



Revision of the Fijian *Chimarra* (Trichoptera, Philopotamidae) with description of 24 new species

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Table of contents

| | |
|--|----|
| Abstract | 2 |
| Introduction | 2 |
| Material and methods | 3 |
| Systematics | 6 |
| Key to Fijian Trichoptera families (adults) and Philopotamidae species (males) | 6 |
| Philopotamidae Stephens, 1829 | 7 |
| <i>Chimarra</i> Stephens, 1829 | 7 |
| <i>Chimarra nervosa</i> (Brauer), nomen dubium | 8 |
| <i>Chimarra vanuensis</i> , new species | 8 |
| <i>Chimarra macuatensis</i> , new species | 15 |
| <i>Chimarra signata</i> Banks | 17 |
| <i>Chimarra schlingeri</i> , new species | 19 |
| <i>Chimarra nathani</i> , new species | 20 |
| <i>Chimarra braueri</i> , new species | 22 |
| <i>Chimarra vitiensis</i> , new species | 23 |
| <i>Chimarra karoyanitensis</i> , new species | 25 |
| <i>Chimarra tokotaai</i> , new species | 26 |
| <i>Chimarra vuda</i> , new species | 28 |
| <i>Chimarra naitasirensis</i> , new species | 30 |
| <i>Chimarra veisarensis</i> , new species | 31 |
| <i>Chimarra fijiana</i> , new species | 33 |
| <i>Chimarra abacensis</i> , new species | 34 |
| <i>Chimarra manni</i> Banks | 36 |
| <i>Chimarra cakaudrovensis</i> , new species | 38 |
| <i>Chimarra cartwrighti</i> , new species | 40 |
| <i>Chimarra kimminsi</i> , new species | 41 |
| <i>Chimarra kadavuensis</i> , new species | 43 |
| <i>Chimarra lavensis</i> , new species | 44 |
| <i>Chimarra devoensis</i> , new species | 46 |
| <i>Chimarra helomyzida</i> , new species | 47 |
| <i>Chimarra tipulida</i> , new species | 49 |
| <i>Chimarra psychodida</i> , new species | 50 |
| <i>Chimarra levuensis</i> , new species | 52 |
| <i>Chimarra malickyi</i> , new species | 53 |
| <i>Chimarra obscurella</i> Banks | 55 |
| Acknowledgements | 56 |
| References | 57 |

Abstract

The philopotamid genus *Chimarra* (Trichoptera) of Fiji is revised. The previously described species *Chimarra nervosa* (Brauer, 1867) is considered a *nomen dubium*. *Chimarra indigota* Mosely, 1941, is synonymized with *Chimarra manni* Banks, 1924. The following 24 new *Chimarra* species are described: *C. vanuensis*, *C. macuatensis*, *C. schlingeri*, *C. nathani*, *C. braueri*, *C. vitiensis*, *C. karoyanitensis*, *C. tokotaai*, *C. vuda*, *C. naitasirensis*, *C. veisarensis*, *C. fijiana*, *C. abacensis*, *C. cakaurovensis*, *C. cartwrighti*, *C. kimminsi*, *C. kadavuensis*, *C. lavensis*, *C. devoensis*, *C. helomyzida*, *C. tipulida*, *C. psychodida*, *C. levuensis*, and *C. malickyi*. *Chimarra signata* Banks, 1936, *C. manni* Banks, 1924, and *C. obscurella* Banks, 1924, are re-described based on type material.

Key words: caddisflies, Chimarrinae, re-descriptions, Southwest Pacific

Introduction

The Fiji Islands constitute an archipelago of 332 volcanic Melanesian islands located about 1,800 km NE of New Zealand, 1,800 km SE of Solomon Islands, and 800 km E of Vanuatu. The total land area is about 18,300 km², corresponding to the land area of New Caledonia. The area of the 4 islands Viti Levu, Vanua Levu, Taveuni Island and Kadavu Island is equivalent to 92% of Fiji's total land area. Most of the islands are covered by rainforest and have a mean yearly temperature of around 25°C (Neall & Trewick 2008). A high number of permanent streams and rivers drain the interior highlands of the larger islands, forming suitable and diverse habitats for various aquatic insect groups. The caddisfly (Trichoptera) fauna of Fiji is poorly known, comprising 39 described species in 8 families, all of which can be ecologically associated with running water. Permanent freshwater habitats on the islands are possibly of Miocene age, since Strandberg & Johanson (2011) argued from molecular data that a monophyletic group of *Apsilochorema* caddisflies (Hydrobiosidae) from Fiji separated from the Vanuatuan sister species about 16 million years ago (mean age). This time corresponds with the age of the earliest available land dated to Middle Miocene (Neall & Trewick 2008). Espeland & Johanson (2010) found that Fijian hydropsychid caddisflies form a monophyletic sister group to a monophyletic New Caledonian clade that separated during Middle Oligocene, approximately 29.5 million years ago (mean age), well ahead of the supposed existence of terrestrial Fijian land.

The first caddisfly species described from the country were *Abacaria picea* (Brauer, 1867), *Abacaria ruficeps* (Brauer, 1867) (both Hydropsychidae) and *Chimarra nervosa* (Brauer, 1867) (Philopotamidae), the first 2 described originally in the genus *Hydromanicus*, and the latter described originally in the genus *Wormaldia*. Banks (1924, 1936) described 10 more species and added Calamoceratidae, Goeridae, Leptoceridae and Polycentropodidae to the known Fijian fauna. Mosely (1933, 1941) described 6 species from the islands, and recorded the family Hydrobiosidae for the first time. Ross (1951) described 2 species from Fiji in that family. The next work on Fijian Trichoptera, was published 38 years later by Kelley (1989), who described *Oxyethira fijiensis*. This represented the first record of the family Hydroptilidae from the country. The latest additions to the knowledge of the Fijian Trichoptera diversity were those by Oláh *et al.* (2006), Johanson & Oláh (2008), and Oláh & Johanson (2010a, 2010b) who described 17 species in Hydropsychidae, Goeridae, Polycentropodidae, and Calamoceratidae, respectively.

One of the first caddisfly families reported from the islands is Philopotamidae (Brauer 1867). The family is presently divided into 3 subfamilies (Blahnik 1998), with the genus *Chimarra* Stephens, 1829, classified in the Chimarrinae.

Adults of *Chimarra* species are distinguished from species in other philopotamid genera by a set of morphological features (Blahnik 1998), including spur formula 1,4,4 and hind wings with the A2 vein looped to join the A1 vein, forming a closed cell. Of the 4 subgenera of *Chimarra*, subgenus *Chimarra* is distributed worldwide, while the subgenera *Chimarrita*, *Curgia*, and *Otarra* are restricted to the Neotropical Region, except that a few species of the subgenus *Curgia* also recorded from the Nearctic Region. The species of the Australasian Region all belong to the subgenus *Chimarra*.

With about 660 previously described species globally (Johanson & Espeland 2010, Johanson *et al.* 2011), *Chimarra* constitutes the second largest caddisfly genus in terms of species diversity, surpassed only by *Rhyacophila* Pictet, 1834 (Rhyacophilidae) (718 species, Morse 2010), and is known from all biogeographical regions except Antarctica. Two-thirds of the species in *Chimarra* are restricted to the Neotropical and Oriental biogeographical