

DYTISCIDAE:

The genus *Rhantus* DEJEAN

(Coleoptera)

M. BALKE, G. WEWALKA, Y. ALARIE & I. RIBERA

Abstract

Five species of *Rhantus* DEJEAN, 1833 (Coleoptera: Dytiscidae: Colymbetinae) occur in New Caledonia. Four of these, all belonging to the *R. pacificus* group (sensu BALKE 1993) are endemic: *R. alutaceus* FAUVEL, 1883, *R. monteithi* BALKE, WEWALKA, ALARIE & RIBERA, 2007, *R. novaecaledoniae* BALFOUR-BROWNE, 1944, and *R. poellerbaueri* BALKE, WEWALKA, ALARIE & RIBERA, 2007. The fifth species, *R. suturalis* MACLEAY, 1825 is a member of the *R. suturalis* species group and very wide-spread in the Old World. A taxonomic overview, including the known larvae of the endemic species, is provided.

Key words: Coleoptera, Dytiscidae, Colymbetinae, *Rhantus*, taxonomy, New Caledonia.

Introduction

The dytiscid subfamily Colymbetinae is widely distributed throughout the Pacific. This subfamily contains ten genera with ca. 130 species world-wide (NILSSON 2001). Two of these genera occur in the Pacific Region: the monotypic New Guinea endemic genus *Carabdytes* BALKE et al. and the cosmopolitan genus *Rhantus* DEJEAN (BALKE 2001). The members of the genus *Rhantus* can be subdivided into two groups: the *R. suturalis* group and the *R. pacificus* group (BALKE 1993, 1998, 2001, PECK & BALKE 1993), both occurring in New Caledonia (BALKE et al. 2007), from where five species of *Rhantus* are presently known.

Here, we summarize the taxonomic results relevant for New Caledonia following BALKE et al. (2007), who provided a taxonomic revision of the New Caledonian and Fijian fauna, including larvae when available.

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)
CYA	Collection Yves Alarie, Laurentian University, Department of Biology, Sudbury, Ontario, Canada
IAC	Institut Agronomique Néo-Calédonien, Pocquereux, New Caledonia; S. Cazères, C. Mille
IRSNB	Institut royal des Sciences naturelles de Belgique, Brussels, Belgium; P. Limbourg
MNHN	Muséum national d'Histoire naturelle, Paris, France; H. Perrin
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
ZSM	Zoologische Staatssammlung, München, Germany; M. Balke

Measurements given in the text are: TL – total length of beetle from frons to tip of elytron, TL-h – length minus head, TW – total width of beetle.

Larval and chaetotaxic analysis: The methods, terminology, and format of larval descriptions follow those of recent studies on larval morphology of the Colymbetinae (ALARIE et al. 1998, ALARIE & LARSON 1998, ALARIE & BALKE 1999, SHAVERDO 2003, ALARIE & WANG 2004, ALARIE & HUGHES 2006, MICHAT 2006). Larval specimens of each species were disarticulated and mounted on standard glass slides with Hoyer's medium. Examination at magnifications of 80–800 × was done using an Olympus BX50 compound microscope equipped with Nomarsky differential interference optics. Voucher specimens are deposited in the CYA. To ensure correct interpretations of some terms in the morphometric analysis, notes of explanation are provided (abbreviations, if used in the text, are given in parentheses):

Head length (HL): total head length including the frontoclypeus measured medially along the epicranial stem.

Head width (HW): maximum width measured posterior to the stemmata.

Length of frontoclypeus (FCL): from apex of the nasal to the back of the ecdysial suture.

Occipital foramen width (OcW): maximum width measured along the dorsal margin of the occipital foramen.

Length of antenna (AL): derived by adding the length of each individual antennomere; comparison among antennomeres was made using the capital letter A with a number corresponding to the segment considered (e.g. A1 for antennomere 1); A3 is used as an abbreviation for the lateral elongation of antennomere 3.

Length of maxillary palpus: derived by adding the length of each individual palpomere (e.g. MX1 for palpomere 1).

Length of maxillary galea (GaLL): maximal length measured from apex of the galea to margin of the maxillary stipes (i.e. including the palpifer).

Length of maxillary stipes (StPL): maximal length of stipes measured along the outer margin.

Length of mandible (MndL): maximal length measured from apex to the mandibular condyla.

Width of mandible (MndW): maximal width measured across the proximal portion of the mandible.

Length of labial palpus: derived by adding the length of each individual palpomere (e.g. LB1 for palpomere 1).

Length of legs: derived by adding the length of each individual segment including the longest claw; the length of each segment was taken at the longest point except for the trochanter which includes only the proximal portion (the length of distal portion being included in the femoral length).

Dorsal length of last abdominal segment (LLAS): includes the whole sclerite measured dorsally along mid-line from the anterior margin to the posterior margin; siphon refers to the dorsal prolongation of the eighth abdominal segment (= last abdominal segment); the length of the siphon was determined by measuring the difference between the dorsal and ventral lengths of the segment.

Length of urogomphus (UROL): measured along the lateral margin.

Primary (observed in instar I) and secondary (added throughout the ontogenetic development) setae and pores were distinguished on the cephalic capsule, head appendages, legs, last abdominal segment, and urogomphi. The setae and pores are coded according to the systems proposed by ALARIE (1995) for the legs, the last abdominal segment, and urogomphi and ALARIE (1998) for the cephalic capsule and head appendages. Instar I larvae of the Colymbetinae may be characterized by the presence of a variable number of additional setae on some leg articles. These were included in the count of secondary setae. Notes: Additional setae are primary setae which are not part of the ground-plan system of the Colymbetinae. In Colymbetinae, instar I may have a variable number of additional setae on some leg articles. In order to be able to discriminate additional setae from the secondary ones, which are added through the ontogenetic development of the larva, one needs to have access to first instars. This was not possible in the context of our paper as we did not have first instar. On the other hand, the primary ground-plan setae are consistent throughout the family (in contrast to the additional setae, which vary in number) and accordingly, they can be excluded from the count of secondary setae even in absence of first instar as we know exactly how many are found on each leg article.

Setae are coded by two capital letters corresponding to the first two letters of the name of the structure on which the seta is located (AN: antenna; CO: coxa; FE: femur; MX: maxilla; LA: labium; TA: tarsus; TI: tibia; TR: trochanter) and a number. Pores are coded in a similar manner except that the number is replaced by a lower case letter. The position of the sensilla is described by adding the following abbreviations: A: anterior; AV: anteroventral; D: dorsal; Di: distal; Pr: proximal; PV: posteroventral.

List of Localities

(**Locs. 2001/NC:** leg. Balke & Wewalka, **Locs. 2009/NC:** leg. Jäch)

