

DYTISCIDAE: Hydroporini (Coleoptera)

L. HENDRICH, M. BALKE & G. WEWALKA

Abstract

The Hydroporini (Coleoptera: Dytiscidae: Hydroporinae) of New Caledonia are revised. Two new species, *Megaporus feryi* sp.n. and *Necterosoma schoelleri* sp.n. are described. New faunistic records are published for *Necterosoma novaecaledoniae* BALFOUR-BROWNE, 1939, which had not been collected over a period of 80 years. All three species of New Caledonian Hydroporini are endemic to Grande Terre, being known from few localities only. All species were collected from small streams or permanent pools of intermittent creeks, usually shaded by rainforest.

Key words: Coleoptera, Dytiscidae, Hydroporinae, Hydroporini, *Necterosoma*, *Megaporus*, new species, taxonomy, New Caledonia, Grande Terre, Australia, New Guinea, Fiji.

Introduction

The genus *Megaporus* BRINCK, 1943 [= replacement name for *Macroporus* SHARP, 1882] is predominantly Australian (WATTS 1985, 2002, LAWRENCE et al. 1987), but there has been one endemic species described from Fiji (ZIMMERMANN 1926) and one from southern Papua New Guinea (NILSSON 2001). The eight Australian species were revised by WATTS (1978) and the New Guinean one was treated by BALKE (1995). One larva, identified as “*Macroporus* sp.” [= *Megaporus*] by BERTRAND (1968), was collected in New Caledonia by the “Austrian New Caledonia Expedition” in 1965.

Necterosoma SHARP, 1882 is a typical Australian Hydroporini genus, with only one species occurring outside Australia, i.e. *Necterosoma novaecaledoniae* BALFOUR-BROWNE, 1939 described from Grande Terre, New Caledonia (NILSSON 2001).

The Australian species of the genus *Necterosoma* were revised by WATTS (1978), who provided a key for all the eight species then known. Later on, ZWICK (1979) synonymized one of these species, and described an additional species. Recently HENDRICH (2003) added *N. theonathani*, occurring in NW Australia. The genus is in need of a comprehensive taxonomic revision (HENDRICH & BALKE, in prep.).

Here, we describe one new species of *Megaporus* and one new species of *Necterosoma*, and we provide a key to the three New Caledonian species of Hydroporini, as well as habitat notes. All three species are restricted to Grande Terre. Hydroporini have not been collected on any other New Caledonian island so far.

Material and methods

The specimens examined are deposited in the following collections:

CGW	Collection Günther Wewalka, Vienna, Austria
CLH	Collection Lars Hendrich, München, Germany (property of NMW)
IAC	Institut Agronomique Néo-Calédonien, Pocquereux, New Caledonia; S. Cazères, C. Mille
NMP	Národní muzeum v Praze, Czech Republic; J. Hájek
NHML	The Natural History Museum, London, U.K. (formerly British Museum of Natural History); C. Taylor
NMW	Naturhistorisches Museum Wien, Vienna, Austria; M.A. Jäch
QMB	Queensland Museum, Brisbane, Australia; G. Monteith
SAMA	South Australian Museum, Adelaide, Australia; C.H.S. Watts
ZSM	Zoologische Staatssammlung, München, Germany; M. Balke

The drawings were made with the aid of a Leica MZ 12. The style of the descriptive notes of the new *Necterosoma* follows WATTS (1978), ZWICK (1979) and HENDRICH (2003). Type specimens were re-examined for all relevant species. The male genitalia were studied and figured in wet condition. The terminology to denote the orientation of the genitalia follows MILLER & NILSSON (2003).

Abbreviations: ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; QLD = Queensland; SA = South Australia; TAS = Tasmania; VIC = Victoria; WA = Western Australia.

The following additional species were studied:

Megaporus natvigi: 1 ♂, 1 ♀ (CLH): “Australia, New South Wales, 2 km N Batemans Bay, 18.IV.1997, C.H.S. Watts leg.”; 1 ♂ (ZSM): “490 DNA M Balke” [Green label indicating that the specimen with voucher number 490 was used for DNA extraction], “Australia, Queensland, Northern Stradbroke Island, X.2003, Balke & Monteith leg.”.

Megaporus fischeri: 3 exs. (CLH): “AUSTRALIA, WA, Shire of Wyndham - East Kimberley, Mitchell Plateau, Mitchell Falls Camping Area, 300 m, 14-15.VI.1999, Hendrich leg. (loc. 11/111)”; 2 exs. (CLH): “AUSTRALIA, WA Shire of Wyndham - East Kimberley, Mitchell Plateau, Little Mertens Falls, 300 m, 15.VI.1999, Hendrich leg. (loc. 11a/111a)”; 3 exs. (CLH): “AUSTRALIA, WA Shire of Wyndham - East Kimberley, Kalumburu Road, Meelarie Creek, 5 km N Drysdale Crossing, 350 m, 18.-19.VI.1999, Hendrich leg. (loc. 15/115)”.

