



## The “Celestial Pearl danio” is a miniature *Danio* (s.s) (Ostariophysi: Cyprinidae): evidence from morphology and molecules

KEVIN W. CONWAY, WEI-JEN CHEN & RICHARD L. MAYDEN

Department of Biology, Saint Louis University, 3507 Laclede Ave, St. Louis, MO 63103, USA. E-mail: conwaykw@gmail.com

### Abstract

The osteology of the miniature cyprinid *Celestichthys margaritatus* Roberts, type species of *Celestichthys* Roberts, is described in detail and briefly compared with that of other members of the Rasborinae (notably *Danio* (s.s), *Danionella*, *Devario*, *Esomus*, *Microrasbora*, *Paedocypris* and *Sundadanio*). *Celestichthys margaritatus* possesses an “A” stripe on the anal fin and two pigment stripes on the caudal fin (apomorphic features of *Danio* sensu Fang, 2003). In addition, *C. margaritatus* exhibits a median projection on the outer arm of the os suspensorium, a derived feature, present only in species of *Danio* (including *D. erythromicron*) amongst the Cyprinidae, and a lateral projection on the lateral face of the dentary (present only in *Danio*, *Sundadanio* and *Paedocypris*). Phylogenetic analysis of 1,494 bp of the RAG1 nuclear gene for 31 rasborine taxa, including 5 species of *Danio*, places *C. margaritatus* as the sister group to *D. erythromicron*, and part of a larger monophyletic group including all other species of *Danio* included for analysis. Based on characters of morphology and its position in a molecular phylogeny of the Rasborinae it is proposed that *Celestichthys* be placed in the synonymy of *Danio*, its only member referred to as *Danio margaritatus* new combination.

**Key words:** Cypriniformes; *Celestichthys*; *Danio*; osteology; phylogeny; RAG1; miniaturization; taxonomy

### Introduction

Roberts (2007) recently described *Celestichthys margaritatus* as a new genus and new species of miniature cyprinid fish from Myanmar. This description was greatly anticipated by the aquarist community, to which this species was known under the common name of “Galaxy microrasbora” or “Galaxy rasbora” (Clarke, 2006a,b). These common names, in reference to the spectacular colour pattern of this species (Fig. 1A), are rather confusing as they suggested that the species was a member of either *Microrasbora* or *Rasbora* prior to any taxonomic assignment. In its taxonomic description Roberts (2007) inflated the situation by introducing another common name, “Celestial Pearl danio”, in allusion to the small pearly spots along the flanks. Despite the choice of common name, however, Roberts did not place this new species within *Danio* but instead created a new generic name, *Celestichthys*, for the sole inclusion of this miniature species, with slight reference that one other miniature species, *Danio erythromicron* (Annandale) (referred to as “*Microrasbora*” *erythromicron*) might also be a congener.

Little is known about the ecology of the “Celestial Pearl danio” other than that it inhabits small and shallow ponds with abundant aquatic vegetation (Roberts, 2007). Until recently the distribution of *C. margaritatus* was believed to be restricted to the type locality (ponds at the foot of a mountain near Hopong Town, 30km east of Taunggyi, Myanmar; Roberts, 2007). However, it is now known to have a much wider distribution within Myanmar (Clarke, 2007) and has even been reported from Thailand (Hary, 2007).

Roberts (2007) diagnosed the genus *Celestichthys* and its species, *C. margaritatus*, from all previously known Asian Cyprinidae by its distinctive head and body shape, small upturned mouth with shortened jaws,