



Phylogenetic analysis of the Paulsoni species group (Decapoda: Alpheidae) from the American Pacific, with implications for the phylogenetic classification of the genus *Synalpheus*

MARGARITA HERMOSO-SALAZAR¹, MARY WICKSTEN² & JUAN J. MORRONE³

¹Laboratorio de Ecología y Biodiversidad de Invertebrados Marinos, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México (UNAM), Apdo. Postal 70-305, C.P. 04510 Mexico, D.F., Mexico. E-mail: hermoso@mar.icmyl.unam.mx

²Department of Biology, Texas A&M University, College Station, Texas 77843-3258, U.S.A. E-mail: Wicksten@mail.bio.tamu.edu

³Museo de Zoología “Alfonso L. Herrera”, Departamento de Biología Evolutiva, Facultad de Ciencias, Universidad Nacional Autónoma de México (UNAM), Apdo. Postal 70-399, C.P. 04510 Mexico D.F., Mexico. E-mail: jjm@hp.fciencias.unam.mx

Abstract

A cladistic analysis of 22 species of *Synalpheus*, represented primarily by species of the Paulsoni species group from the American Pacific and selected species from the Gambarelloides, Neomeris, Brevicarpus, and Biunguiculatus species groups was undertaken, based on 51 morphological characters. The Paulsoni species group proved to be paraphyletic, because species of the Neomeris, Brevicarpus, and Biunguiculatus species groups nested within it. It is proposed herein that in order to achieve a more natural classification, only two groups should be maintained within *Synalpheus*: Gambarelloides and Paulsoni, the latter in its broadest sense, treating the remaining species groups as synonyms.

Key words: American Pacific, Alpheidae, Caridea, *Synalpheus*, Phylogenetics

Introduction

Synalpheus Bate, 1888 is one of the most diverse genera of Alpheidae, with species widely distributed along all the oceans. These shrimps constitute an important component of the cryptofauna from the intertidal zone. Many species live in symbiotic associations with corals, sponges and crinoids (Bruce, 1984; Chace, 1988). Approximately 115 species of *Synalpheus* are common in reef substrates from tropical and subtropical zones (Chace, 1988). Species of *Synalpheus* are known as snapping shrimps and pistol shrimps, because of the noise they produce by closing swiftly the disproportionately large and powerful fighting claw, apparently to indicate homeland defense (Duffy *et al.*, 2002; Anker *et al.*, 2006).

The systematic study of the genus *Synalpheus* has proven to be difficult (Chace, 1972, 1988; Banner and Banner, 1975; Dardeau, 1984; Hermoso Salazar *et al.*, 2005; Anker, 2001). There are many taxonomic problems, mainly because there are several morphologically similar and broadly distributed species. The apparent intraspecific variation and ambiguous morphological characters do not allow a clear identification of the species.

Coutière (1908, 1909) divided the genus *Synalpheus* into the Comatularum, Neomeris, Paulsoni, Brevicarpus, Laevimanus, and Biunguiculatus species groups, based on morphological features. Banner (1953) renamed the Biunguiculatus species group as Coutierei species group, due to confusion regarding the morphological, taxonomic and geographical distribution of *S. biunguiculatus* (Stimpson, 1860). Holthuis and Gottlieb (1958) renamed the Laevimanus species group as Gambarelloides species group, because *S. laevimanus* (Heller, 1862) was a junior synonym of *S. gambarelloides* (Nardo, 1847). Banner and Banner (1975) analyzed