- Loc. 2001/NC 1:** Dumbéa, 50 m a.s.l., near road to Mt. Koghi, 3.XI.2001. Slowly flowing stream (max. 2 m wide), shaded, forming larger pools (max. 70 cm deep), edge with leaf packs and roots, ground sandy and gravelly with few larger stones.
- Loc. 2001/NC 7** (JÄCH & BALKE 2010: Fig. 11): 10 km east of Pouembout, 50 m a.s.l., 6.XI.2001. Lowlands, dirt road 10 km inland to Forêt Plate, small stream, slowly flowing, more or less shaded, collected from small backflows and bays at the edge, with leaves and pine needles; and larger, slowly flowing shallow stream nearby.
- Loc. 2001/NC 15:** Mt. Panié, 1200 m a.s.l., 8.XI.2001. Small stream, underneath of stones, in forest.
- 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 17:** Mt. Panié, 1550 m a.s.l., 9.XI.2001. Stream bed on level area below summit, in forest.
- Loc. 2001/NC 18a:** Mt. Panié, 1100 m a.s.l., 9.XI.2001. Water hole in otherwise dry stream bed, 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 26:** 10 km SE Ouégoa, road to Mandjélia, 560 m a.s.l., 11.XI.2001. Small stream in gully, water nearly stagnant, montane forest, shaded.
- Loc. 2001/NC 27:** 9 km SSE Ouégoa, road to Mandjélia, 100 m a.s.l., 12.XI.2001. Small stream in cultivated area.
- Loc. 2001/NC 32:** ca. 25 km west of Pombeï, near Bobeito, 300 m a.s.l., 13.XI.2001. Old mining road, area very dry and with disturbed forest and pine plantations. Small stream, almost dry, shaded, water eutrophicated and in part black, fouling.
- 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 34** (JÄCH & BALKE 2010: Fig. 16): Aoupinié, 25 km SW Ponérihouen, 700 m a.s.l., 14.XI.2001. Western slopes of the range, stream bed, almost dry, only two small puddles left, bottom with leaves, sandy/rocky; shaded.
- Loc. 2001/NC 35:** Me Maoya Area, 4 km south of Nérin, 600 m a.s.l., 14.XI.2001. Wide, hardly shaded stream bed, sandy/gravelly/rocky, with some large boulders; with stream pools ca. 2 × 3 m wide, max. 1 m deep.
- Loc. 2001/NC 37:** Mt. Canala, 15–20 km south of Canala, 600 m a.s.l., 15.XI.2001. Puddle in otherwise dry stream bed, montane forest, shaded, stream bed comparably level but with some cascades up to 2 m high.
- Loc. 2001/NC 38** (JÄCH & BALKE 2010: Fig. 25): road Canala – Koindé – La Foa, southern slope of pass near Koindé, 620 m a.s.l., 16.XI.2001. Small shaded stream, slowly flowing, puddles with leaves. (Note: this locality is in the border region North / South Province, and most likely situated in the South Province).
- Loc. 2001/NC 40:** 16 km west of Thio, 350 m a.s.l., 16–17.XI.2001. Pool (2 × 1 m wide and more than 50 cm deep) in stream bed formed by concrete ford; unshaded, bottom sandy, with clay, grassy edge, water slightly turbid.
- Loc. 2001/NC 44** (JÄCH & BALKE 2010: Fig. 22): Mt. Koghi, 500 m a.s.l., 19.XI.2001. Stream bed in montane forest, steep slope, almost dry, bed rocky, some gravel and sand in the more level parts of slope. Beetles in rock pools (max. 30 × 30 cm) on large boulders/bedrock, water full of fouling leaves. Upper part of stream with some flowing water, beetles collected from small water holes at edge, or minute backflows.
- Loc. 2001/NC 52:** Mt. Mou, near Sanatorium, 400 m a.s.l., 23.XI.2001. Small stream, shaded, backflows with leaf packs and ditch at road, created by backflow, ground sandy/gravelly, shaded.
- Loc. 2009/NC 5** (JÄCH & BALKE 2010: Fig. 28): Mt. Mou, ca. 13 km SE Tontouta, ca. 380 m a.s.l., 22°04'23.2"S/166°19'47.6"E, 23.XI.2009. Small stream, ca. 1–2 m wide, flowing through dense rainforest.
- Loc. 2009/NC 11** (JÄCH & BALKE 2010: Fig. 34): Mt. Koghi, ca. 5 km N Nouméa, ca. 500–550 m a.s.l., 22°10'33.4"S/166°30'22.7"E, 25.XI.2009. Small streams (1–3 m wide), flowing through forest.
- Loc. 2009/NC 12:** ca. 10 km NW Nouméa, ca. 2 m a.s.l., 22°09'50.4"S/166°25'33.8"E, 25.XI.2009. Swamp in River Dumbéa flood plain.
- Loc. 2009/NC 15** (JÄCH & BALKE 2010: Fig. 39): ca. 8 km NNW Nouméa, ca. 10 m a.s.l., 22°09'20.7"S/166°27'23.7"E, 28.XI.2009. Pools and backwaters of River Dumbéa flood plain.
- Loc. 2009/NC 16** (JÄCH & BALKE 2010: Fig. 35): Col d'Amieu, ca. 10 km NNW La Foa, ca. 490 m a.s.l., 21°36'39"S/165°48'38"E and ca. 430 m a.s.l., 21°36'52"S/165°48'49.6"E, 28.XI.2009. Small streams (1–3 m wide), flowing through forest.
- Loc. 2009/NC 18** (JÄCH & BALKE 2010: Fig. 37): ca. 2 km NNE Farino, Refuge de Farino – Petite Cascade, ca. 270–340 m a.s.l., 21°38'55"S/165°46'53"E (coordinates taken at Refuge de Farino), 29.XI.2009. Rock pools and residual pools of two very small, almost dry streams (right tributaries of River Farino), flowing through degraded forest.

- Loc. 2009/NC 21** (JÄCH & BALKE 2010: Fig. 38): ca. 7 km SE La Foa, ca. 20 m a.s.l., 21°44'04"S/165°53'23"E, 30.XI.2009. River Pocquereux, epipotamal, ca. 5–10 m wide, flowing through forest.
- Loc. 2009/NC 22** (JÄCH & BALKE 2010: Fig. 41): ca. 2 km NE Sarraméa, near La Cuve, ca. 160 m a.s.l., 21°38'13"S/165°51'53"E, 30.XI.2009. Stream, 5–7 m wide, with large boulders, slowly flowing through forest.
- Loc. 2009/NC 27** (JÄCH & BALKE 2010: Fig. 46): ca. 8 km NNE Bouloupari, ca. 120 m a.s.l., 21°48'08"S/166°04'12"E, 3.XII.2009. Stream (La Wamuttu), hardly flowing, mostly over bare rock and between big boulders, with numerous rock pools, through degraded forest.

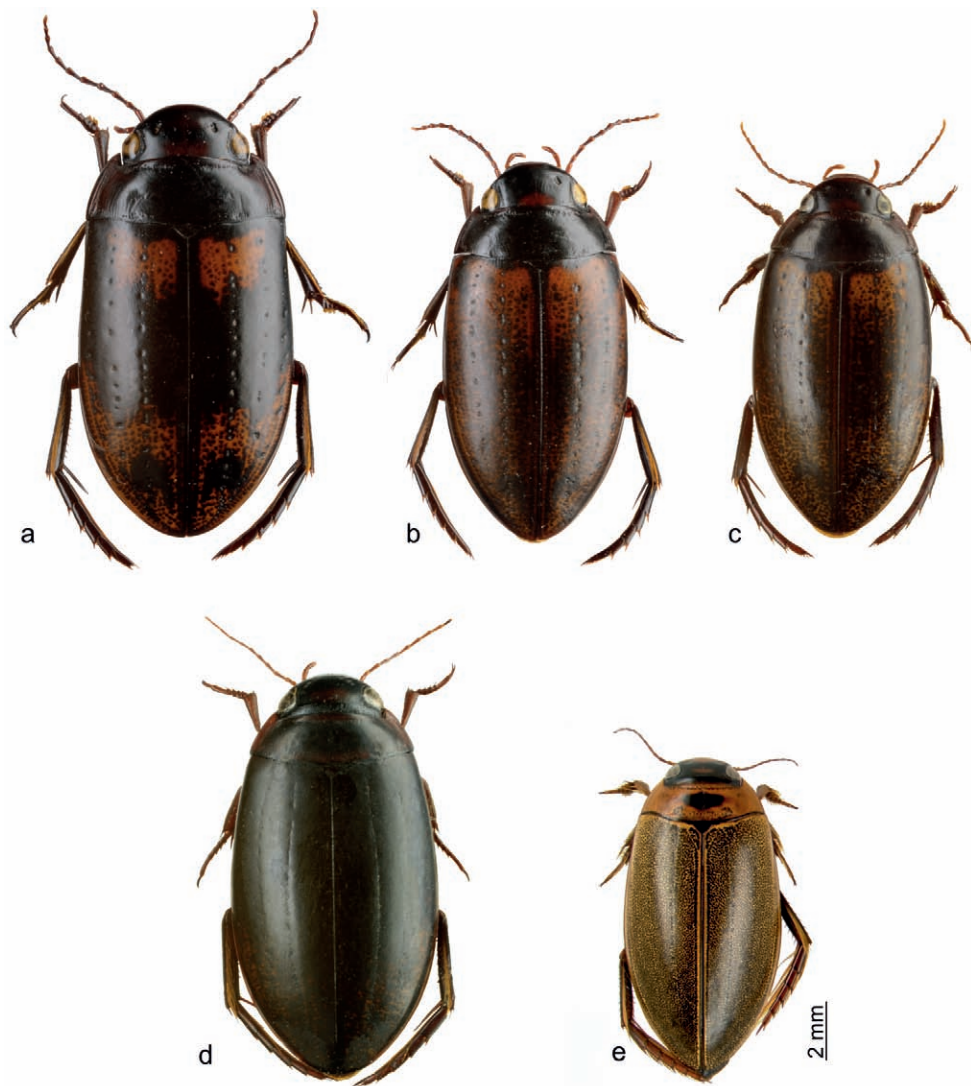


Fig. 1: Habitus and coloration of a) *Rhantus monteithi*, b) *R. poellerbaueri*, c) *R. novaecaledoniae*, d) *R. alutaceus*, e) *R. suturalis*.

