



Notes on Madagascan Stoneflies (Plecoptera: Notonemouridae)

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Abstract

Madagascar is inhabited by the single stonefly genus, *Madenemura* Paulian (= *Tsaranemura* Paulian, **new synonymy**). The original material of R. Paulian and the types of all nominal species proposed by him are lost. The type species, *M. capuroni* Paulian is distinct but material is presently not available. *Madenemura andringitrensis* Paulian (= *M. perrieri* Paulian, **new synonymy**), *M. descarpentriesi* Paulian, and *M. culminalis* Paulian are redescribed from subjectively identified fresh material. *Madenemura pauliani* **new species** is named from two females with overlong ovipositor. *Madenemura bezanozano* Paulian and *M. stuckenbergi* Paulian are **doubtful species** that cannot be recognized among the presently available material.

Key words: morphology, taxonomy, new species, new synonymy, endemism

Introduction

The stonefly family Notonemouridae belongs to the superfamily Nemouroidea in the suborder Arctoperlaria. The Arctoperlaria are believed to have originated in the northern hemisphere but they do include a few taxa occurring exclusively in the southern hemisphere, namely the South American Anacroneuriini among the Perlidae, and the Notonemouridae. The Notonemouridae are represented by endemic genera in New Zealand, Eastern Australia, Andean South America, southernmost Africa, and Madagascar. The monophyly of the Notonemouridae and their biogeography pose unanswered questions (Zwick 2000).

The first Plecoptera on Madagascar were discovered by R. Paulian (1949) who was impressed by the abundance of larvae in a stream. The only available adult was a female. Paulian (1949) erected the new genus *Madenemura* assuming that it was closely related to some African genera, e.g., *Aphanicerca* Tillyard and *Aphaniceropsis* Barnard. Additional species that Paulian (1951, 1959) named later were based on female types. Males were briefly described but not named because the group is so homogenous that to recognize conspecific sexes, mating pairs would be required. However, specimens in copula were not and still are not available. Barnard (1934) had experienced a similar problem in his study of South African Notonemouridae.

After Paulian, the taxonomy of Madagascan Plecoptera have not been subsequently studied. All nominal species are similar, for the identification of fresh material described below it would have been desirable to study the types. According to the publication (Paulian 1959) several types should have been deposited in the Muséum National d'Histoire Naturelle, in Paris. Apparently they are not, they appear also not in the database of the museum. In fact, in a personal conversation, R. Paulian indicated to M. Sartori that all his material remained on Madagascar and was lost (Sartori, pers. comm., 6 Oct. 2015; see also Tierno de Figueroa *et al.* 2007).

The nominal species have to be interpreted from the descriptions alone. They are brief, occasionally only a reference to an accompanying small figure. Most figures of females show only the left body half, in ventral view. Attempts to reconstruct entire abdominal tips using digital imaging failed because slight inaccuracies in the position of the sagittal plane rendered the reconstructions arbitrary.

Taxa which cannot unambiguously be recognized from the description and of which fresh material is not available are doubtful. This applies to some unnamed males and to

Madenemura stuckenbergi Paulian, 1959: 12, fig. I; *species inquirenda*.

Madenemura bezanozano Paulian, 1959: 12, figs. 5, IV; 6, III; *species inquirenda*.