



<http://dx.doi.org/10.11646/zootaxa.3753.3.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:DE234954-1829-4277-9E17-78C4E5C18142>

Taxonomic revision of the species of *Parvanachis* Radwin, 1968 (Gastropoda: Columbellidae) from the Gulf of Panama

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Abstract

Species of *Parvanachis* Radwin, 1968 collected from the Gulf of Panama are anatomically characterized and taxonomically revised. Six species are reported to occur in the region: *P. pygmaea* (Sowerby, 1832), *P. pardalis* (Hinds, 1843), *P. diminuta* (C.B. Adams, 1852), *P. albonodosa* (Carpenter, 1857), *P. milium* (Dall, 1916), and *P. dalli* Bartsch, 1931. Of these six, three are confirmed as described. *P. milium* was not found in new collections or the previous survey collection and may be more common further south. *P. dalli* is a synonym of *P. pygmaea*; and *P. albonodosa* (auct.) is renamed, because the type material represents a different species. Two new species are described, *P. dichroma* and *P. adamsi*. *P. pardalis*, based on anatomy and shell and radular morphology, is referred to the genus *Anachis*, and *Costoanachis nigricans* (Sowerby, 1844), based on anatomy and shell morphology, is transferred to *Parvanachis*. The resulting seven species of *Parvanachis* constitute two groups; one (including the type species) with smaller shells and a simple penis morphology, and a group of four larger species with more complex penis morphology.

Key words: Neogastropoda, Buccinidae, *Anachis*, Panamic Province

Introduction

Columbellids are one of the most diverse living neogastropod families, with almost 700 nominal Recent species in about 70 genera, distributed globally and represented in most marine habitats. The group is comprised of small but active and attractive snails, whose shells, being common in many habitats and variable within species, are commonly used for shell craft.

Though diverse and often very common where they occur, the identity and relationships of columbellid species are not well resolved. Many species are small, less than 10 mm adult length. These smaller taxa are typically not well illustrated in older texts and the types of many species have not been photographed. The subject of the present study is the columbellid species of the Gulf of Panama in the tropical eastern Pacific. The Panamic columbellid fauna is diverse, with 50 or more species placed in 18 genus level taxa (Keen 1971). The larger members of this fauna are well documented, but the small, similar, axially ribbed species placed in the genus *Parvanachis* Radwin, 1968 remain poorly illustrated and easily confused.

Parvanachis was described by Radwin in 1968 as a subgenus of *Anachis*, to contain a group of “small, stout, *Anachis*-like columbellids with inflated body whorls and heavily thickened aperture lips”, and a “strongly down-hooked” proximal lateral radular tooth cusp (Radwin 1968: 147). He designated *Buccinum obesum* C.B. Adams, 1845 from the western Atlantic as the type species. Radwin (1977a, b) raised *Parvanachis* to a genus in his revision of the western Atlantic columbellids, and included five western Atlantic species. An additional species was named by Altena from Suriname (1975). Keen (1971) included 11 tropical eastern Pacific species in *Parvanachis*. Among the axially ridged columbellids, they have generally been differentiated from similar genera by their smaller size and more rounded overall shell shape. The genus is restricted to warm temperate and tropical shallow waters of the Americas.

Lopes *et al.* (1971) referred *Anachis obesa* and *Anachis pulchella* of Marcus & Marcus (1962, 1964) to *Zafra* A. Adams, 1860, a group of very small axially ribbed columbellid species with narrowed apertures, which Adams

anatomically similar to *Anachis scalarina*, and considering it probably is not possible to determine exactly what *Costoanachis* actually is due to lack of anatomical and molecular data, this species should be referred to as *Anachis pardalina* until a global systematic analysis can be carried out.

Conclusion

In summary the seven species of Panamic *Parvanachis* documented herein are easily distinguished from regional species in other nominal genera, and fall in two basic groups. They have similar habitats and may occur together. I am hesitant to propose subgeneric status for these two groups until a more inclusive analysis of the entire group, including Caribbean and Panamic *Parvanachis* species not discussed herein, can be completed and their monophyly tested. Members of the first group include *P. diminuta*, *P. dichroma*, and *P. minibrunnea*. These three species are smaller in general than the species of the second group, with a cream colored body with white specks lacking black markings and simple penis morphology. They are more similar to the type species *P. obesa* in size and appearance than are species of the second group. *P. diminuta* has been documented for a number of years, however *P. dichroma* appears to have been missed by collectors and *P. minibrunnea* misidentified.

The second group consists of *P. pygmaea*, *P. mullineri*, *P. adamsi* and *P. nigricans*. These four species are generally larger, and are variable in shell color and pattern so are easily confused. Unlike the smaller species, they have dark patches on the body and a more complex penial morphology. The group overall is easily distinguished from other axially ribbed columbellids in the Panamic region (*Anachis pardalis* for example), which may be referred to *Anachis*, *Costoanachis*, or other genera. Further research, preferably using molecular sequence analyses, may help resolve the relationships among these various taxa.

Acknowledgements

I would like to thank the organizers (J. Harasewych, E. Strong & H. Fortunato) of the 2006 Neogastropod Systematics Workshop, hosted by the Smithsonian Institution and the Smithsonian Tropical Research Institute (STRI), for help gathering material and interesting discussions. Rachel Collin hosted my visit in 2007 and helped with specimen collection and general logistics. Kevin Monsecour, Kathie Way, Andreia Salvador and Wes Thorsson provided photos and information about type specimens from a number of institutions. I would also like to thank Kevin Monsecour, Jerry Harasewych, and one anonymous reviewer for critically reviewing the manuscript and providing feedback.

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