Megaporus tristis: 1 ♀ (ZSM): “571 DNA M Balke” [Green label indicating the specimen with voucher number 571 was used for DNA extraction], “Fiji: Vanua Levu, 5 km S of Natua, 50 m, 15.XI.2003, Wewalka, Balke & Koto leg. (Fi 21)”.

List of Localities (Locs. 2001/NC: leg. Balke & Wewalka)

Loc. 2001/NC 16 (JÄCH & BALKE 2010: Figs. 13, 14, 17): Mt. Panié, 1350 m a.s.l., 8.–9.XI.2001. Slowly flowing stream close to alpinist hut, stream pools as well as dry but moist stream bed feeding into the pools, underneath of stones, in forest.

Loc. 2001/NC 19: Mt. Panié, 1400 m a.s.l., 9.XI.2001. Water hole in otherwise dry stream bed, in forest.

Loc. 2001/NC 33: Aoupinié, 15 km SW Ponérihouen, 500–700 m a.s.l., 14.XI.2001. Stream bed in montane forest, slope very steep and rocky; water almost stagnant but clear, small residual pools with leaves and root mats.

Loc. 2001/NC 47 (JÄCH & BALKE 2010: Fig. 21): 2 km west of Prony, Goro Nickel Plant, 180 m a.s.l., 19.XI.2001. Water filled doline (towards the middle > 5 m deep), water crystal clear, edge with red soil, reeds and macrophytes.

Key to New Caledonian Hydroporini

- 1 Protarsi pseudotetramerous, body length (5.7–6.0 mm), body form roundish, coloration black.
 *Megaporus feryi*
- Protarsi distinctly five-segmented, smaller (4.4–5.4 mm), body form more convex and stout, male protibia moderately thickened, in middle with a notch on inner edge 2
- 2 Elytra with four shallow carinae and a reddish spot of variable size antero-laterally. Epipleuron without a very small triangular expansion just before apex. Male protibia expanded with a large notch on inner edge near base. Body length 5.0–5.4 mm.
 *Necterosoma schoelleri*
- Elytra without carinae; coloration black. Epipleuron with a very small triangular expansion just before apex. Male protibia moderately thickened with a rather small but deep notch on inner edge in the middle. Body length 4.4–4.8 mm. *Necterosoma novaecaledoniae*

Genus *Megaporus* BRINCK, 1943

Medium sized (5.8–7.2 mm), oval, globular. Color reddish or black, sometimes with yellow and black color pattern on elytra. *Megaporus* is distinguished from all other Australian Hydroporini by distinctly pseudotetramerous (4th tarsomere very small and hardly visible) protarsi and by the metatibia with only serial punctures on the infero-external surface. Terminal portion of epipleuron rather broad. Metafemur stout, postero-external angle sharply defined. Hind claws equal in length. Eight species occur in Australia (WATTS 1985, 2002), one in New Guinea, one in Fiji, and one in New Caledonia.

World checklist of *Megaporus*

<i>Megaporus feryi</i> sp.n.	New Caledonia (Grande Terre)
<i>Megaporus fischeri</i> MOUCHAMPS, 1964	Australia: WA, NT, QLD
<i>Megaporus gardnerii</i> (CLARK, 1862)	Australia: SA, VIC, NSW
<i>Megaporus hamatus</i> (CLARK, 1862)	Australia: SA, VIC, NSW, QLD, TAS
<i>Megaporus howittii</i> (CLARK, 1862)	Australia: WA, SA, VIC, NSW, NT, QLD
<i>Megaporus navigi</i> MOUCHAMPS, 1964	Australia: NSW, QLD
<i>Megaporus piceatus</i> (RÉGIMBART, 1892)	Papua New Guinea
<i>Megaporus ruficeps</i> (SHARP, 1882)	Australia: WA, NT, QLD
<i>Megaporus solidus</i> (SHARP, 1882)	Australia: WA
<i>Megaporus tristis</i> (ZIMMERMANN, 1926)	Fiji
<i>Megaporus wilsoni</i> MOUCHAMPS, 1964	Australia: SA, VIC, NSW, TAS

Megaporus feryi sp.n.

? *Macroporus* sp.: BERTRAND 1968: 76.

? *Megaporus* sp.: BERTRAND 1972: 49, Fig. 31; STARMÜHLNER 1986: 477.

TYPE LOCALITY: New Caledonia, South Province, doline [water-filled sinkhole] 2 km W Prony [22°31'S/166°79'E], Inco Usine Pilote [Nickel plant].

TYPE MATERIAL: **Holotype** ♂ (NMW): “Nouvelle Calédonie Doline Inco Usine Pilote No. 75, C. Pöllabauer leg.”, “HOLOTYPE *Megaporus feryi* sp.n. Hendrich, Balke & Wewalka des. 2009” [red printed label].

