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**A review of the sponge-dwelling snapping shrimp from Carrie Bow Cay, Belize,  
with description of *Zuzalpheus*, new genus, and six new species  
(Crustacea: Decapoda: Alpheidae)**

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## Abstract

We review the taxonomy of sponge-dwelling shrimp in the “Gambarelloides species group” within the genus *Synalpheus* Bate 1888, an informal but widely recognized group that is largely endemic to the western Atlantic and contains the majority of *Synalpheus* species in that region. The validity of most species described from the western Atlantic is reevaluated based on extensive new material from Carrie Bow Cay, Belize, and on examination of types of most described species. Twenty-eight species, including all those historically considered as part of the Gambarelloides group, are herein removed from *Synalpheus* and transferred to *Zuzalpheus*, n. gen., which is diagnosed by two synapomorphies: the dense brush of curved setae on the minor first pereopod, and the mesial lamellae on the coxae of the 3<sup>rd</sup> pereopods. Six new species are described (*Zuzalpheus dardeaui*, *Z. elizabethae*, *Z. idios*, *Z. kensleyi*, *Z. ul*, *Z. yano*) and *Z. osburni* (Schmitt 1933) n. comb. is removed from synonymy with *Synalpheus goodei*. An identification key to all 34 species of West Atlantic *Zuzalpheus* is presented, as are known host associations, and color plates of most species.

**Key words:** Decapoda, Alpheidae, Belize, Caribbean, sponge, symbiotic, reef, *Zuzalpheus*, *Zuzalpheus dardeaui*, *Z. elizabethae*, *Z. idios*, *Z. kensleyi*, *Z. ul*, *Z. yano* n. spp.

## Introduction

Snapping shrimp in the genus *Synalpheus* Bate, 1888 are abundant and diverse components of the cryptic fauna of coral reefs and other tropical marine ecosystems worldwide (Felder and Chaney 1979, Reed *et al.* 1982). The genus includes more than 150 species (Chace 1988; R. Ríos, pers. obs.) that inhabit the interstices of coral rubble, the internal spaces of sponges, and in the Indo-Pacific, the arms of crinoid echinoderms (Beebe 1928; Pearse 1932; Bruce 1976; Duffy 1992). These shrimp are small (usually <2 cm in length) and reclusive, and are often among the most abundant cryptofaunal macroinvertebrates in reef environments (Pearse 1932; Rützler 1976). Despite their abundance and diversity, the systematic relationships and taxonomy of *Synalpheus* remain poorly resolved.

In a pioneering effort to impose some order on the large and unwieldy genus *Synalpheus*, Coutière (1908, 1909) divided the genus into six informal groups of species based on morphological characters, namely the Comatularum, Brevicarpus, Laevimanus (later called Gambarelloides), Neomeris, Biunguiculatus (later called Coutièrei), and Paulsoni groups. Banner and Banner (1975) reassessed the definitions of these groups, and concluded that only the first three listed “may be coherent enough to continue to be recognized”. In the western Atlantic, the *Synalpheus* fauna is dominated by species in the Gambarelloides group (Coutière 1909; Dardeau 1984), which is largely endemic to that region, and currently includes most of the described species from the western Atlantic. The Gambarelloides group is characterized by a distinctive brush of long, thickly packed setae arranged in transverse parallel rows on the extensor surface of the dactyl of the smaller first chela (Coutière 1908, 1909). All known species in the Gambarelloides group are obligate inhabitants of living sponges, and their distinctive setal brush is used to collect food from the surfaces of the sponge canals in which they live (Duffy 2003).

Over the last 15 years we have obtained abundant new material collected primarily from the vicinity of Carrie Bow Cay, Belize, representing most of the known species in the Gambarelloides group and several previously unknown species. Examination of this material, together with molecular phylogenetic analyses (Morrison *et al.* 2004), led us to the conclusion, foreseen by previous workers (Banner and Banner 1975; Chace 1988), that it is necessary to separate the previously known Gambarelloides group of species as a distinct genus. Thus, we here erect *Zuzalpheus* n. gen., for this group of species, on the basis of morphological, ecological, and molecular evidence. The new genus contains six new species herein described, together with 28 species transferred from *Synalpheus*. We present diagnoses for most of the previously known species found at Carrie Bow Cay, an updated identification key to all 34 species of West Atlantic *Zuzalpheus* n. gen., and color plates of most species recorded from the Carrie Bow Cay region.