Checklist of New Caledonian *Rhantus*

<i>Rhantus alutaceus</i> FAUVEL, 1883	New Caledonia (Grande Terre)
<i>Rhantus monteithi</i> BALKE, WEWALKA, ALARIE & RIBERA, 2007	New Caledonia (North Province)
<i>Rhantus novaecaledoniae</i> BALFOUR-BROWNE, 1944	New Caledonia (Grande Terre, Île des Pins)
<i>Rhantus poellerbaueri</i> BALKE, WEWALKA, ALARIE & RIBERA, 2007	New Caledonia (North Province)
<i>Rhantus suturalis</i> (MACLEAY, 1825)	New Caledonia, Australian, Oriental and Palearctic Regions

Rhantus alutaceus FAUVEL, 1883

Rhantus alutaceus FAUVEL 1883: 343; HELLER 1916: 239; ZIMMERMANN 1920: 197; BALKE 1993: 43; NILSSON 2001: 48; BALKE et al. 2007: 191.

TYPE LOCALITY: New Caledonia.

TYPE MATERIAL: **Holotype** ♂ (IRSNB): “N.elle Calédonie”, “Coll. R.I.Sc.N.B., Nouvelle Calédonie, re. Deplanche, ex. coll. Fauvel”, “Coll. et det. A. Fauvel”, “*Rhantus alutaceus* Fvl.”, “Holotype” (see BALKE 1993).

ADDITIONAL MATERIAL EXAMINED:

NORTH PROVINCE: 1 ex. (QMB): Aoupinié, sawmill, 21°10'S 165°19'E, 550 m, 23.XI.2001–1.II.2002, leg. G. Monteith “loc. 8929”; 1 ex. (NHML): Gélima, 730 m, 15.XI.2002, leg. C. Burwell & G. Monteith “loc. 11190”.

4 ♂♂, 7 ♀♀ (CGW): Loc. 2001/NC 33; 4 ♂♂, 2 ♀♀, 1 ex. (NHML, NMW): Loc. 2001/NC 34; 3 ♂♂ (NMW): Loc. 2001/NC 37.

SOUTH PROVINCE: 2 exs. (IAC): Sarraméa, Col d'Amieu, 444 m, 21°35'184"S 165°46'463"E, 21.IV.2006, leg. J. Brinon, S. Cazères, J.-P. Kataoui & C. Mille; 1 ex. (NHML): Mt. Humboldt, 1350 m, 5.–6.XI.2002, leg. C. Burwell “loc. 11124”; 1 ex. (CLH): Rivière Bleue Provincial Park, 19.III.1994, leg. M. Schöller; 1 ex. (QMB): Forêt Nord, 22°19'S 166°55'E, 200 m, 2.XII.2004, leg. Queensland Museum Party “Loc. 11835” (mercury vapour lamp, rainforest).

4 ♀♀ (NMW): Loc. 2001/NC 38.

3 exs. (NMW): Loc. 2009/NC 16.

DESCRIPTION: Habitus (as in Fig. 1d). Body regularly-oval, moderately convex; pronotum at posterior angles as broad as elytra at shoulders, lateral margin almost straight in middle; elytra regularly-oval, broadest almost in the middle.

Measurements: TL 14.0–15.1 mm (mean: 14.5 mm); TL-h 12.6–13.7 mm (mean: 13.4 mm); TW 7.3–7.8 mm (mean: 7.5 mm).

Color: Head black, often with a vague reddish frontal mark and reddish also at the clypeal margin. Pronotum black, vaguely reddish laterally and at the anterior margin and sometimes at the posterior margin. Elytra appearing mostly black, in the posterior third reddish between black speckles (Fig. 1d). Ventral surface black.

Surface sculpture: Head with distinctly impressed double punctation; sometimes with very dense and fine microreticulation posteriorly and hardly defined wrinkle-like meshes present posteriorly and along the eyes. Pronotum with distinct punctation and well impressed hardly defined wrinkle-like meshes. Elytra with a very dense fine microreticulation, with distinct punctation of almost one size and defined meshes which are wrinkle-like on the anterior half.

Structures: Pronotum with lateral rim relatively fine (0.1 mm), missing on anterior sixth.

Male: Pro- and mesotarsomeres I–III distinctly dilated with rows of elongate suction discs ventrally. Protarsal claws simple, gently curved and of equal length, almost as long as tarsomere 5. Penis and parameres as in Fig. 2a–c.

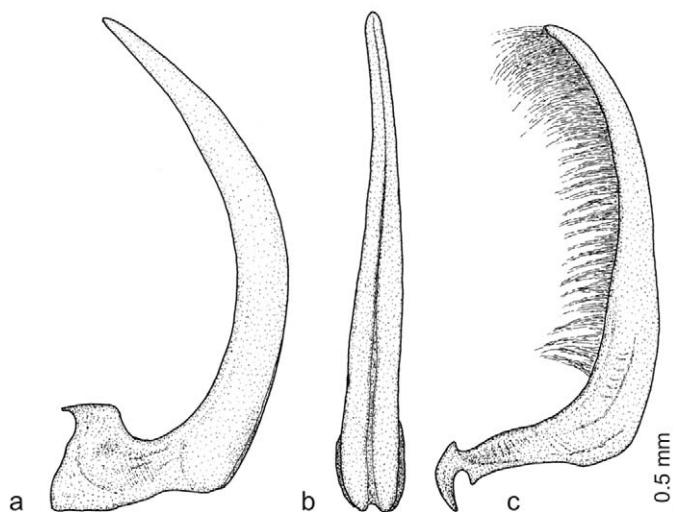


Fig. 2: *Rhantus alutaceus*: a) median lobe of aedeagus in lateral view, b) median lobe of aedeagus in ventral view, c) paramere in external view.

Larva: Unknown.

DIAGNOSIS: Adults of *R. alutaceus* are similar to those of *R. novaecaledoniae* and *R. poellerbaueriae*, from which it can readily be separated by 1) its slightly larger size, 2) the predominantly black elytra, 3) the much stronger punctation and wrinkle-like meshes of the elytra, and 4) the shape of the median lobe (Fig. 2a–c) which appears longer and less stout than in the above species, especially in ventral view.

HABITAT: Pools in intermittent streams of medium altitude (350–700 m) as well as small waterholes in rocks at the edge of such streams.

DISTRIBUTION (Fig. 8): Widely distributed on Grande Terre.

***Rhantus monteithi* BALKE, WEWALKA, ALARIE & RIBERA, 2007**

Rhantus novaecaledoniae BALFOUR-BROWNE: BALKE 1993: 45 (partim).

Rhantus monteithi BALKE et al. 2007: 186 (orig. descr.).

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** ♂ (MNHN): “New Caledonia: North Prov., Mont Panié, 1350 m, 8 - 9. XI.2001, leg. Wewalka (NC 16)”.