Paratypes: 2 ♂♂, 3 ♀♀ (CLH, NMW): same data as holotype; 1 ♀ (NMP): “New Caledonia S.P. Plain des Lacs Chutes de la Madelaine [= Madeleine] S. Bily leg., 27.–30.3.1999”, “coll. Jiří Hájek, Prague Charles University”; 1 ♀ (ZSM): “New Caledonia, Prov. Sud, Mont Dore, Pond, Road CR7 1.8 km E of road CR9, lat. -22°18' long. 166°48'; 19.viii.2008 A. Gervais coll. #D2”; 1 ex. (ZSM): “New Caledonia: pond 10km W Yaté, 11.xii.2008, J. Damgaard leg.”.

104 exs. (CGW, CLH, IAC, NMW, ZSM): Loc. 2001/NC 47, 1 ♀ with additional “DNA MB694” [green label indicating the specimen with voucher number 694 was used for DNA extraction].

ADDITIONAL MATERIAL EXAMINED:

SOUTH PROVINCE: 2 exs. (IAC): Rivière Bleue Provincial Park, 7.–8.II.2006, leg. P. & M. Jolivet. These two specimens are teneral and strongly damaged (head and pronotum missing).

DESCRIPTION: Medium sized, elongate ovate and robust. Point of greatest width behind middle (Figs. 1, 21, 22). Pronotum and elytra shiny, coarsely and densely punctate.

Measurements: Males: Total length 5.7–6.0 mm (holotype 6.0 mm); length without head 5.1–5.5 mm (holotype 5.5 mm); greatest width 3.0–3.2 mm (holotype 3.2 mm).

Color (Figs. 21, 22): Black; anterior part of head, sides of pronotum, and appendages lighter; epipleuron, prosternum and legs mainly rufo-piceous; metatibiae and -tarsi dark rufo-piceous; palpi rufo-piceous; basal antennomeres (1–3) rufo-piceous, middle antennomeres darker, apical antennomeres (7–11) black.

Sculpture: Dorsal surface of elytra slightly microreticulate, shiny, coarsely and densely punctate; punctures on pronotum smaller but more densely microreticulate. Ventral surface shiny, without visible microreticulation, sparsely punctate. Metacoxal lines strongly raised, diverging in middle, parallel in anterior third. Middle of metaventricle flat, somewhat depressed, surrounded by a weak ridge along line running forward from metacoxal line.

Male: Median lobe of aedeagus simple, without conspicuous structures (Figs. 3–4). Parameres elongate, simple (Fig. 5). Pro- and mesotarsi moderately expanded, second segment about 1.5 × as wide as long; third slightly longer than wide. Protarsal claws unequal; anterior claw of protarsus much thicker than posterior one and strongly curved, only 2/3 length of posterior.

Female: Pro- and mesotarsus less expanded, second segment about as wide as long. Protarsal claws simple. Reticulation and punctuation as in male.

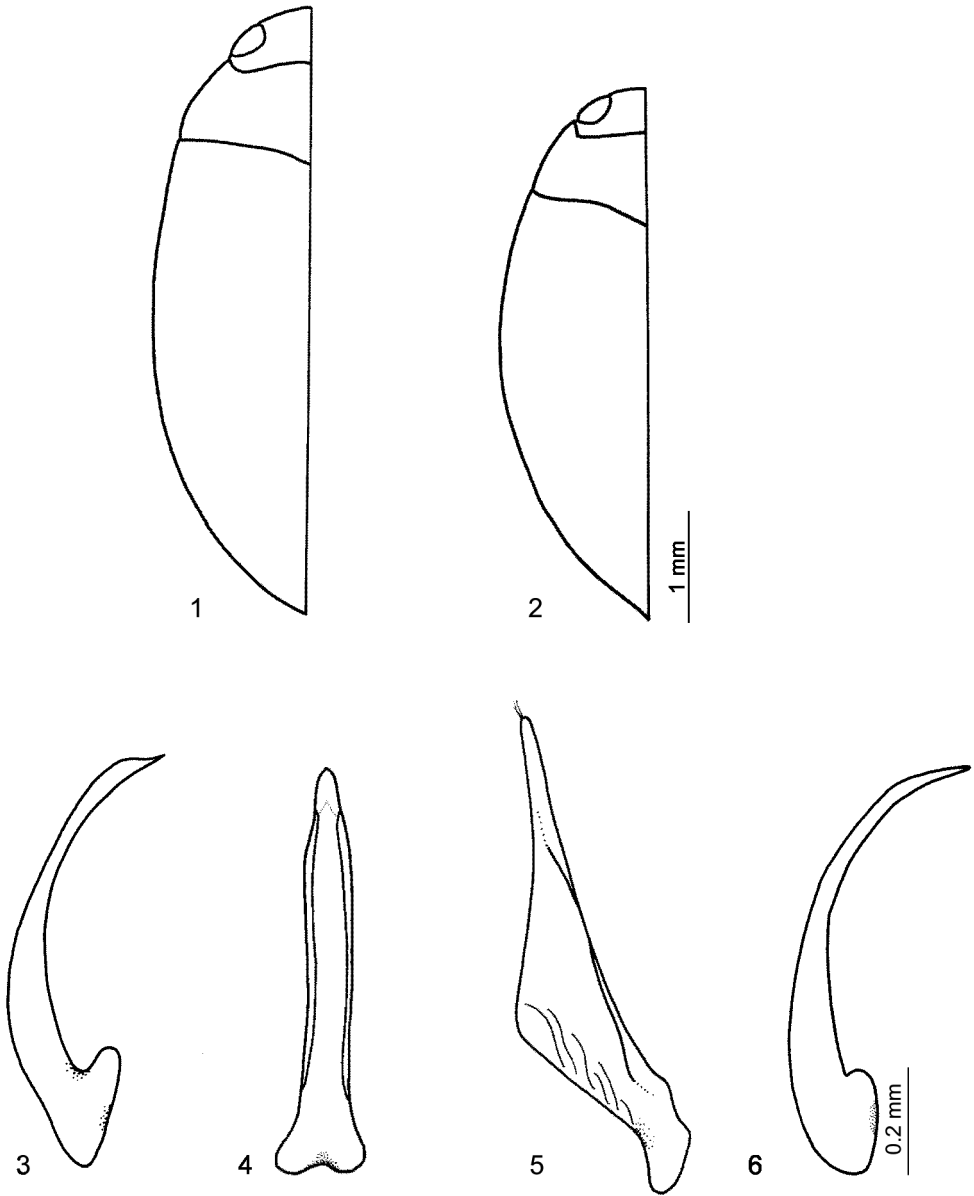
DISTRIBUTION (Fig. 17): Known only from the very south of Grande Terre.

