JÄCH & BALKE (eds.): Water beetles of New Caledonia	part 1	163–169	Wien, May 2010

DYTISCIDAE: *Typhlodessus monteithi* BRANCUCCI – redescription and notes on habitat and sampling circumstances

(Coleoptera)

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Abstract

Typhlodessus monteithi BRANCUCCI, 1985 (Coleoptera: Dytiscidae: Hydroporinae) is illustrated and its original description reproduced. Additional notes on habitat and sampling circumstances of the holotype are given. A world check list of "leaf litter" dytiscids is provided.

Key words: Coleoptera, Dytiscidae, *Typhlodessus monteithi*, montane rainforest, New Caledonia, Grande Terre.

Introduction

More than 4,000 species of Dytiscidae have been described to date (NILSSON 2001, 2007, JÄCH & BALKE 2008) of which – curiously enough – several blind species lacking swimming hairs have been sifted from leaf litter in forests on mountain tops. One of these species, *Typhlodessus monteithi* BRANCUCCI, 1985, was described from a single male collected by G. Monteith (Brisbane, Australia) on Mt. Panié, Grande Terre, New Caledonia. Despite several additional entomological expeditions carried out by G. Monteith and the late J.C. Watt (Auckland, New Zealand), who sifted huge amounts of leaf litter from the forest floor at the type locality and other suitable places in New Caledonia, no other specimen was obtained.

The lack of eyes suggests a hidden existence, but whether this species is indeed terrestrial remains speculative in the absence of more studies, particularly on the larval habitat.

Checklist of "leaf litter" Dytiscidae

Species with eyes	
Geodessus besucheti BRANCUCCI, 1979	North India, Nepal, ? China (Yünnan)
Geodessus kejvali BALKE & HENDRICH, 1996	South India (Kerala)
Species without eyes	
Terradessus anophthalmus BRANCUCCI & MONTEITH, 1997	Australia (Queensland)
Terradessus caecus WATTS, 1982	Australia (Queensland)
Typhlodessus monteithi BRANCUCCI, 1985	New Caledonia

According to R.A.B. Leschen (Christchurch, New Zealand) (personal communication, 2003) a blind leaf litter species belonging to an undescribed genus was discovered in New Zealand and is awaiting description.

Genus *Typhlodessus* BRANCUCCI, 1985

DIAGNOSIS: Habitus as in Fig. 1. Body only 1.25 mm long, testaceous, dorsoventrally flattened. Head without eyes, without clypeal grooves and cervical stria. Pronotum strongly depressed on posterior half, posterior angles protruding. Elytra with five costae. Prosternal process very small, broadly triangular, strongly depressed, narrowly rounded at apex. Metacoxal processes rather flat and situated almost at the same level as abdomen, not covering the proximal part of the metatrochanters. Legs without swimming hairs. Metatibiae short (BRANCUCCI 1985).

Typhlodessus monteithi BRANCUCCI, 1985

TYPE LOCALITY: New Caledonia, North Province, Mt. Panié, 1300–1600 m.

TYPE MATERIAL: **Holotype** ♂ (Queensland Museum, Brisbane): "NEW CALEDONIA Mt Panié 15 May 1984 G. Monteith & D. Cook", "Q.M. BERLESATE No. 649, 20.35S X 164.47E Rainforest, 1300-1600m Moss & Litter", "HOLOTYPE T. 10731 Typhlodessus monteithi n.gen. n.sp. det. M. Brancucci 85".

DESCRIPTION: Body elongate (Fig. l), subparallel-sided, testaceous, unicolored.

Measurements: Body length 1.25 mm; body width 0.55 mm.

Head: Broad, eyes absent, only a small rounded black spot visible at anterior corner of usual eye-position. No distinctly impressed clypeal grooves visible. Ground sculpture consisting of very small polygonal meshes on disc, of slightly larger ones on clypeus and vertex, and of several large punctures on lateral part. Vertex with a pair of slight admedian depressions. Antennae short; antennomeres 1 and 2 long and broad; 3–5 very small, globular, 6–10 progressively broadened, 11 elongate, distinctly broadened at middle.