Paratypes: 21 ♂♂, 16 ♀♀, 2 exs. and one 3rd instar larva (CGW, NHML, NMW): same data as holotype; 1 ex. (QMB): Mt. Panié, 950–1300 m, 14.–16.V.1984, leg. G. Monteith & D. Cook; 1 ex. (QMB): Mt. Panié, 20°34'S 164°46'E, 1300 m, 16.–18.XI.2000, leg. P. Bouchard, C. Burwell & G. Monteith “loc. 9938”; 1 ♂ (NHML): Pombé, 16.IX.1914, leg. P.D. Montague.

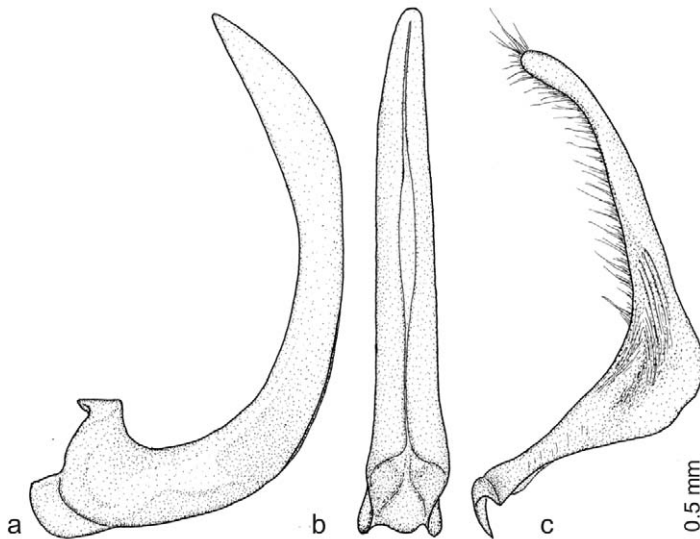


Fig. 3: *Rhantus monteithi*: a) median lobe of aedeagus in lateral view, b) median lobe of aedeagus in ventral view, c) paramere in external view.

ADDITIONAL SPECIMEN EXAMINED (identity uncertain):

NORTH PROVINCE: 1 ♂ (QMB): Mandjélia, 600–750 m, 11.–13.V.1984, leg. G. Monteith & D. Cook.

This specimen is much smaller than all the other individuals studied: TL 12.0 mm versus TL 14.5–15.9 mm. DNA-sequence data from that population might help to establish its taxonomic status.

DESCRIPTION: Habitus as in Fig. 1a. Body oblong-oval, distinctly convex; pronotum slightly broader at posterior angles than elytra at shoulders, lateral margin moderately curved; elytra almost parallel-sided in anterior part, sides slightly concave anteriorly, broadest distinctly behind the middle.

Measurements: TL 14.5–15.9 mm (mean: 14.8 mm); TL-h 13.1–14.1 mm (mean: 13.2 mm); TW 7.1–7.9 mm (mean: 7.5 mm).

Color: Head black, sometimes with a very vague reddish frontal mark. Pronotum black, sometimes very vaguely reddish laterally. Elytra black with three broad reddish bands one subbasal neither reaching the suture nor the lateral margin, one postmedian reaching the lateral margin and one apical band which is connected with the postmedian one laterally; the posterior bands are interrupted by many black speckles, the anterior one only by very few (Fig. 1a). Ventral surface black.

Surface sculpture: Head with scarcely impressed double punctation and hardly defined meshes present only along eyes and posteriorly. Pronotum with fine double punctation similar to that on head and well impressed, hardly defined wrinkle-like meshes only present along lateral margins. Elytra with a very dense fine microreticulation, which is missing along the suture anteriorly, and with fine double punctation similar to that on head; in areas with microreticulation only the larger punctures are visible.

Structures: Pronotum with lateral rim very broad (0.3 mm), missing only on anterior corner.

Male: Pro- and mesotarsomeres I–III distinctly dilated with rows of elongate suction discs ventrally. Penis and paramere as in Fig. 3a–c.

LARVA: Instar III: Color (alcohol preserved specimens): Dorsal surface of cephalic capsule predominantly dark brown; parietale with several minute yellow maculae posteriorly; frontoclypeus yellowish, with a dark brown reticulate pattern mesally; head appendages yellow, proximal articles lightly infusate; thoracic terga predominantly dark brown, yellow along lateral margin; meso- and metatergum with a yellowish macula mesally; legs predominantly dark yellow, coxae dark brown dorsally; abdominal terga dark brown; urogomphus dark yellow.

Head (Fig. 7a): HL = 3.75 mm; HW = 4.28 mm; FCL = 1.38 mm. Cephalic capsule subquadrate, broader than long (HL/HW = 0.88), strongly constricted posteriorly at level of occipital suture, HW/OcW = 2.11; coronal suture short, 0.63 times HL; occipital suture well-developed; frontoclypeus strongly convex mesally, 0.37 times HL, extending medially to about level of lateral lobes [= adnasalia]; apical margin of frontoclypeus with several club-shaped setae variable in size; ocularium present, stemmata visible ventrally and subdivided into 2 vertical series; tentorial pits visible ventrally on each side of middle at about midlength. Antenna. AL = 2.43 mm, shorter than HW; (AL/HW = 0.53–0.56); A1 = A2 > A3 = A4, A2/A3 = 1.17; lateral elongation of antennomere 3 pore-like; antennomere 3 with a ventroapical spinula. Mandible. Falciform, MndL/MndW = 3.10; MndL/HL = 0.62; mandibular channel present, pubescence developed along inner margins. Maxilla. Stipes subrectangular, short and thick; cardo and galea present, lacinia lacking; StpL = 0.71 mm, StpL/length of maxillary palpus = 0.37; GalL = 0.28–0.20 mm, 0.36 times length of maxillary palpomere 1; palpus length = 1.95 mm, palpifer developed like a palpomere, AL/length of maxillary palpus = 1.24; palpomere 1 > 2 > 3, length of palpomere 3/length of palpomere 2 = 0.76. Labium. Prementum subrectangular, broader than long, slightly sinuate mesally; labial palpus length = 1.41 mm; length of maxillary palpus/length of labial palpus = 1.39; palpomere 2 is 0.67 times as long as palpomere 1. Chaetotaxy. Head capsule with several secondary setae, lateral margin of parietal with 11 short spines; head appendages lacking secondary setae except mandible with several tiny secondary setae (pore-like at lower magnifications).

Thorax: Pronotum trapezoidal dorsally, ovate laterally, widest at about mid-length; length of pronotum about twice that of mesonotum; metanotum subequal to mesonotum in length, both as broad as pronotum; pronotum with a posterotransverse carina; meso- and metanota both with antero- and postero-transverse carina; maximum body width at level of prothorax; thoracic venter membranous; spiracular openings present antero-laterally on mesothorax.

Legs (Fig. 7c–d): Metathoracic legs longest, about 1.30 times length of prothoracic legs, and 2.30 times HW; femur > coxa > tibia = tarsus > trochanter; tarsus with two claws, posterior claw slightly shorter than anterior claw on pro- and mesothoracic legs, slightly longer on metathoracic leg; anterior metathoracic claw 0.21 times as long as metatarsus; spinulae on ventral margin of protibia and protarsus strongly developed; tarsal claws lacking spinulae ventro-proximally.

Abdomen: Eight-segmented; LLAS = 2.65 mm; dorsally sclerotized; segments 1–6 membranous ventrally, segments 7 and 8 completely sclerotized; terga 1 to 7 with antero- and postero-dorsal transverse carina, tergum 8 with an antero-dorsal transverse carina only; segments 1–7 with a pair of spiracular openings; segment 8 sub-cylindrical, LLAS/HW = 0.62, abruptly narrowing posterior to insertion of urogomphi; siphon 0.22 times as long as LLAS, shortly sinuate mesally. Chaetotaxy. Secondary setae predominantly short and spine-like.

Urogomphus (Fig. 7f): One-segmented, lacking a subbasal suture; total length of urogomphus = 2.83 mm, 1.10 times as long as LLAS, and 0.66 times as long as HW. Chaetotaxy. Urogomphus with 11 hair-like secondary setae.

