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Mexorchestia: a new genus of talitrid amphipod (Crustacea, Amphipoda, Talitridae) from the Gulf of Mexico and Caribbean Sea, with the description of a new species and two new subspecies

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Abstract

Two species of supralittoral *Tethorchestia* were reported by Bousfield (1984) to occur on the shores of the Gulf of Mexico and closely adjacent waters: *T. antillensis* Bousfield, 1984 from Quintana Roo, Mexico and an undescribed species, *Tethorchestia* sp. B of Bousfield (1984), from Florida and the U.S. Gulf coast. In this paper, we rediagnose and illustrate the former taxon based on material from Goodland Bay, Florida, which represents a range extension for that species. We examined the latter taxon from many locations throughout the Gulf of Mexico using classical morphology, epidermal pigment pattern recognition and allometry, reinforced by molecular markers (mitochondrial cytochrome oxidase I, Radulovici 2012), determining that *Tethorchestia* sp. B represents a new genus and species, comprising two subspecies. The nominate subspecies, *Mexorchestia carpenteri carpenteri* **n. gen.**, **sp.** and **subsp**., is described from Tiger Tail Beach, Florida, based on conventional morphological criteria and its distinctive epidermal pigment patterns. The Tiger Tail Beach ecotope of *M. c. carpenteri* **n. gen.**, **sp**. and **subsp**. was distinct from that of other locations examined in Florida and was associated with epidermal pigment pattern polymorphism, absent at other locations. A second subspecies, distinguished by differences in size, number of articles in the flagellum of antenna 2, the number of marginal setae on oostegite 2 of the female and the number of distal dorsolateral robust setae on the telson, was found in samples from Belize and Mexico. This subspecies is described from material collected at Turneffe Island, Belize, as *Mexorchestia carpenteri radulovicia*e **n. gen.**, **sp**. and **subsp**. Like *M. c. carpenteri* **n. gen.**, **sp**. and **subsp**., this taxon is also associated with epidermal pigment pattern polymorphism. A key is provided for the three currently described species of *Tethorchestia* (two extant) and two new subspecies of *Mexorchestia* n.gen.

Key words: Crustacea, Amphipoda, Talitridae, *Mexorchestia carpenteri carpenteri*, *Mexorchestia carpenteri radulovicia*e, *Tethorchestia antillensis*, dorsal pigment patterns, supralittoral ecotopes, Gulf of Mexico, Yucatan, Florida, Belize

Introduction

The genus *Tethorchestia* Bousfield (1984) was split off from the supralittoral/eulittoral genus *Orchestia* Leach, 1814 of Europe. The type species of the genus is *T. antillensis* Bousfield, 1984, with the type locality occurring at a supralittoral sand beach in Ascension Bay, Quintana Roo, Yucatan Peninsula, Mexico. *Tethorchestia antillensis* was first illustrated by Ciavattii (1989) with specimens from Guadaloupe and then by Bousfield and Poinar (1995) based on specimens from the type locality. Both of these authors also included descriptions of new species of *Tethorchestia*: Ciavatti (1989) with *T. karukerae*, an extant, supralittoral taxon from Guadaloupe, and Bousfield and Poinar (1995) with a terrestrial fossil species, *T. palaeorchestes*, from Oligocene amber deposits discovered in the Dominican Republic. Bousfield and Quesnel (1990) and Bousfield and Poinar (1995) also tentatively included within the genus a supralittoral hopper from Brazil briefly described by Müller (1864) as *Orchestia tucurauna*. Serejo (2004), in a taxonomic study of the talitrids of the Brazilian coastline, figured and re-described *Talorchestia tucurauna* (Müller, 1864) based on material from several different Brazilian localities, pointing out that Müller's

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Florida and co-occurs with other taxa such as *Platorchestia platensis* at Cedar Key, *Tethorchestia antillensis* at Goodland Bay and *Orchestia grillus* at Shired Island and Lower Suwanee River. For the less common *T. antillensis*, in Florida we identified a single ecotope: wrack, consisting principally of mangrove litter, on a sandy beach near mangrove trees. In other locations, this species has been reported from sand beach (Bousfield 1984) and seagrass wrack (Ciavatti 1989) ecotopes. Both new subspecies of *Mexorchestia* can be ecologically classified as sub-tropical, non-substrate modifying, wrack generalists. Two distinct ecotopes for *M. c. carpenteri* **n. subsp**., were identified during this study: (1) supralittoral white shell-sand beach, in a protected saltmarsh lagoon, associated with fiddler crab pellets where wrack was scarce, and (2) supralittoral on a variety of beach substrates, always associated with copious wrack consisting of many different species of macroalgae, seagrass, marshgrass or mangrove tree litter. The wrack habitat is the most common one, and most locations examined were of this type, suggesting that the open sand/fiddler crab dominated ecotope was relatively rare. Much less is known ecologically about *Mexorchestia c. raduloviciae* **n. subsp**., which has so far been found in only a few supralittoral wrack Caribbean locations, and not in the Gulf of Mexico.

Shorebird predation is reported for other non-substrate modifying wrack generalists (Heard 1982; Wildish 1988) and is likely important for *M. c. carpenteri* **n. subsp**., as well. We propose that shorebird predation sets up selection pressure, which results in pigment pattern adaptations in opposite directions for open sand (1) and beach wrack (2) ecotopes. A polymorphic genetic mechanism and selection may both underlie the loss of dorsal pigmentation against a pale background in the absence of wrack (Fig. 5), whereas the presence of wrack results in selection for maximum levels of dorsal pigmentation (Fig. 6). This interpretation assumes that dorsal pigmentation patterns function in camouflaging *Mexorchestia* **n. gen.** individuals, so that they blend better with their background, thereby avoiding predators. Dorsal pigment patterns of both subspecies are highly variable, although subtly different from each other. In both subspecies, if they live against a lighter background, selection for dorsal pigmentation loss appears to be strong.

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