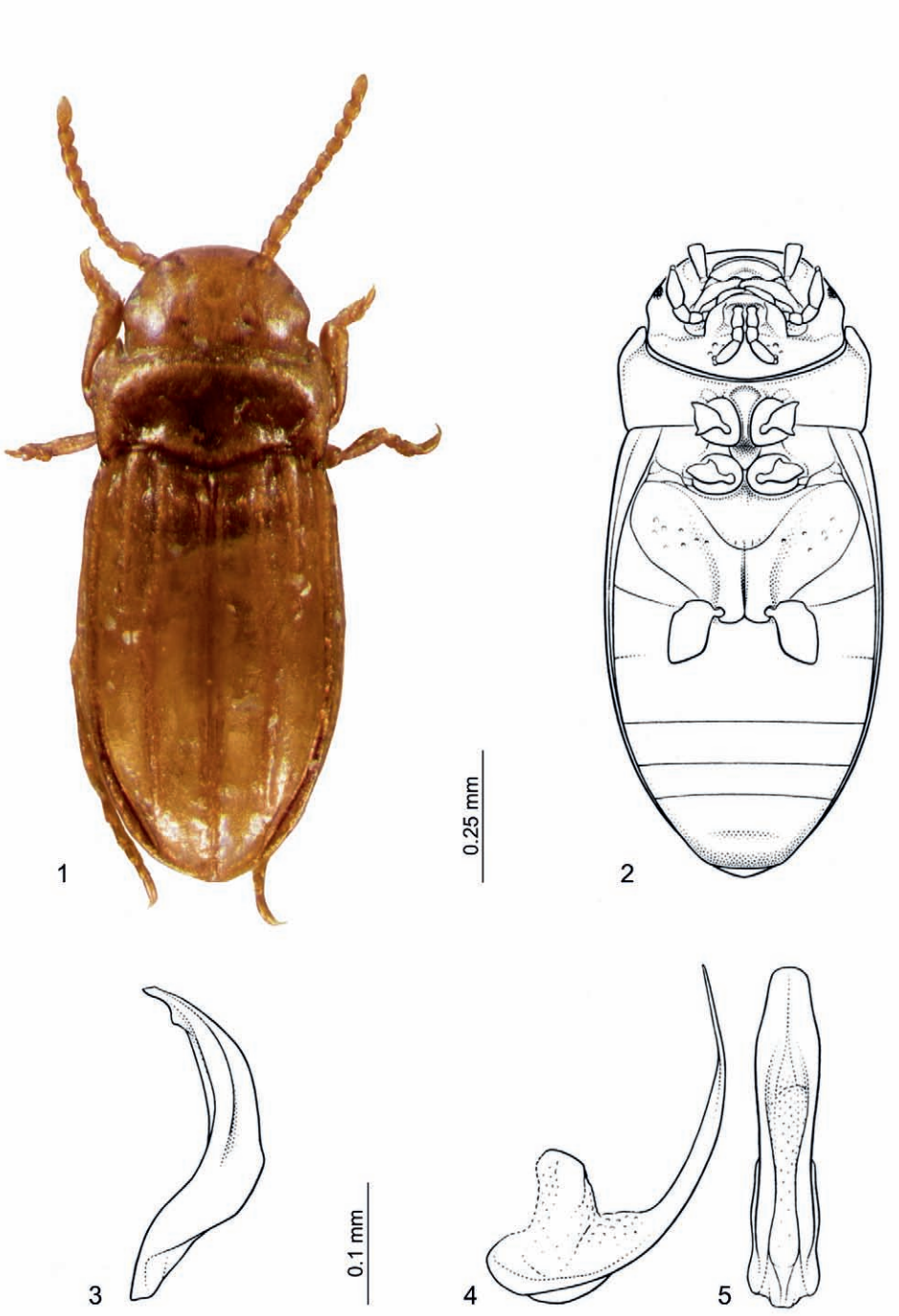
Pronotum: Twice as broad as long, widest in anterior half, strongly depressed on posterior half, particularly near posterior margin just before posterior angles, produced antero-laterally along side of head. Anterior margin slightly rounded. Lateral margins finely bordered, slightly converging posteriorly, suddenly curved just before anterior angles. Posterior margin convex and rounded at middle, becoming concave before reaching posterior angles. Posterior angles acute, projecting onto elytra. Surface sculpture alutaceous, consisting of small polygonal meshes. Several large punctures also present along anterior margin and a few at middle of posterior half.

Elytra: Parallel-sided on anterior 2/3, evenly tapering in posterior part, and broadly rounded at apex; with five costae, a weak sutural one, a long strong discal one almost reaching apex, a short but strong sublateral one (1/3 of elytral length), a long strong lateral one reaching and bordering apex, and a weak one between sublateral one and epipleuron. Ground sculpture alutaceous, consisting of small, weakly impressed polygonal meshes.

Wings atrophied.

Legs: Profemora thin proximally, strongly broadened at middle. Tibiae and tarsi without swimming hairs. Metatibiae short. Metatrochanters broad (Fig. 2).

Ventral side: Lateral extensions of metaventrite very short. Metacoxal lines absent. Metacoxal processes broad, deeply excavated at sides; posterior margin rounded. Last ventrite transversely depressed (Fig. 2). Entire underside very sparsely and finely punctate, alutaceous, with weak and obsolescent microreticulation.



Figs. 1–5: *Typhlodessus monteithi*: 1) habitus of holotype (photograph); 2) ventral side; 3) right paramere; 4) median lobe of aedeagus in lateral view and in 5) ventral view (Figs. 2–5 after BRANCUCCI 1985).