DIAGNOSIS: ADULTS: The coloration of *Rhantus monteithi* is similar to *R. novaecaledoniae* and *R. poellerbaueri*. It can be separated both from of these species and other species of *Rhantus* by its bodyshape: pronotum slightly broader at posterior angles than elytra at shoulders and elytra almost parallel-sided in anterior part, broadest distinctly behind the middle. **LARVAE:** *Rhantus monteithi* can be distinguished from *R. poellerbaueri* by the following combination of characters: larger size, presence of secondary setae on urogomphus (Fig. 7f), larger number of secondary setae on legs and reduced number of natatory setae on metafemur (< 10 compare to > 18). *Rhantus monteithi* is also characterized by the presence of hair-like secondary setae along the dorsal margin of coxae (Fig. 7d), a feature reported for the first time for *R. formosanus* KAMIYA (ALARIE & WANG 2004).

HABITAT: Rockpools of clear streams of high mountains (1350 m).

DISTRIBUTION (Fig. 8): North Province of New Caledonia.

Rhantus novaecaledoniae BALFOUR-BROWNE, 1944

Colymbetes marmoratus PERROUD & MONTROUSIER 1864: 77 (nec GRAY 1831: plate 32).

Rhantus marmoratus PERROUD: SHARP 1882: 763; FAUVEL 1868: 176, 1903: 249; HELLER 1916: 239; ZIMMERMANN 1920: 202.

Rantus [sic!] *marmoratus* PERROUD: BALFOUR-BROWNE 1939: 370.

Rantus [sic!] *novaecaledoniae* BALFOUR-BROWNE 1944: 354 (replacement name for *Colymbetes marmoratus*).

Rhantus novaecaledoniae BALFOUR-BROWNE: BALKE 1993: 44; NILSSON 2001: 51; BALKE et al. 2007: 184.

TYPE LOCALITY: New Caledonia, North Province, Canala.

TYPE MATERIAL: **Lectotype** ♂ (IRSNB), designated by BALKE (1993): “Kanala [= Canala] type”, “*Rhantus marmoratus* Perr.”, “Coll. A. Fauvel”, “Coll. R.I.Sc.N.B., Nouvelle Calédonie, ex. Coll. Fauvel, rec. Montrouzier”, “Syntype”.

ADDITIONAL MATERIAL EXAMINED:

NORTH PROVINCE: 1 ex. (NMW): Grotte le Cresson, 60 m, 18.IX.1965, leg. Austrian New Caledonia Expedition; 1 ex. (NMW): Koniambo, Constance Basin, 22 m, 4.VIII.2007, leg. C. Pöllabauer; 2 exs. (QMB): Mandjélia, 600–750 m, 11.–13.V.1984, leg. G. Monteith & D. Cook; 2 exs. (QMB): Mandjélia, 600–750 m, 11.–13.V.1984, G. Monteith & D. Cook; 1 ex. (NHML): Pombeï, 16.IX.1914, leg. P.D. Montague; 1 ex. (NHML): Mt. Ignambi, 1300 m, 2.IX.1914, leg. P.D. Montague; 1 ex. (QMB): Aoupinié, top camp, loc. 8715, 21°11'S 165°19'E, 2.–3.XI.2001, leg. C. Burwell & G. Monteith.

2 ♂♂, 1 ex. (NHML, NMW): Loc. 2001/NC 26; 1 ex. (NHML): Loc. 2001/NC 32; 2 ♀♀ (CGW): Loc. 2001/NC 33; 2 exs. (NHML): Loc. 2001/NC 34; 12 ♂♂, 5 ♀♀, 5 exs. (CGW, NHML, NMW): Loc. 2001/NC 35; 6 ♂♂, 1 ♀♀ (CGW, NMW): Loc. 2001/NC 37.

SOUTH PROVINCE (Grande Terre): 1 ex. (ZSM): Mont Dore District, stream, road CR5 6 km N road RP1, 22°11'S 166°32'E, 31.VII.2008, leg. A. Gervais “M2”; 1 ex. (QMB): 22°14'S 166°50'E, 280 m, Pic du Pin, rainforest, 25.–26.XI.2004, Queensland Museum “Loc. 11791” (day hand collecting).

3 ♂♂, 1 ♀, 1 ex. (NHML, NMW): Loc. 2001/NC 38; 1 ♂ (CGW): Loc. 2001/NC 40; 8 ♂♂, 10 ♀♀, 4 exs. (CGW, NHML, NMW): Loc. 2001/NC 44; 1 ♂, 2 ♀♀ (NMW): Loc. 2001/NC 52.

1 exs. (NMW): Loc. 2009/NC 11; 5 exs. (NMW): Loc. 2009/NC 16; 2 exs. (NMW): Loc. 2009/NC 18; 3 exs. (NMW): Loc. 2009/NC 22.

SOUTH PROVINCE (Île des Pins): 2 exs. (IRSNB): “Île des Pins”, leg. E. Deplanche (BALKE 1993).

DESCRIPTION: Habitus as in Fig. 1c. Body regularly-oval, moderately convex; pronotum at posterior angles as broad as elytra at shoulders, lateral margin almost straight in middle; elytra broadest almost in the middle.

Measurements: TL = 11.8–13.5 mm (mean: 12.8 mm); TL-h = 10.6–12.3 mm (mean: 11.8 mm); TW = 6.0–6.9 mm (mean: 6.5 mm).

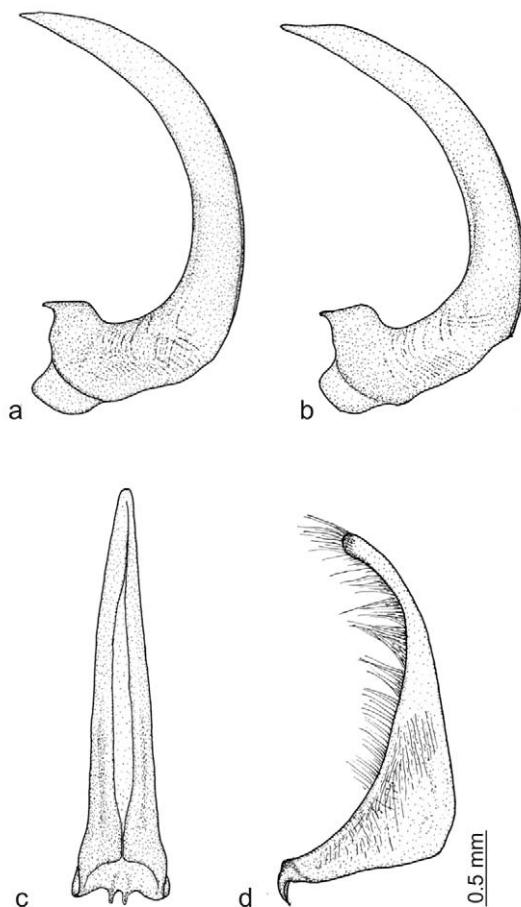


Fig. 4: *Rhantus novaecaledoniae*: a) median lobe of aedeagus in lateral view (Mt. Koghi), b) same (Mt. Mandjélia), c) median lobe of aedeagus in ventral view, d) paramere in external view.

Color: Head black, often with a vague reddish frontal mark. Pronotum black, sometimes vaguely reddish laterally and along the anterior margin. Elytra reddish with many black speckles (Fig. 1c). Ventral surface black.

Surface sculpture: Head with double punctation distinctly impressed, meshes well-defined posteriorly; pronotum with double punctation distinctly impressed, similar to that on head, and well impressed hardly defined meshes only present along lateral margins. Elytra with a fine punctation of almost one size and a very dense fine microreticulation, missing only anteriorly in a small area along suture; in areas with microreticulation punctures hardly visible.

Structures: Pronotum with lateral rim moderately broad (0.15 mm), missing anteriorly.

