

## ON THE STATUS OF *ALPHEUS BARBARA* LOCKINGTON (CRUSTACEA: CARIDEA: ALPHEIDAE)

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*Abstract.*—*Alpheus barbara*, described by Lockington (1878) based on a single specimen from California, has not been reported since its description. The type material has been lost. One of the major distinguishing features between *A. barbara* and *A. clamator*, the presence of a spine on the basicerite of the second antenna in the latter species, is inconsistent. Spines on alpheids may be lost, blunt or reduced in old or large individuals. Based on the evidence, *A. barbara* Lockington, 1878 is considered to be a junior subjective synonym of *A. clamator* Lockington, 1877.

In 1878, W. Lockington described a new species of snapping shrimp, *Alpheus barbara*, from Santa Barbara, California. The description was based on the unique type material, a specimen originally reported by J. Kingsley in 1878. Kingsley, however, reported the specimen as *Alpheus clamator* Lockington, 1876. According to Lockington (1878), Kingsley's specimen differed from *A. clamator* by the dissimilar proportions of the articles of the carpus of the second pereopods and the absence of spines on the basicerites of the second antennae and meri of the posterior three pereopods. Neither writer figured the specimen. Both mentioned that it was damaged, missing the rostrum and frontal region of the carapace.

The type specimen, "in the collections of the Peabody Academy of Science at Salem, Massachusetts" or "the Peabody Museum of Yale College" (Kingsley 1878:189), apparently was lost. Neither Holmes (1900) nor Schmitt (1921) reported seeing specimens of the species. No additional material of the supposed species has been reported since the species was described.

In an attempt to compile an accurate list of decapod crustaceans of southern California, I checked records of all species reported in the area. Extensive collections have been made in southern California from the shore-

line to the lower continental slopes—the Allan Hancock Foundation, University of Southern California, has over 19,000 specimens of decapod crustaceans, and large collections also exist at Scripps Institution of Oceanography, the California Academy of Sciences and the National Museum of Natural History, Smithsonian Institution. Decapod crustaceans have been collected and studied by environmental agencies, the California Department of Fish and Game, students and researchers from many institutions, park personnel and divers. Despite all of this activity, no further material of *A. barbara* has been reported in the literature or deposited in collections, nor has it been found off western Mexico.

It seems odd that a species in such a well-studied area as southern California would not be found unless it lived in a very inaccessible habitat or occurred in a freshwater site that had been destroyed by human activity. Although exact collecting data was not provided, *Alpheus barbara* probably came from an intertidal or shallow subtidal rocky area. The collector, W. G. W. Harford, collected other alpheids known to live in such habitats (Kingsley 1878). Although there is the remote possibility that the species became extinct, it seems unlikely. Most coastal environmental degradation

in southern California has occurred in bays, estuaries and marshlands (Wicksten 1984a).

Kingsley originally referred his specimen to *A. clamator*. This common species is well represented in collections. To determine if *A. barbara* might be misidentified among such material, I examined all of the specimens of *A. clamator* in the collections of the Allan Hancock Foundation. These 1030 specimens have been taken throughout the entire geographic and bathymetric range of the species, and include individuals of both sexes and a wide range of sizes.

When examining the specimens of *A. clamator*, I looked for the differences which Lockington (1878) indicated as different between *A. barbara* and *A. clamator*: the proportions of the articles of the carpus of the second pereopod and absence of spines from the basicerite and meri of the third–fifth pereopods. The proportions of the carpal articles vary slightly and can be difficult to measure exactly without a micrometer. Supposedly, in *A. barbara*, the first two segments of the carpus of the second pereopod are equal in size, while in *A. clamator*, the first segment is  $1.3\times$  as long as the second (Kim & Abele 1988). Such a slight difference probably could be easily confused, and is not a useful character for distinguishing between two species.

Of the 1030 specimens of *A. clamator* that I examined, a spine was absent from at least one basicerite in 14 specimens. In 10, the spine was absent on the right but present on the left, and in four, it was absent on the left but present on the right. In addition, in three specimens the spine was blunt or reduced on the right, and in another two it was blunt or reduced on the left. In all, about 2% of individuals of *A. clamator* lack a spine on the basicerite on at least one side. All individuals had spines on the meri of the posterior three pereopods, but these spines could be blunt in large individuals. Animals that were regenerating appendages often had abnormally slender, spineless legs.

At present, three valid species of *Alpheus*

are known from southern California: *A. clamator*, *A. bellimanus* Lockington and *A. californiensis* Holmes (Wicksten 1984b). The major chelae of the latter two species differ greatly in the pattern of spines and sulci from those described by Kingsley for his specimen, so it is unlikely that *A. barbara* could have been confused with either species.

The distinction between *A. barbara* and *A. clamator* was based on three differences. The proportions of the segments of the carpus of the second pereopod could have been misinterpreted without accurate measuring devices: there is little difference between segments “equal” and one being  $1.3\times$  as long as the other. The spine on the basicerite is missing in a low proportion of the population of *A. clamator*. In a “damaged” specimen, meral spines might be missing from the posterior pereopods.

In the account by Lockington (1878) describing *A. barbara*, there is no evidence that Lockington ever actually examined Kingsley’s specimen. The short description differentiates between *A. clamator*, *A. bellimanus* and *A. barbara*, but provides no description of the specimen except what was reported by Kingsley. Lockington (p. 472) ended the description by stating, “As Kingsley had only an imperfect specimen, and does not describe the rostrum and front, I cannot be sure that this species belongs to this section” (of alpheids). Based on the description and the evidence of variability within *A. clamator*, I suggest that *Alpheus barbara* Lockington is a junior subjective synonym of *A. clamator* Lockington.

Snapping shrimp of the genus *Alpheus* are known to show considerable within-species variation. The major chelae of males and females often differ in size and shape, as do those of juveniles from adults. Widespread species also can have regional variants. (See, for example, the discussion of *A. floridanus* by Chace 1972:66; and the remarks on variation in the genus *Alpheus* by Banner & Banner 1982:21.) Such within-species variabil-

ity has confused systematists working on the family and has resulted in many species having extensive lists of synonyms.

Kim & Abele (1988:21) treated *A. barbara* as a valid species "because the absence of a lateral spine on the basicerite is a quite distinct and important character." From my study, it appears that the presence of the spine of the basicerite usually, but not always, is consistent within a single species. I have observed similar variation in spines on the carpal segments of the major chelae of *A. armillatus* Milne Edwards and *A. canalis* Kim & Abele—most individuals of the population have distinct spines, but a few very large (and probably old) individuals have small knobs or no spines at all. Anyone attempting to identify or describe alpheids should be cautious about using presence or absence of spines alone as a distinguishing feature between species, especially when examining a large or old individual.

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