

**Taxonomic notes on New Caledonian *Dematochroma samuelsoni* Jolivet,
Verma et Mille and *D. difficilis* (Heller) (Coleoptera, Chrysomelidae:
Eumolpinae)**

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Abstract – The study of specimens that are part of the Hungarian Natural History Museum helps fixing the identity and systematic placement of *Dematochroma samuelsoni* Jolivet, Verma et Mille, 2007, as closely allied to *D. difficilis* (Heller, 1916). The males of *D. samuelsoni* had been overlooked in the original description because of sexual dimorphism resulting precisely in the lack of the apomorphic character for the species in males. This situation is recognised here and the availability of male specimens is used to describe the penis of the species. With 3 figures.

Key words – New Caledonia, sexual dimorphism, taxonomy

INTRODUCTION

The entomological collection of the Hungarian Natural History Museum (HNHM) hosts a small but very interesting representation of New Caledonian Eumolpinae collected in the expeditions of the prestigious Hungarian biologist and oribatid mite specialist, Prof. János Balogh. Among them, I found a series of specimens collected near the summit (at some 1360–1450 m) of Mont Panié of a species recently described from this same locality, albeit at lower elevation (JOLIVET *et al.* 2011): *Dematochroma samuelsoni* Jolivet, Verma et Mille, 2011. This species was founded on six female specimens and on the basis of a highly conspicuous character, namely the presence of numerous, small warts on the anterior half of lateral declivity of elytra. Given that the authors had only seen females, they adventured that the species may be parthenogenetic (JOLIVET *et al.* 2011).

A most likely explanation, particularly considering the small sample size for their species description, was that they had simply missed the chance to collect males of the species because of some sampling bias or unknown effect. But an alternative justification, which may become more common as we know more about New

Caledonian Eumolpinae, is that sexual dimorphism jeopardised the correct match of males and females of the same species. Striking sexual dimorphism is not rare in New Caledonian eumolpine species, and has been described for other genera such as *Taophila* Heller, 1916 (SAMUELSON 2010, GÓMEZ-ZURITA & CARDOSO 2014). However, a paradigmatic case of the problem that this may represent for the taxonomy of New Caledonian Eumolpinae is the genus *Acronymolpus* Samuelson, 2015, where the males and females of the two known species of the genus were actually described as different species (SAMUELSON 2015, GÓMEZ-ZURITA 2017). Indeed, the small series of *D. samuelsoni* at HNHM includes two male specimens, which show evidence of the species being sexually dimorphic: besides more slender proportions and enlarged first fore and mid tarsomeres, which are more or less standard male attributes in many leaf beetles, these specimens also lack the elytral rugosities that characterise the females of the same species. Apart from realising this important gender difference, having recognised the males of *D. samuelsoni* allows the description of the penis of the species, which will help its identification, its diagnosis and also its correct systematic placement.

THE PENIS OF *DEMATOCHROMA SAMUELSONI*

Material – The penis of *D. samuelsoni* is described based on two male specimens, one labelled “NEW-CALEDONIE, Mont Panié / 8.X.1977, leg. Dr. J. Balogh / *Dematochroma samuelsoni* Jolivet *et al.* J. Gómez-Zurita det. 2017”, and one labelled “New-Caledonie, Mont Panié, 1360-1450 m / 7.X.1977, leg. Dr. J. Balogh / *Dematochroma samuelsoni* Jolivet *et al.* J. Gómez-Zurita det. 2017”. (The series also includes three females with the same data as the latter.)

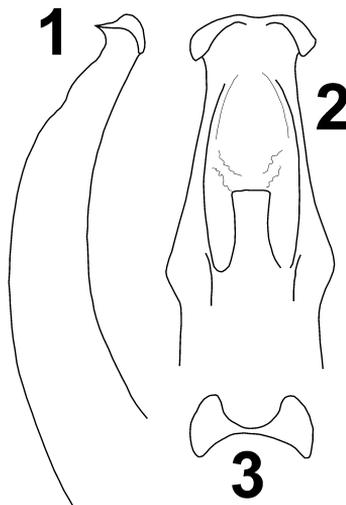
Description of the penis – The penis of *D. samuelsoni* is slender, regularly curved ventrally from base to apex (Fig. 1), nearly cylindrical for most of its length, or imperceptibly narrowing apically, and with a very characteristic apical region. The tip of the penis in dorsal view is elongate, with abrupt angular enlargements at the base, before gradually narrowing towards apex; the operculum is also elongate, oblong, occupying most of the penis width, and limited basally by a narrow, longer than wide flap (Fig. 2). The apex is gradually enlarged both laterally and dorsoventrally at sides, while narrowed dorsoventrally at middle with a very unique shape, biconcave at dorsal and ventral surfaces, with concavity more pronounced in the latter (Fig. 3); the apex is convex and projects pointed lateral tips dorsally.

TAXONOMIC AFFINITIES OF *DEMATOCHROMA SAMUELSONI*

JOLIVET *et al.* (2011) compared their *D. samuelsoni* with and endorsed (phylogenetic) closeness to *D. maculifrons* (Heller, 1916), referring their separation

based on the aforementioned elytral feature, present in the former, lacking in the latter. It is interesting to note that, in the same work, they reported three specimens of *D. maculifrons* from the same locality and the same collection event as the type series of *D. samuelsoni*, which I have no doubt that correspond to the overlooked males of this species. In any case, the most pertinent comparison should have been another. This species is actually almost indistinguishable externally from another species, *D. difficilis* (Heller, 1916), at least in the case of males. The best chance to separate the two species is by examining females, which in the case of *D. difficilis* lack the warty subhumeral area on elytra, and at most show weak transverse irregularities (GÓMEZ-ZURITA 2011). Other than that, the clearly different apex of the penis should make it possible to recognise males of both species. Precisely the type of penis, with relatively intricate apex, and reminiscent of the very unique penis of *D. difficilis* (GÓMEZ-ZURITA 2011), makes one of the strongest arguments for both the separate identity and the close relatedness of both species.