Male: Pro- and mesotarsomeres I–III distinctly dilated with rows of elongate suction discs ventrally. Protarsal claws simple, gently curved and of equal length, distinctly shorter than

tarsomere 5. Penis and parameres as in Fig. 4a–d; in lateral view, tip of northern specimens from Mt. Mandjélia a bit more flattened (Fig. 4b) compared to southern specimens from Mt. Koghi (Fig. 4a). However, intermediate forms exist.

LARVA: Unknown.

DIAGNOSIS: *Rhantus novaecaledoniae* is very similar to *R. poellerbaueri* in size, shape of body and coloration but can be separated by its fine, relatively dense elytral punctation (punctures almost of equal size) and male genitalia.

HABITAT: Pools in intermittent streams as well as small waterholes in rocks at the edge of such streams from about 20–700 m elevation. In some cases, beetles were retrieved from rock holes of only a few centimeters in diameter, filled with black, foul water.

DISTRIBUTION (Fig. 9): Wide-spread in New Caledonia (Grande Terre, Île des Pins) – see also BALKE (1993).

***Rhantus poellerbaueri* BALKE, WEWALKA, ALARIE & RIBERA, 2007**

Rhantus novaecaledoniae BALFOUR-BROWNE: BALKE 1993: 45 (partim).

Rhantus poellerbaueri [sic!] BALKE et al. 2007: 189 (orig. descr.).

TYPE LOCALITY (see JÄCH & BALKE 2010: Figs. 13, 14): New Caledonia: North Province, Mt. Panié, 1350 m a.s.l. (Loc. 2001/NC 16).

TYPE MATERIAL: **Holotype** ♂ (MNHN): “New Caledonia: North Prov., Mont Panié, 1350 m, 8 - 9. XI.2001, leg. Wewalka (NC 16)”.

Paratypes: 31 ♂♂, 36 ♀♀, 2nd and 3rd instar larvae (CGW, NMW): same data as holotype; 1 ex. (NHML): Ignambi, 1300 m, 2.IX.1914, leg. P.D. Montague; 5 exs. (QMB): Mt. Panié, summit, 20°34'S 164°46'E, 1660 m, 9.XI.2001, leg. C. Burwell “loc. 8772”; 8 exs. (QMB): Mt. Panié, 20°34'S 164°46'E, 1300 m, 16.–18.XI.2000, leg. P. Bouchard, C. Burwell & G. Monteith “loc. 9938”; 2 exs. (QMB): Mt. Panié, 1300–1600 m, 15.V.1984, leg. G. Monteith & D. Cook.

5 ♂♂, 2 ♀♀ (CGW): Loc. 2001/NC 15; 2 exs. (NHML): Loc. 2001/NC 17; 1 ♀ (NMW): Loc. 2001/NC 18a; 3 ♂♂, 3 ♀♀ (NMW): Loc. 2001/NC 19.

DESCRIPTION: Habitus as in Fig. 1b. Body regularly-oval, moderately convex; pronotum at posterior angles as broad as elytra at shoulders, lateral margin moderately curved; elytra regularly-oval, broadest almost in the middle.

Measurements: TL 11.9–14.1 mm (mean: 13.4 mm); TL-h 11.0–12.6 mm (mean: 12.2 mm); TW 6.1–6.9 mm (mean: 6.7 mm).

Color: Head black, sometimes with a very vague reddish frontal mark. Pronotum black, sometimes very vaguely reddish laterally. Elytra reddish with many black speckles which are concentrated in the middle near suture, at the anterior part of suture, near shoulders and near apex; in the subbasal area black speckles are almost missing forming reddish triangle bands neither reaching the suture nor the lateral margin and the base (Fig. 1b). Ventral surface black.

Surface sculpture: Head with distinctly impressed double punctation and hardly defined meshes present only along eyes and posteriorly. Pronotum with distinctly double punctation similar to that on head and well impressed hardly defined wrinkle-like meshes only present along lateral margins. Elytra with a very dense fine microreticulation which is missing only in a small area along the suture anteriorly and fine double punctation similar to that on head; in areas with microreticulation only the larger punctures are visible.

Structures. Pronotum with lateral rim moderately broad (0.15 mm), absent on anterior eighth.

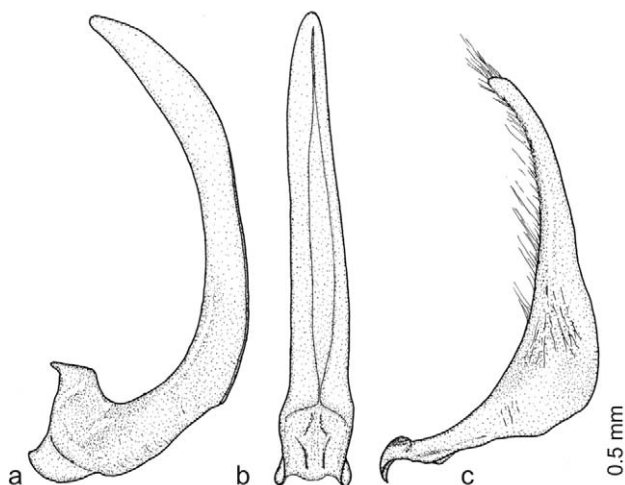


Fig. 5: *Rhantus poellerbaueri*: a) median lobe of aedeagus in lateral view, b) median lobe of aedeagus in ventral view, c) paramere in external view.

Male: Pro- and mesotarsomeres I–III distinctly dilated with rows of elongate suction discs ventrally. Protarsal claws simple, gently curved and of equal length, distinctly shorter than tarsomere 5. Penis and parameres as in Fig. 5a–c.

Larva: Instar III: Color (alcohol preserved specimens): Dorsal surface of head capsule yellowish to pale brown; frontoclypeus with a light brown macula posteriorly; parietal brownish, with several yellowish maculae posteriorly; head appendages yellow; thoracic terga dark brown mesally with several yellowish maculae, yellowish along lateral margins; legs yellow to pale brown; abdominal terga I–VI predominantly dark brown; abdominal terga VII and VIII dark yellow; urogomphus dark yellow.

Head (Fig. 7b): HL = 3.10–3.35 mm (mean = 3.23 mm); HW = 3.48–3.55 mm (mean = 3.51 mm); FCL = 1.10–1.15 mm (mean = 1.13 mm). Cephalic capsule rounded to subquadrate, as broad as long (HL/HW = 0.89–0.94), strongly constricted posteriorly at level of occipital suture, HW/OcW = 2.17–2.25; coronal suture short, 0.65–0.66 times HL; occipital suture well-developed; frontoclypeus strongly convex mesally, 0.34–0.36 times HL, extending medially to about level of lateral lobes [= adnasalia]; apical margin of frontoclypeus with several club-shaped setae variable in size; ocularium present, stemmata visible ventrally and subdivided into 2 vertical series; tentorial pits visible ventrally on each side of middle at about midlength. Antenna. AL = 1.94–1.98 mm (mean = 1.96 mm); shorter than HW; (AL/HW = 0.56); A1 > A2 > A3 > A4, A2/A3 = 1.17–1.20; lateral elongation of antennomere 3 pore-like; antennomere 3 with a ventro-apical spinula. Mandible. Falciform, MndL/MndW = 3.41–3.43; MndL/HL = 0.54–0.59; mandibular channel present, pubescence developed along inner margins; Maxilla. Stipes subrectangular, short and thick; cardo and galea present, lacinia lacking; StpL = 0.55 mm, StpL/length of maxillary palpus = 0.37; GalL = 0.24–0.26 mm (mean = 0.25 mm), 0.40–0.43

times length of maxillary palpomere 1; palpus length = 1.47–1.50 mm (mean = 1.48 mm); AL/length of maxillary palpus = 1.30–1.35; palpomere 1 > 2 > 3, length of palpomere 3/length of palpomere 2 = 0.83–0.84. Labium. Prementum subrectangular, broader than long, slightly sinuate mesally; palpus length = 1.15–1.16 mm (mean = 1.15 mm); length of maxillary palpus/length of labial palpus = 1.26–1.30; palpomere 2 0.63 times as long as palpomere 1. Chaetotaxy. Head capsule with several secondary setae, lateral margin of parietal with 9 short spines; head appendages lacking secondary setae except mandible with several tiny secondary setae (pore-like at lower magnifications).