The single larva described by BERTRAND (1968) under the name “*Macroporus* sp.” was collected in a swamp near River Blanche (“FNK 28”, see STARMÜHLNER 1968) in the Rivière Bleue Provincial Park, in southern Grande Terre, not too far away from the other known localities of *Megaporus feryi*.

HABITAT: All specimens from Prony were collected from the edges of a very deep doline (> 5 m), surrounded by dense stands of sedges. The bottom consisted of red sand. The water was partly covered by small macrophytes (Fig. 18). It co-occured with *Cybister tripunctatus* ssp. *temnenkii* (AUBÉ, 1838), *Rhantaticus congestus* (KLUG, 1833), *Hydaticus quadrivittatus* BLANCHARD, 1843 (Dytiscidae), thousands of *Gyrinus convexiusculus* MACLEAY, 1871 (Gyrinidae), and tadpoles.

AFFINITIES: This species is close to *Macroporus natvigi* from Australia (LAWRENCE et al. 1987, WATTS 2002), from which it can be distinguished by the more robust and more parallel-sided body, the coarse and dense punctuation and the shape of the median lobe (Fig. 6). From the other black Australian species, *M. fischeri*, it can be separated by the less shiny surface and by the shape of the median lobe. *Megaporus tristis* from Fiji is smaller (5.3 mm), broadly ovate, having its greatest width in the middle (Fig. 2), with a matt dorsal surface with distinct microreticulation; its elytra are shortly sinuate before the apex.

ETYMOLOGY: This species is dedicated to our friend and colleague Dr. Hans Fery (Berlin, Germany), the “creator” of numerous Palearctic Hydroporinae.



Figs. 1–2: Habitus of 1) *Megaporus feryi*, 2) *M. tristis*.
Figs. 3–5: *Megaporus feryi*: 3) median lobe, ventral view, 4) same, lateral view, 5) paramere, lateral view.
Fig. 6: *Megaporus natvigi*, median lobe, lateral view.

Genus *Necterosoma* SHARP, 1882

Small to medium-sized (4.0–5.4 mm); protarsi distinctly five-segmented; medially confluent metacoxal cavities and mesoventrite in a more or less vertical position, at a pronounced angle with the metaventrite. Males with front tibiae notched, often strongly so. Most species with distinct elytral color pattern, and raised elytral striae in three species (WATTS 1978, 2002, ZWICK 1979, HENDRICH 2003).

World checklist of *Necterosoma*

<i>Necterosoma aphrodite</i> WATTS, 1978	Australia: VIC
<i>Necterosoma darwinii</i> (BABINGTON, 1841)	Australia: WA
<i>Necterosoma dispar</i> (GERMAR, 1848)	Australia: SA, VIC
<i>Necterosoma novaecaledoniae</i> BALFOUR-BROWNE, 1939	New Caledonia (Grande Terre)
<i>Necterosoma penicillatum</i> (CLARK, 1862)	Australia: WA, NT, NSW, VIC, QLD, TAS
<i>Necterosoma regulare</i> SHARP, 1882	Australia: WA, NT, QLD
<i>Necterosoma schmeltzi</i> SHARP, 1882	Australia: NSW, QLD
<i>Necterosoma schoelleri</i> sp.n.	New Caledonia (Grande Terre)
<i>Necterosoma susanna</i> ZWICK, 1979	Australia: ACT, NSW, TAS
<i>Necterosoma theonathani</i> HENDRICH, 2003	Australia: WA
<i>Necterosoma undecimlineatum</i> (BABINGTON, 1841)	Australia: WA, NT, VIC, NSW, QLD, TAS

Necterosoma novaecaledoniae BALFOUR-BROWNE, 1939

Necterosoma novaecaledoniae BALFOUR-BROWNE 1939: 370; NILSSON 2001: 174.