Genitalia: Parameres elongate, with an inner tooth slightly below apex (Fig. 3). Median lobe of aedeagus in ventral view elongate; margins subparallel in basal part, slightly broadened behind middle, gently converging anteriorly and truncate at apex (Fig. 5). In lateral view apical third very thin, slightly curved and flattened (Fig. 4).

Female: So far unknown.

DISTRIBUTION (Fig. 6): Known only from the type locality.

Fig. 6: Map of New Caledonia indicating the type locality of *Typhlodessus monteithi*.

COLLECTING NOTES: Mt. Panié is the highest mountain of Grande Terre. It rises immediately from the shores of the east coast, about 90 km southeast of the northern tip of the island. This mountain is among the wettest in New Caledonia and largely covered with primary rainforest. The main walking track to the summit starts from the coast on the east side and passes via a refuge hut at 1,300 m. The holotype of *Typhlodessus monteithi* was obtained by using a Berlese funnel extraction (Fig. 9) of sifted leaf litter sampled between 1,300 m and the summit at 1,600 m (Fig. 8). The forest at that point is very diverse (Fig. 7), with many conifers such as *Agathis* and *Araucaria* and a dense understorey of palms, *Pandanus* and other plants (HLAVÁC et al. 2006; Monteith, personal communication).

Figs. 7–9: Mt. Panié; 7) high altitude wet palm and conifer forest above 1,300 m, special botanical reserve on the east face of the mountain; 8) Australian entomologists D. Cook (left) and G. Monteith on the summit (1,600 m), in May 1984; 9) refuge hut in May 1984 at the time when *Typhlodessus monteithi* was collected; on the left are the red funnels being used to extract insects from leaf litter collected in the red bags on the ground; D. Cook is waiting to process the samples.

Discussion

Typhlodessus monteithi, *Terradessus caecus* and *T. anopthalmus* totally lack swimming hairs on the legs. They were all collected among moss and litter in higher-altitude rain forests. Morphologically, *Typhlodessus* is not similar to *Terradessus*. The absence of eyes obviously is a convergent reduction as an adaptation to derived habitats. Both genera undoubtedly belong to the Hydroporinae, but their position within this subfamily remains unclear: some features such as the structure of the metacoxal processes or metatibiae suggest a placement in the Bidessini. Other structures such as the prosternal process or parameres suggest a placement in the Hydroporini.

However, the question of the phylogenetic position within the Hydroporinae will only be resolved when fresh material becomes available for molecular systematic studies.

Both species of the genus *Geodessus* BRANCUCCI were also sifted from leaf litter and were referred to as being terrestrial (BALKE & HENDRICH 1996). But in contrast to *Typhlodessus* and *Terradessus* they possess eyes. Specimens (probably belonging to *Geodessus besucheti*) were collected by H. Schönmann in China (Yünnan) at 1,300 m in a small stream flowing through dense forest (CWBS loc. 389, see JÄCH & JI 2003).

The life history and habitat of *Typhlodessus monteithi* remain unclear. The lack of eyes is suggestive of an existence hidden from light, where eye sight offers no advantage; the lack of swimming hairs suggests crawling and/or burrowing locomotion. Collecting around the type locality of *Typhlodessus monteithi* by M. Balke and G. Wewalka in 2001 yielded the aquatic diving beetles *Exocelina monteithi* WEWALKA et al., 2010 and *Rhantus poellerbauerae* BALKE et al., 2007 in large numbers hidden under rocks in dried-out first order stream beds. *Exocelina monteithi* has small eyes, similar to Australian species of *Exocelina* BROUN, which have been found half-way underground in gravel besides streams (M. Balke, personal communication). The sites where *Exocelina monteithi* and *Rhantus poellerbauerae* were hiding have coarse sandy/gravelly substrate which might offer enough space for smaller beetles. *Typhlodessus monteithi* might have entered this environment and may indeed dwell in such a moist subterranean habitat, which could explain its morphology substantially differing from other diving beetles.

The occurrence of several additional rare water beetle species belonging to the genera *Dactylosternum* WOLLASTON, 1854, *Psalitrus* ORCHYMONT, 1919 (FIKÁČEK 2010a), *Kanala* BALFOUR-BROWNE, 1939 (all Hydrophilidae) (FIKÁČEK 2010b) as well as the Dytiscidae *Exocelina monteithi*, *E. poellabauerae* WEWALKA et al., 2010, *Necterosoma schoelleri* HENDRICH et al., 2010, *Rhantus monteithi* BALKE et al., 2007 and *R. poellerbauerae* indicate the high conservation value for the macroinvertebrate fauna of the remaining rainforest patches and aquatic habitats around Mt. Panié.

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