Thorax: Pronotum trapezoidal dorsally, ovate laterally, widest at about mid-length; length of pronotum about twice that of mesonotum; metanotum subequal to mesonotum in length, both as broad as pronotum; pronotum with a posterotransverse carina; meso- and metanota both with antero- and posterotransverse carina; maximum body width at level of prothorax; thoracic venter membranous; spiracular openings present antero-laterally on mesothorax.

Legs (Fig. 7e): Metathoracic legs longest, about 1.36 times length of prothoracic legs, and 2.28 times HW; femur > coxa > tibia = tarsus > trochanter; tarsus with two claws, posterior claw slightly shorter than anterior claw on pro- and mesothoracic legs, slightly longer on metathoracic leg; anterior metathoracic claw 0.23–0.29 times as long as metatarsus; spinulae on ventral margin of protibia and protarsus strongly developed; tarsal claws lacking spinulae ventro-proximally.

Abdomen: Eight-segmented; LLAS = 2.28–2.30 mm (mean = 2.29 mm); dorsally sclerotized; segments 1–6 membranous ventrally, segments 7 and 8 completely sclerotized; terga 1–7 with antero- and postero-dorsal transverse carina, tergum 8 with an antero-dorsal transverse carina only; segments 1–7 with a pair of spiracular openings; segment 8 subcylindrical, LLAS/HW = 0.64–0.66, abruptly narrowing posterior to insertion of urogomphi; siphon 0.17–0.19 times as long as LLAS, shortly sinuate mesally. Chaetotaxy. Secondary setae predominantly short and spine-like.

Urogomphus (Fig. 7g): One-segmented, lacking a subbasal suture; total length of urogomphus = 2.35–2.40 mm (mean = 2.29 mm), 1.03–1.06 times as long as LLAS, and 0.66–0.69 times as long as HW. Chaetotaxy. Urogomphus lacking secondary setae.

DIAGNOSIS: ADULTS: *Rhantus poellerbauerae* is very similar to *R. novaecaledoniae* in size, shape of body and coloration but can be separated by its double punctation on elytra as well as the shape of male genitalia. LARVAE of *R. poellerbauerae* are distinguished from all other known larvae of the genus *Rhantus* by the absence of secondary setae on the urogomphus. See under *R. monteithi*.

HABITAT: Most specimens of *R. poellerbauerae*, adults and larvae, were collected from underneath rocks at the bottom of dried-out stream pools of a first order stream, where the beetles gathered in clusters. These places were still moist but water seemed only to collect during extended periods of rainfall. The locality was situated directly above the streampools from which we collected *R. monteithi*; the dried-out first order stream feeds these pools. Only one specimen of *R. poellerbauerae* was collected from the pools.

DISTRIBUTION (Fig. 9): North Province of New Caledonia.

ETYMOLOGY: This species is dedicated to Dr. Christine Pöllabauer, Nouméa, New Caledonia. The epithet is unfortunately based on a misspelling, which, according to the International Code of Zoological Nomenclature (Art. 32.5.1) cannot be corrected.

***Rhantus suturalis* (MACLEAY, 1825)**

Colymbetes suturalis MACLEAY 1825: 31.

Colymbetes montrouzieri LUCAS in MONTROUZIER 1860: 243.

Rhantus suturalis MACLEAY: FAUVEL 1868: 176; BALKE et al. 2007: 192.

TYPE LOCALITY: Indonesia: Java.

TYPE MATERIAL: *Colymbetes suturalis*: **Lectotype** ♂ (NHML), designated by BALKE (1993). *Colymbetes montrouzieri*: could not be located (BALKE 1993).

ADDITIONAL MATERIAL EXAMINED (New Caledonia):

NORTH PROVINCE: 2 exs. (NMW): Koniambo, 81 m, 26.XI.2004, leg. C. Pöllabauer.

1 ♀, 1 ex. (CGW, NHML): Loc. 2001/NC 7; 1 ♂, 1 ♀ (CGW): Loc. 2001/NC 27.

SOUTH PROVINCE: 1 ex. (ZSM): New Caledonia: Plateau de Dogny, 976 m, 4.XII.2008, leg. J. Damgaard; 2 exs. (ZSM): Mont Dore District, pond, road CR7 1.8 km E of road CR9, 22°18'S 166°48'E, 19.VIII.2008, leg. A. Gervais "D2".

1 ♀ (CGW): Loc. 2001/NC 1; 3 ♂♂ (CGW, NMW): Loc. 2001/NC 52.

1 ex. (NMW): Loc. 2009/NC 5; 1 ex. (NMW): Loc. 2009/NC 12; 3 exs. (NMW): Loc. 2009/NC 15; 1 ex. (NMW): Loc. 2009/NC 18; 4 exs. (NMW): Loc. 2009/NC 21; 1 ex. (NMW): Loc. 2009/NC 22; 1 ex. (NMW): Loc. 2009/NC 27.

MEASUREMENTS (New Caledonian beetles): TL 11.4–12.2 mm (mean: 11.6 mm); TL-h 10.4–11.3 mm (mean: 10.6 mm); TW 5.9–6.5 mm (mean: 6.2 mm).

DESCRIPTION: This species has been described sufficiently by WATTS (1978) and BALKE (1993). Synonymies, type localities, type specimen data and references were provided by BALKE (1993). For reliable identification, males should be examined. While the male fore and middle claws are subequal in length in other Pacific *Rhantus* species, the inner claw is distinctly shorter in *R. suturalis*, the inner fore-claw (Fig. 6c) also more strongly curved (BALKE 1993, 2001). The habitus and light brown elytral coloration with black speckles readily differentiate this species from other New Caledonian *Rhantus* (Fig. 1e). The median lobe is shown in Fig. 6a–b.

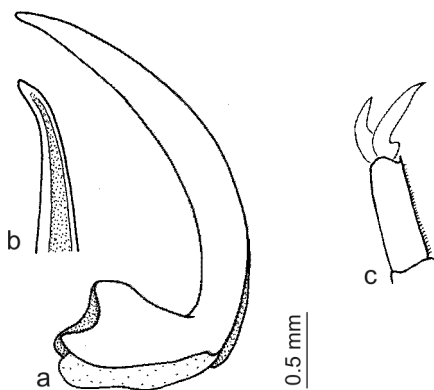


Fig. 6: *Rhantus suturalis*: a) median lobe of aedeagus in lateral view, b) tip of median lobe of aedeagus in ventral view, c) male foreclaw.

HABITAT: In New Caledonia: backflows of slowly flowing streams and streampools on lower altitudes (50–1,000 m).

DISTRIBUTION (Fig. 8): Palearctic, Oriental and Australian Regions (Australia, New Guinea, New Caledonia, New Zealand).