TYPE LOCALITY: New Caledonia, North Province, Mt. Panié.

TYPE MATERIAL: **Holotype** ♂: “Type” (NHML), “Mt. Panié, New Caledonia, 28.VIII.1914, P.D. Montague, 1918-87” [printed and round label with red margin].

Paratypes: 6 exs. (NHML) from the same locality as the holotype and labelled “Co-Type” [printed and round labels with yellow margin].

ADDITIONAL MATERIAL EXAMINED:

SOUTH PROVINCE: 2 exs. (QMB): “NEW CALEDONIA 11195 21°37'S x 165°52'E. Plateau de Dogny. 16 Nov 2002. C.Burwell. hand collection. 910.”; 44 exs. (CGW, CLH, SAMA, ZSM): “Neukaledonien Rivière Bleue 19.3.1994, M. Schöller leg.”; 1 ex. (QMB): “New Caledonia 8732, 22°06' Sx166°40'E, R.[ivière] Bleue, main road, 17Nov2001, SR Monteith, Stream collecting, 160 m”.

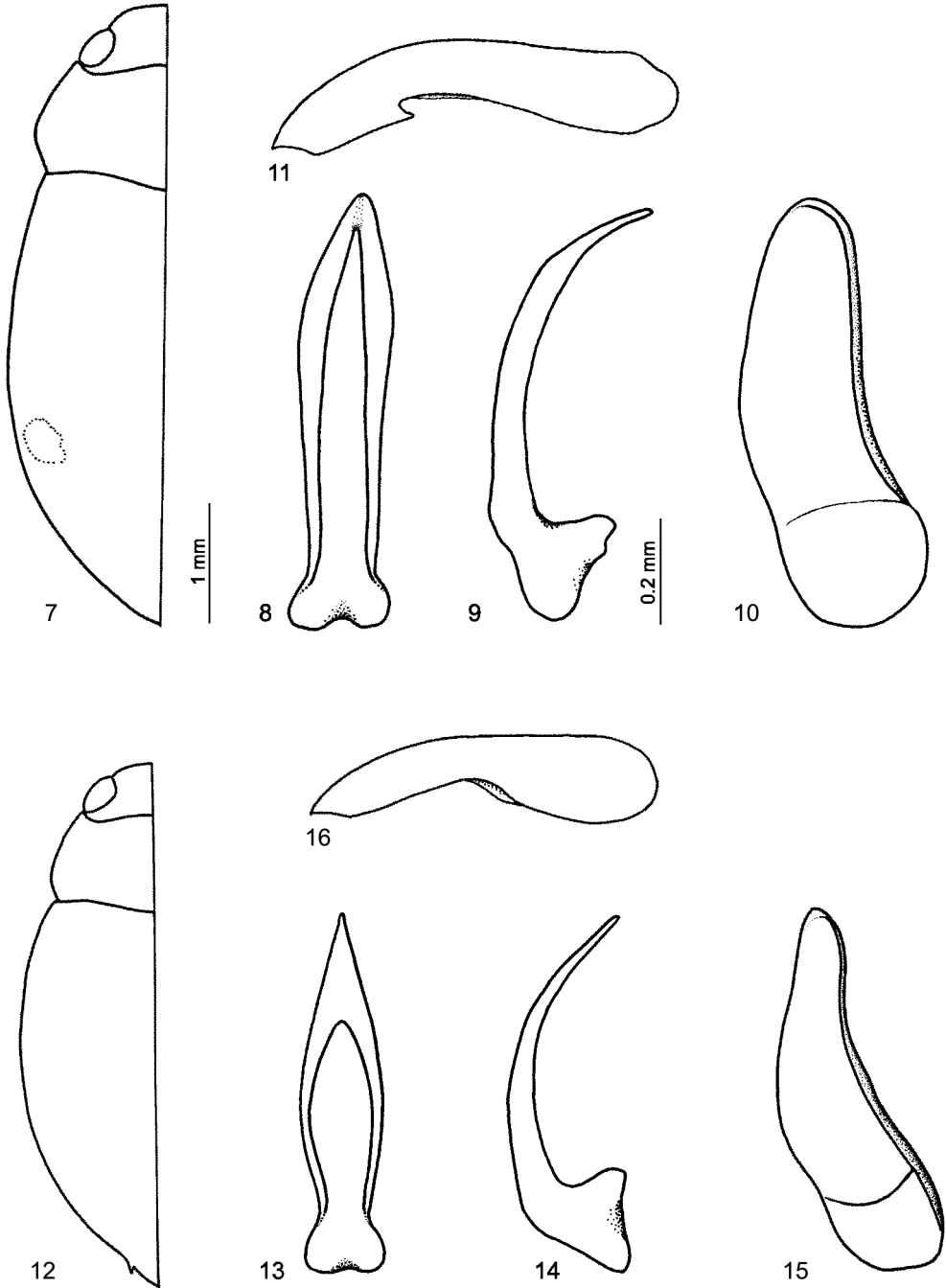
REDESCRIPTION: Oval, convex and stout, widest in middle (Figs. 12, 23–24).

