



## Two new species of Asian *Serratella* Edmunds (Ephemeroptera: Ephemerellidae)

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### Abstract

Two new species of *Serratella* Edmunds (Ephemeroptera: Ephemerellidae: Ephemerellinae: Hyrtanellini) are described based on larvae from China and Iran. *Serratella brevicauda*, new species, is distinguishable from other Hyrtanellini based on its short caudal filaments and its relatively large body size. *Serratella elissa*, new species, is distinguishable from other Hyrtanellini based on a combination of its having paired tufts of spatulate setae and no paired spines on abdominal terga and having tarsal claws with denticles nearly subequal in size. The state of Asian *Serratella* systematics is reviewed, and some problems of Hyrtanellini systematics are discussed. Modifications to a recent identification key for ephemerellid larvae are suggested.

**Key words:** Ephemerellinae, Hyrtanellini, Palearctic, Iran, China, description, identification

### Introduction

As part of our studies of Ephemerellidae (Ephemeroptera), we discovered two undescribed larvae from stream samples taken in China and Iran. The placement of these species within the phylogenetic framework of Jacobus and McCafferty (2008) was not clear when relationships were explored using MacClade (Maddison & Maddison, 2005). We provisionally consider these two species to be part of the genus *Serratella* Edmunds (Ephemerellinae: Hyrtanellini) because they have cleft ventral lamellae of gills 6 but lack the defining characteristics of all other Hyrtanellini genera. We reiterate that *Serratella* may not be monophyletic and that it requires additional study. The related genus *Quatica* Jacobus & McCafferty contains three species and also may be non-monophyletic (Jacobus & McCafferty, 2008).

*Serratella* recently was revised to include fifteen species from the Oriental, Palearctic and Nearctic regions. Ogden *et al.* (2009) provided alternative hypotheses about the phylogenetic relationships of *Serratella* to other ephemerellid groups, based on analyses of morphological and molecular data from two species collected in the United States and Japan: *Serratella serrata* (Morgan) and *S. tsuno* Jacobus & McCafferty (= *Ephemerella cornutus* Gose of Ogden *et al.*, 2009). The Ogden *et al.* (2009) study was published after the revisions of Jacobus & McCafferty (2008) but was admitted to the publication process before the revisionary work and therefore utilized only names available at the time (ICZN, 1999). The other *Serratella* species included by Ogden *et al.* (2009) was transferred by Jacobus & McCafferty (2008) to the genus *Matriella* Jacobus & McCafferty (Ephemerellinae: Ephemerellini).

As mentioned above, *Serratella* and *Quatica* need further systematic study, especially the association and detailed characterization of male adults and larvae, examination of egg chorionic ultrastructures and analysis of additional molecular data (Jacobus & McCafferty, 2008; Ubero-Pascal & Puig, 2009; Ogden *et al.*, 2009).