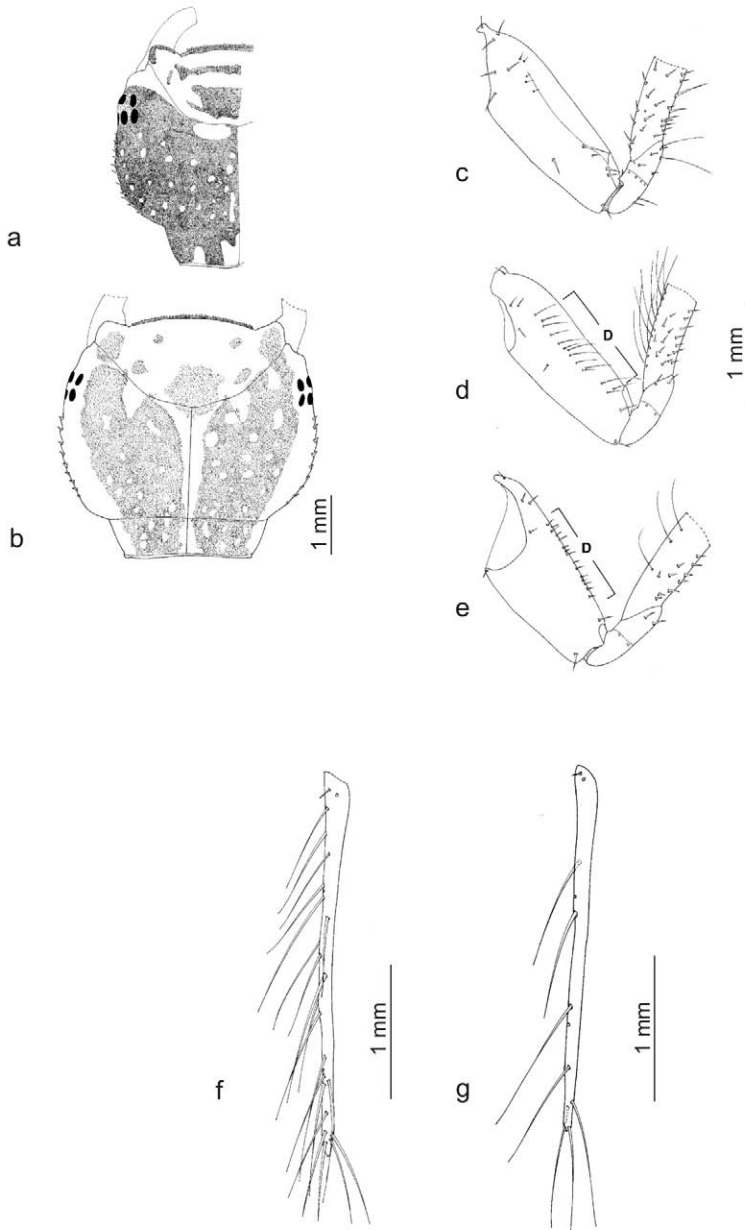
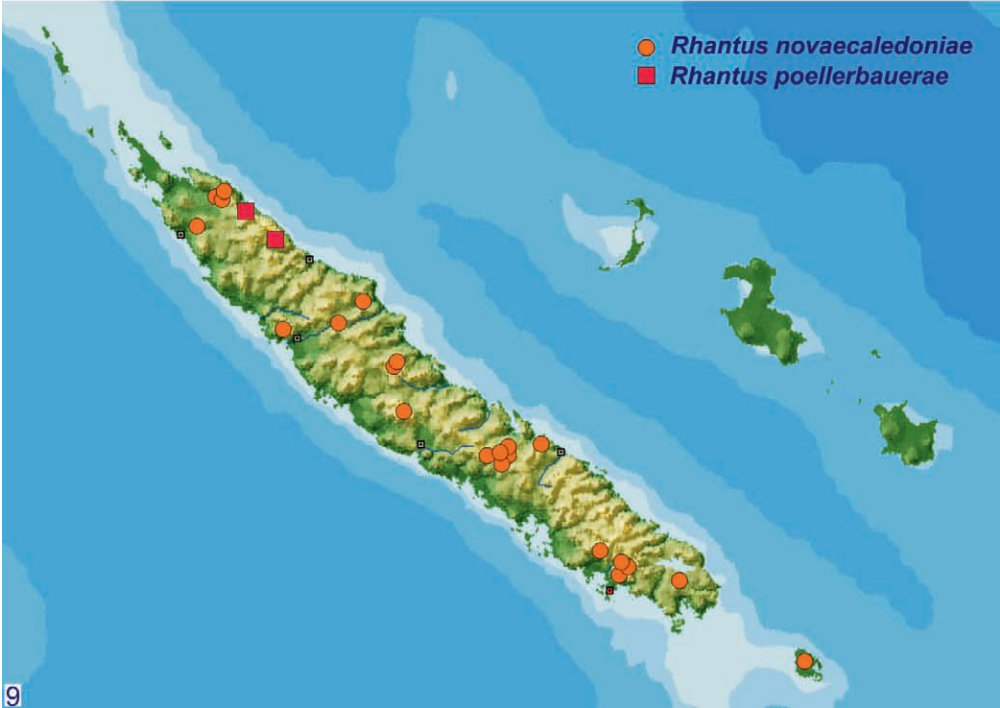
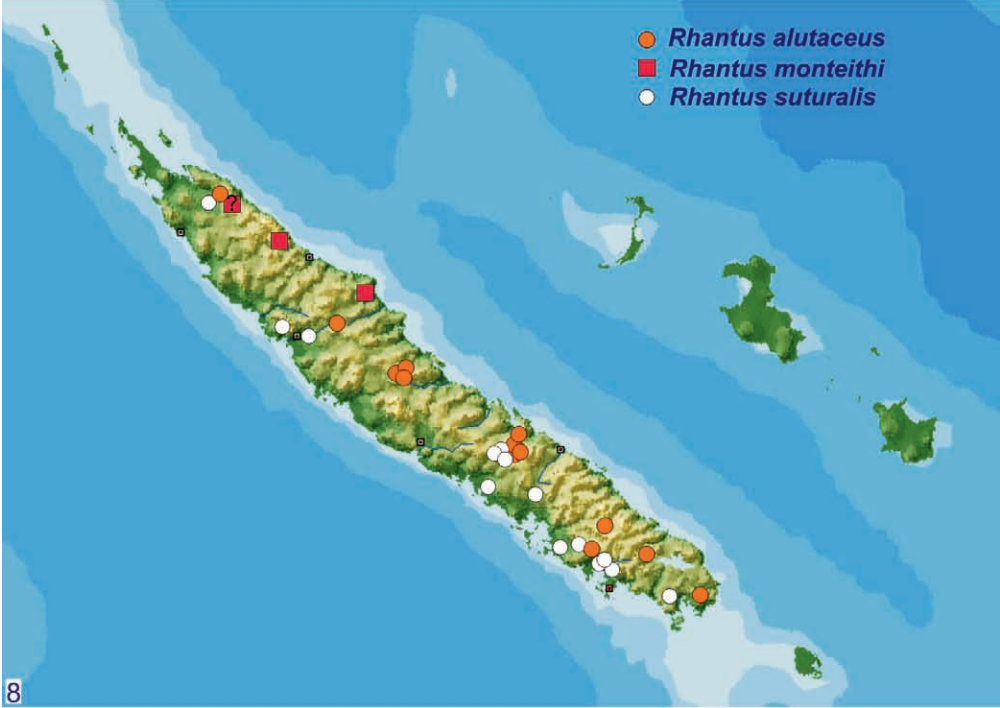


Fig. 7: Larval characters (3rd instar): a–b) head capsule, dorsal aspect of a) *Rhantus monteithi*, b) *R. poellerbaueri*, c–d) proximal portion of metathoracic legs of *R. monteithi*: c) anterior surface, d) posterior surface, e) *R. poellerbaueri*; posterior surface of proximal portion of metathoracic leg, dorsal surface of urogomphus of f) *R. monteithi*, g) *R. poellerbaueri*.



Figs. 8–9: Geographical distribution of *Rhantus* species in New Caledonia.

Species diversity and endemism

There are five species of *Rhantus* in New Caledonia. *Rhantus suturalis* is very wide-spread, being known from the Palearctic, Oriental and Australian Regions. It is a comparably young species, which most likely originated in New Guinea highlands and colonized into New Caledonia via Australia (BALKE et al. 2009). The remaining four species are endemic to New Caledonia (= 80 %), three of these are known only from Grande Terre. Within New Caledonia, *Rhantus alutaceus* and *R. novaecaledoniae* are wide-spread, while *R. monteithi* as well as *R. poellerbaueri* are confined to the mountains of the northeast coast (Figs. 8–9). The four endemic species represent an older element in the New Caledonian fauna. They belong to a clade of *Rhantus* which is isolated from other *Rhantus* species, maybe as its sister group or even more remote in the Colymbetinae phylogenetic tree (BALKE et al. 2009). Closer relatives occur in New Guinea, the Solomon Islands and Hawaii.

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