Measurements: Males: Total length 4.4–4.8 mm (holotype 4.4 mm); length without head 4.0–4.4 mm (holotype 4.0 mm); greatest width 2.3–2.5 mm (holotype 2.4 mm). Females: Total length 4.1–4.2 mm; length without head 3.7–3.9 mm; greatest width 2.1–2.2 mm.

Color: Black (Figs. 23, 24). Epipleuron, prosternum and legs dark rufo-piceous. Palpi and antennae rufo-piceous, middle and apical segments (5–11) of antenna darker at apex.

Sculpture: Microreticulate and densely rugose-punctate throughout, but punctures on dorsal surface more shallow than on ventral side. Epipleuron with a very small triangular expansion just before apex. Prosternal process not strongly narrowed compared to other species of the genus, evenly rounded. Metacoxal lines rather close, diverging in middle, subparallel anteriorly.

Male: Less microreticulate and more shiny than female. Median lobe of aedeagus simple, without conspicuous structures (Figs. 13–14), and similar to those of *N. regulare* and *N. theonathani* (see HENDRICH 2003). Parameres more elongate than in *N. schoelleri* (Fig. 15). Pro- and mesotarsi moderately expanded, second segment about 1.5 × as wide as long. Protibia moderately thickened with a rather small and deep notch on inner edge in middle (Fig. 16).



Figs. 7–11: *Necterosoma schoelleri*: 7) habitus, 8) penis, ventral and 9) lateral view, 10) right paramere, lateral view, 11) male protibia, lateral view.
 Figs. 12–16: *Necterosoma novaecaledoniae*: 12) habitus, 13) penis, ventral and 14) lateral view, 15) right paramere, lateral view, 16) male protibia, lateral view.

Mesotibia slightly curved with a shallow notch, slightly larger than on protibia, on inner edge in apical half. Apical ventrite produced apically into a small conical spine.

Female: More microreticulate, almost matt. Pro- and mesotarsus slightly expanded, second segment about as wide as long. Pro- and mesotibia simple. Tip of apical ventrite flattened, slightly produced backwards.

DISTRIBUTION (Fig. 17): Known from northern (Mt. Panié), central (Plateau de Dogny), and southern (Rivière Bleue Provincial Park) Grande Terre.

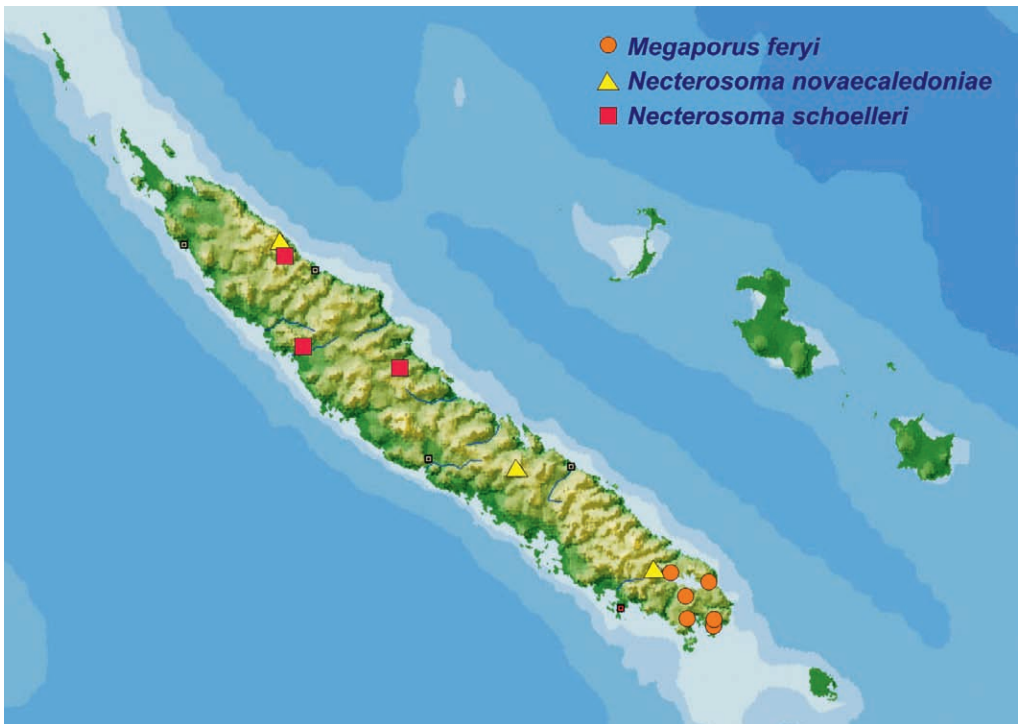


Fig. 17: Geographical distribution of *Megaporus feryi*, *Necterosoma novaecaledoniae* and *N. schoelleri*.

