subgenera and species groups and a synopsis of the species. *Coleopterists Bulletin* **55**: 219–240.
- MILLER K. B. & BERGSTEN J. 2012: Phylogeny and classification of whirligig beetles (Coleoptera: Gyrinidae): relaxed-clock model outperforms parsimony and time-free Bayesian analyses. *Systematic Entomology* **37**: 705–746.
- MOUCHAMPS R. 1949: Notes sur quelques *Dineutus* M.L. (coléoptères gyrinides) intéressants du British Museum (Londres). *Annals and Magazine of Natural History, Twelfth Series* **2**: 660–679.
- OCHS G. 1926: Die Dineutini. 2. Tribus der Unterfamilien Enhydrinae Fam. Gyrinidae (Col). A. Allgemeiner Teil. *Entomologische Zeitschrift* **40**: 61–74, 112–126, 129–140, 190–197.
- OCHS G. 1955: Die Gyriniden-Fauna von Neuguinea nach dem derzeitigen Stand unserer Kenntnisse (Coleoptera, Gyrinidae). *Nova Guinea* **6**: 87–154.
- OYGUR S. & WOLFE G. W. 1991: Classification, distribution, and phylogeny of North American (North of Mexico) species of *Gyrinus* Müller (Coleoptera: Gyrinidae). *Bulletin of the American Museum of Natural History* **207**: 1–97.
- PESCHET R. 1917: Coléoptères des Îles Mascareignes et Séchelles. Missions scientifiques de MM. Ch. Alluaud (1892, 1893 et 1897) et P. Carié (1910–1913). *Annales de la Société Entomologique de France* **86**: 1–56.
- RÉGIMBART M. 1882–1883a: Essai monographique de la famille des Gyrinidae. 1^{re} partie. *Annales de la Société Entomologique de France, 6^e Série* **2**: 379–458 + pls 10–12 [pp. 379–400 published in 1882, pp. 401–458 in 1883].
- RÉGIMBART M. 1882b: Note IV. New species of Gyrinidae in the Leyden Museum. *Notes from the Leyden Museum* **4**: 59–71.
- RÉGIMBART M. 1886: Essai monographique de la famille des Gyrinidae. 1^{er} Supplément. *Annales de la Société Entomologique de France, 6^e Série* **6**: 247–272 + pl. 4.
- RÉGIMBART M. 1892: Essai monographique de la famille des Gyrinidae. 2^e Supplément. *Annales de la Société Entomologique de France* **60**: 663–752 + pls 18–19.
- RÉGIMBART M. 1907: Essai monographique de la famille des Gyrinidae. 3^e Supplément. *Annales de la Société Entomologique de France* **76**: 137–245.
- SITES R. W. & POLHEMUS J. T. 2001: A new species of *Telmatotrepes* (Heteroptera: Nepidae) from Thailand, with distributional notes on congeners. *Aquatic Insects* **23**: 333–340.
- VITHEEPRADIT A. & SITES R. W. 2007: A review of *Eotrechus* Kirkaldy (Hemiptera: Heteroptera: Gerridae) of Thailand with descriptions of three new species. *Zootaxa* **1478**: 1–19.