Apart from an advance in the knowledge of New Caledonian biodiversity, this finding is interesting for another reason: *D. difficilis* was described from Tao, a locality at sea level in the northern slopes of Mont Panié (HELLER 1916), and it has been reported for several localities in the centre and north of the island, including Mandjélia, at 787 m, in the same massif as Mont Panié (GÓMEZ-ZURITA 2011). *D. samuelsoni* thus seemingly represents a highly localised, high-elevation endemism, so far only known from localities above 1000 m. The Mont



Figs 1–3. *Dematochroma samuelsoni* Jolivet, Verma et Mille, 2011: 1 = lateral profile of the penis, 2 = dorsal view of the apex of penis, 3 = transverse view of the tip of penis showing more pronounced ventral concavity of the penis

Panié, with 1628 m, is the highest peak of the Massif du Panié in the north of Grande Terre, and it is a well-known area of endemism in New Caledonia, particularly in the case of plants, constituting the top hotspot of plant narrow endemism in the island (WULFF *et al.* 2013).

Proving the sister relationship between *D. difficilis* and *D. samuelsoni* would allow examining the circumstances for their speciation and contrasting distribution patterns. But these may not be the only closely allied species in this tight group. The collection of the HNHM includes two female specimens with warty transverse prominences in subhumeral area, somehow an intermediate state between the nearly flat and the bumpy states of *D. difficilis* and *D. samuelsoni*, respectively. Moreover, these specimens are darker on head and pronotum, which are chestnut-brown, and on elytra, which are brown with dark brown, broad longitudinal diffuse area on outer half of elytra, from base to apical declivity. Darker morphs are known for *D. difficilis*, yet they lack the elytral rugosity, and both specimens are from the south of Grande Terre, in the Nouméa region (“New Caledonia, Nouméa, Mt. Koghi / 12-13.II.1977, leg. Dr. J. Balogh” and “New Caledonia, Nouméa, Thie Forest, 14.I.1969 / No. PC-U.5, leg. Dr. J. Balogh”), where *D. difficilis* is not known. It is likely that these specimens, which apart from elytral rugosity show relatively prominent teeth on anterior angles of pronotum as a distinctive feature, belong to a third southern species in this group. However, the lack of males to confirm the singularity of a possible new species, and knowing how useful the differences in the apical part of penis are to recognise these species, strongly recommend avoiding a formal description.

INSIGHTS ON NEW CALEDONIAN GENERA OF EUMOLPINAE

Despite having overlooked the high similarity between *D. samuelsoni* and *D. difficilis*, the assessment by JOLIVET *et al.* (2011) recognising the proximity between the former and *D. maculifrons* is, in my opinion, quite accurate too. HELLER (1916) described several species of Eumolpinae very different externally, among them the current *D. maculifrons*, and placed all of them in the genus *Thasyclus* Chapuis, 1874, opposing the view expressed by BALY (1881), who had synonymised Chapuis' genus with his own *Dematochroma* Baly, 1864. After the synonymy was restored by SEENO & WILCOX (1982), several other species with remarkably different appearance have been placed in this same genus.

At the same time, other genera have been created to accommodate equally highly divergent species, but without a defining set of characters that diagnose them. As they stand today, genera like *Dematochroma*, *Montrouzierella* Jolivet, Verma et Mille, 2007, *Samuelsonia* Jolivet, Verma et Mille, 2007 and *Dumbea* Jolivet, Verma et Mille, 2007, possibly represent polyphyletic, or at least mutually paraphyletic taxa.

Particularly the three latter were not based on apomorphies, but rather on a general, rather subjective perception of body size and proportions (JOLIVET *et al.* 2007a). But *D. difficilis*, *D. samuelsoni* and *D. maculifrons* belong to a rather homogeneous group of species in their generally elongate shape, with elytra subparallel at base and regularly round at apex, but most remarkably in the form of their pronotum. These species share a cordiform pronotum, transverse, with lateral margins typically explanate, with anterior border not much narrower than the posterior one, with sides emarginate at base (in the case of these species, the explanate margin narrows considerably in this area), projecting teeth at posterior angles laterally, and with anterior angles also forming small teeth and placed on anterior border of pronotum owing to the strong lateral curvature of pronotal border. Other species that could follow this general pattern are *D. fusca* Jolivet, Verma et Mille, 2007, *D. sylviae* Jolivet, Verma et Mille, 2010, *Montrouzierella tuberculata* Jolivet, Verma et Mille, 2007, or *D. laboulbenei* (Montrouzier, 1861) (see JOLIVET *et al.* 2007a, b, 2010, MONTROUZIER 1861).

It is early to make decisions, and only a deeper, character-based analysis of the organization of New Caledonian Eumolpinae can help fixing the general disarrangement of genera affecting this group. Yet, however small, establishing natural groups like the one recognised here with *D. difficilis* and *D. samuelsoni*, and possibly *D. maculifrons*, will gradually help this goal.

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