HABITAT: A lotic species. In Rivière Bleue Provincial Park collected in shaded, isolated pools of larger forest streams. The habitat was enriched with rotten leaves (M. Schöller, personal communication). At Plateau de Dogny collected in a small more open stream with rocky bed (C. Burwell, personal communication) (Fig. 20).

AFFINITIES: A very distinct species. The only species which could be confused with *N. novaecaledoniae* is *N. theonathani* from northwestern Australia. However, *N. novaecaledoniae* differs clearly in its larger size, its black surface lacking any reddish or yellowish markings, and in the shape of the male protibia and that of the median lobe (see HENDRICH 2003). From *N. schoelleri* it can be distinguished by its smaller size, the more convex and stout body, the form of the male protibia, the very small triangular expansion on epipleuron just before apex, and by the absence of elytral carinae.



Fig. 18: Pool near nickel plant, 2 km W Prony. Habitat of *Megaporus feryi*.
Fig. 19: Stream near Mt. Panié. Habitat of *Necterosoma schoelleri*.



Fig. 20: Plateau de Dogny. Habitat of *Necterosoma novaecaledoniae*.



Figs. 21–22: Habitus of 21) *Megaporus feryi*, male, 22) female.



23



24



25



26

1 mm

Figs. 23–26: Habitus of 23) *Necterosoma novaecaledoniae*, male, 24) female; 25) *N. schoelleri*, male, 26) female.

Necterosoma schoelleri sp.n.

TYPE LOCALITY (see JÄCH & BALKE 2010: Figs. 13, 17): New Caledonia, North Province, Mt. Panié, 1350 m a.s.l. (Loc. 2001/NC 16).

TYPE MATERIAL: **Holotype** ♂ (NMW): “New Caledonia, North Prov. Mt. Panié, 1350 m, 8.–9.11.2001, leg. Balke & Wewalka (NC 16)”, “HOLOTYPE *Necterosoma schoelleri* sp.n. Hendrich, Balke & Wewalka des. 2009” [red label].

Paratypes: 8 exs. (CGW, CLH): from the same locality as holotype; 1 ex. (ZSM): with additional “DNA MB 695” [green label indicating the specimen with voucher number 695 was used for DNA extraction]; 2 ♀♀ (NMW): “NEW CALEDONIA Grande Terre (N-Prov.) Koniambo 26.11.04 (PAND-020) leg. C. Pöllabauer”, “*Pandanus* bassin 478.729 mE 7.676.061 mN 81 m a.s.l.”.

4 exs. (CGW): Loc. 2001/NC 19; 1 ex. (CGW): Loc. 2001/NC 33.

DESCRIPTION: Elongate, dorso-ventrally flattened, widest in posterior third. Pronotum much broader than base of elytra (Figs. 7, 25–26).

Measurements: Males: Total length 5.0–5.4 mm (holotype 5.3 mm); length without head 4.5–4.8 mm (holotype 4.7 mm); greatest width 2.4–2.6 mm (holotype 2.6 mm). Females: Total length 4.7–5.2 mm; length without head 4.3–4.6 mm; greatest width 2.2–2.5 mm.

Color (Figs. 25, 26): Head and pronotum black. Elytron black, antero-laterally with reddish spot of variable size. Ventral surface black. Epipleuron black, prosternum and legs dark rufo-piceous. Palpi and antennae rufo-piceous, middle and apical segments (3–11) of antenna darker at apex.

Sculpture: Microreticulate and densely rugose-punctate throughout, but punctures on dorsal surface more shallow. Four shallow elongate carinae on elytra. Prosternal process greatly narrowed compared to other species of the genus. Metacoxal lines relatively wide, slightly converging anteriorly.

Male: Median lobe of aedeagus simple, without conspicuous structures (Figs. 8–9). Parameres broad and simple (Fig. 10). Pro- and mesotarsi moderately expanded, second segment of protarsi about 1.5 × as wide as long. First segment of mesotarsi with a very small triangular expansion on inner edge. Protibia expanded with a large notch on inner edge near base (Fig. 11). Mesotibia expanded, quite strongly curved with a shallow notch on inner edge in apical half. Tip of apical ventrite flattened.

Female: Pro- and mesotarsus slightly expanded, second segment about as wide as long. Pro- and mesotibia simple. Tip of apical ventrite flattened, slightly produced backwards.

DISTRIBUTION (Fig. 17): Known only from several localities in northern Grande Terre.

HABITAT: *Necterosoma schoelleri* inhabits small forest streams and rock pools of intermittent streams at an altitude of 81–1350 m. All beetles were collected among roots and leaf packs (Fig. 19). At Aoupinié it was found syntopically with *Rhantus novaecaledoniae* BALFOUR-BROWNE, 1944 and numerous *Exocelina* spp.

ETYMOLOGY: Dedicated to Dr. Matthias Schöller (Berlin, Germany) who has rediscovered *N. novaecaledoniae* and collected lots of other interesting water beetles during his journey across Grande Terre.

