



Revision of the *Alpheus nuttingi* (Schmitt) species complex (Crustacea: Decapoda: Alpheidae), with description of a new species from the tropical eastern Pacific

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Abstract

The *Alpheus nuttingi* (Schmitt, 1924) species complex consists of three species. The only western Atlantic species, *A. nuttingi*, occurs from the southeastern United States to Brazil. The two eastern Pacific species are *A. galapagensis* Sivertsen, 1933 (synonyms: *A. canalis* Kim & Abele, 1988; *A. cryptodentatus* Christoffersen & Ramos, 1988), which occurs from the Gulf of California to Colombia and Galapagos, and *A. millsae*, n. sp., presently known only from a few localities in Panama. The three species differ morphologically, genetically, and in color pattern. The two eastern Pacific species both can be found in the intertidal, but *A. millsae*, n. sp. occurs slightly deeper, suggesting the possibility of ecological speciation. All evidence shows that *A. nuttingi* and *A. millsae*, n. sp. are transisthmian sister species, with *A. galapagensis* forming their sister clade. Genetic differentiation between the transisthmian sister species suggests a divergence time of approximately 6 mya, well before the final closure of the Isthmus of Panama.

Key words: *Alpheus*, snapping shrimp, species complex, transisthmian taxa, color pattern, eastern Pacific, western Atlantic, sibling species, COI, barcode

Introduction

The largest and morphologically most heterogeneous species group within the speciose genus *Alpheus* Fabricius, 1798 is the *A. edwardsii* (Audouin, 1826) group (Coutière, 1899), with at least 95 described species worldwide (Anker, 2001b). This group is characterized mainly by the unarmed orbital hoods and the presence of two notches on the major chela: one on the dorsal margin and one on the ventral margin of the palm (e.g., Banner & Banner, 1982). However, based on molecular data, Williams *et al.* (2001) suggested that this configuration of the major chela may have evolved independently more than once within *Alpheus*, i.e., the *A. edwardsii* group may be polyphyletic. One of these clades contains the majority of species of the *A. edwardsii* group, including the western Atlantic *A. nuttingi* (Schmitt, 1924) and an eastern Pacific taxon that has had several names (see below), including *A. galapagensis* Sivertsen, 1933 and *A. canalis* Kim & Abele, 1988. These two closely related species differ from all the other American species of the *A. edwardsii* group by the sharply carinate rostrum; the deep adrostral furrows, not abruptly delimited from the orbital hoods or rostrum; the simple conical dactyli on the walking legs; the merus of the major cheliped with a minute distomesial tooth; the minor cheliped with fingers neither expanded nor balaeniceps, and with sharp, proximally some-