AFFINITIES: The flat and broadened body, the black color with one small reddish spot on elytral apex, the four elytral carinae, and the thickened protibia with very large notch on inner edge near base distinguish *N. schoelleri* from all other species of the genus.

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References

- BABINGTON, C.C. 1841: Dytiscidae Darwinianae. – Transactions of the Royal Entomological Society of London 3: 1–17, 1 pl.
- BALFOUR-BROWNE, J. 1939: New and rare species of aquatic Coleoptera from New Caledonia. Dytiscidae and Palpicornia. – The Annals and Magazine of Natural History (11) 3: 370–376.
- BALKE, M. 1995: The Hydroporini (Coleoptera: Dytiscidae: Hydroporinae) of New Guinea: systematics, distribution and origin of the fauna. – Invertebrate Taxonomy 9: 1009–1019.
- BERTRAND, H. 1968: VI. Larves de Coléoptères aquatiques de Nouvelle-Calédonie. – Cahiers de l'ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer), Série Hydrobiologie II (1): 75–82.
- BERTRAND, H. 1972: Larves et nymphes des Coléoptères aquatiques du globe. – Paris: F. Paillart, 804 pp.
- CLARK, H. 1862: Catalogue of the Dytiscidae and Gyrinidae of Australasia, with descriptions of new species. – The Journal of Entomology. Descriptive and Geographical 1: 399–421.
- GERMAR, E.F. 1848: Beiträge zur Insektenfauna von Adelaide. – Linnaea Entomologica 3: 153–247.
- HENDRICH, L. 2003: A new species of *Necterosoma* Sharp from the Kimberley region in north-western Australia (Coleoptera: Dytiscidae). – Entomologische Zeitschrift 113: 144–145 (color figs.), 152–154.
- JÄCH, M.A. & BALKE, M. 2010: Introduction, pp. 1–29. – In: Jäch, M.A. & Balke, M. (eds.): Water beetles of New Caledonia (part 1). – Monographs on Coleoptera 3: IV+449 pp.
- LAWRENCE, J.F., WEIR, T.A. & PYKE, J.E. 1987: Haliplidae, Hygrobiidae, Noteridae, Dytiscidae and Gyrinidae, pp. 321–366. – In: Walton, D.W. (ed.): Zoological Catalogue of Australia. 4. Coleoptera: Archostemata, Myxophaga and Adephaga edited by the Bureau of Flora and Fauna. – Canberra: Australian Government Publishing Service, viii+444 pp.
- MILLER, K.B. & NILSSON, A.N. 2003: Homology and terminology: Communicating information about rotated structures in water beetles. – Latissimus 17: 1–4.
- MOUCHAMPS, R. 1964: Remarques concernant quelques coléoptères aquatiques australiens. Le genre *Megaporus* Brinck. – Norsk Entomologisk Tidsskrift 12: 183–189.
- NILSSON, A.N. 2001: Dytiscidae Coleoptera. – In: Anonymous (ed.): World Catalogue of Insects. Vol. 3. – Stenstrup: Apollo Books, 395 pp.
- RÉGIMBART, M. 1892: Viaggio di Lamberto Loria nella Papuasias orientale. IV. Haliplidae, Dytiscidae et Gyrinidae. – Annali del Museo Civico di Storia Naturale Giacomo Doria Genova (2) 10: 978–997.
- SHARP, D. 1882: On aquatic carnivorous Coleoptera or Dytiscidae. – The Scientific Transactions of the Royal Dublin Society (2) 2: 179–1003, pls. 7–18.

- STARMÜHLNER, F. 1968: Etudes Hydrobiologiques en Nouvelle-Calédonie (mission 1965 du Premier Institut de Zoologie de l'Université de Vienne): 1. Généralités et description des stations. – Cahiers de l'ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer), Série Hydrobiologie II (1): 3–33.
- STARMÜHLNER, F. 1986: Checklist of the fauna of mountain streams of tropical Indopacific islands. – Annalen des Naturhistorischen Museums in Wien (B) 88/89: 457–480.
- WATTS, C.H.S. 1978: A revision of the Australian Dytiscidae (Coleoptera). – Australian Journal of Zoology, Supplementary Series 57: 1–166.
- WATTS, C.H.S. 1985: A faunal assessment of Australian Hydradephaga. – Proceedings of the Academy of Natural Sciences of Philadelphia 137 (1): 22–28.
- WATTS, C.H.S. 2002: Checklist and guides to the identification, to genus, of adults and larval Australian water beetles of the families Dytiscidae, Noteridae, Hygrobiidae, Haliplidae, Gyrinidae, Hydraenidae and the superfamily Hydrophiloidea (Insecta – Coleoptera). Cooperative Research Centre for Freshwater Ecology (Australia). – Identification and Ecology Guide 43: 1–110.
- ZIMMERMANN, A. 1926: Two new species of Dytiscidae. – The Annals and Magazine of Natural History (9) 17: 167–168.
- ZWICK, P. 1979: Notes on the genus *Necterosoma* (Col., Dytiscidae), with description of *N. susanna* sp. n. from Australia. – Aquatic Insects 1 (3): 179–184.

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