



<http://dx.doi.org/10.11646/zootaxa.3905.3.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:4DA803F1-30C6-4FC3-8EEF-9690A89822A6>

Taxonomy of the freshwater crabs of Costa Rica, with a revision of the genus *Ptychophallus* Smalley, 1964 (Crustacea: Decapoda: Pseudothelphusidae)

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Abstract

The taxonomy and geographic distribution of the freshwater crabs of the family Pseudothelphusidae Ortmann, 1893, of Costa Rica, Central America, particularly of the genus *Ptychophallus* Smalley, 1964, are revised. Historical materials deposited in major collections of several institutions were examined, as well as valuable collections in the Zoological Museum of the University of Costa Rica that include abundant specimens obtained recently (2007–2010) in the southern region of the country. The pseudothelphusids of Costa Rica consists of 15 currently valid species belonging to *Achlidon* Smalley, 1964 (two species), *Allacanthos* Smalley, 1964 (two species), *Potamocarcinus* H. Milne Edwards, 1853 (three species), and *Ptychophallus* (eight species). Two species seem to be restricted to the Atlantic drainage, while seven are known only from the Pacific drainage; six species occur in both drainages. *Ptychophallus* comprises 13 valid species; four new synonymies are proposed: *P. osaensis* Rodríguez, 2001, *P. campylus* Pretzmann, 1968, *P. tumimanus ingae* Pretzmann, 1978, and *P. barbillaensis* Rodríguez & Hedström, 2001, as junior synonyms of *P. paraxantusi* (Bott, 1968), *P. tristani* (Rathbun 1896), *P. tumimanus* (Rathbun, 1898), and *P. uncinatus* Campos & Lemaitre, 1999, respectively. Two species, *P. colombianus* (Rathbun, 1896) and *P. exilipes* (Rathbun, 1898), are considered *species inquerendae*. Lectotype designations are made for *P. montanus* and *P. colombianus*. Three species of *Ptychophallus* are known exclusively from Costa Rica, five exclusively from Panama, and five species occur in both countries; one species appears to be exclusive of the Atlantic drainage, whereas five are known only from the Pacific drainage and seven occur in both drainages. The gonopod morphology of all species is redescribed and illustrated, and maps of their geographic distribution are furnished. A key to the species of Pseudothelphusidae from Costa Rica and to all species of *Ptychophallus* is provided.

Key words: Brachyura, Central America, freshwater biodiversity, Neotropical region, Panama

Introduction

The complex geologic history of the Central American Isthmus (Coates 1977; Coates & Obando 1996; MacMillan *et al.* 2004; Montes *et al.* 2012) was linked to a series of climatic, paleoceanographic, and biological events, which led to the evolution of a rich biota inhabiting the Central American land bridge, especially the present Costa Rica and Panama (for groups of aquatic organisms see: Bussing 1985; Bermingham & Martin 1998; Martin & Bermingham 1998; Fortunato 2008; Ornelas-García *et al.* 2008; Wehrtmann & Cortés 2009). The region also harbors a rich freshwater crab fauna, consisting mostly of species of the family Pseudothelphusidae Ortmann, 1893 (Pretzmann 1972; Rodríguez 1982; Rodríguez & Magalhães 2005; Lara *et al.* 2013). The mountainous relief and the variety of climates, microclimates, and environments of the Isthmus certainly concurred to foster the speciation of this group, which shows a high taxonomic diversity along the mountains of Mesoamerica and South America, from Mexico to Peru (Rodríguez 1982; Rodríguez & Suárez 2004; Campos 2005; Villalobos Hiriart & Álvarez 2008).

The first mention of a freshwater crab from both Costa Rica and Panama was made by Rathbun (1893), who recorded a female of *Potamocarcinus nicaraguensis* Rathbun, 1893, from the Frio River, a tributary of San Juan River, Alajuela Province, Costa Rica, and described *Pseudothelphusa colombianus* (= *Ptychophallus colombianus*) from the David River, Chiriquí Province, Panama. Rathbun (1896, 1898) subsequently described several new species from specimens collected in Costa Rica and classified them in the genus *Pseudothelphusa* Saussure, 1857, based mainly on morphological characters of the carapace. Smalley (1964b) also considered the Costa Rican species as *Potamocarcinus* H. Milne Edwards, 1853, and *Pseudothelphusa*, but described four new subgenera according to differences in the gonopod morphology: *Pseudothelphusa* (*Achlidon*), *P.* (*Allacanthos*), *P.* (*Megathelphusa*), and *P.* (*Ptychophallus*). Pretzmann (1965) raised *Ptychophallus* to generic level, erected two subgenera, *Ptychophallus* (*Semiptychophallus*) and *P.* (*Microptychophallus*), and described *P. (M.) goldmanni* from Panama. Since then, the number of species included in *Ptychophallus* increased with descriptions of new species by Bott (1968), Villalobos (1974), Pretzmann (1978), Rodríguez (1994, 2001), Campos & Lemaitre (1999), and Rodríguez & Hedström (2000). Other publications also added new information on the distribution of some of the species and/or offered new propositions for their classification (Rathbun 1905; Pretzmann 1971, 1972, 1980; Rodríguez 1982, Rodríguez 1994; Villalobos Hiriart & Álvarez 2008; Villalobos & Alvarez 2010). The taxonomy of Costa Rican species belonging to other genera was dealt with by Rathbun (1905), Pretzmann (1965, 1971, 1972, 1978, 1980), Smalley (1970), Rodríguez (1982), Hobbs (1991), and Magalhães *et al.* (2010). In addition to these taxonomic studies, Villalobos & Burgos (1975) studied the geographic distribution of *Potamocarcinus*

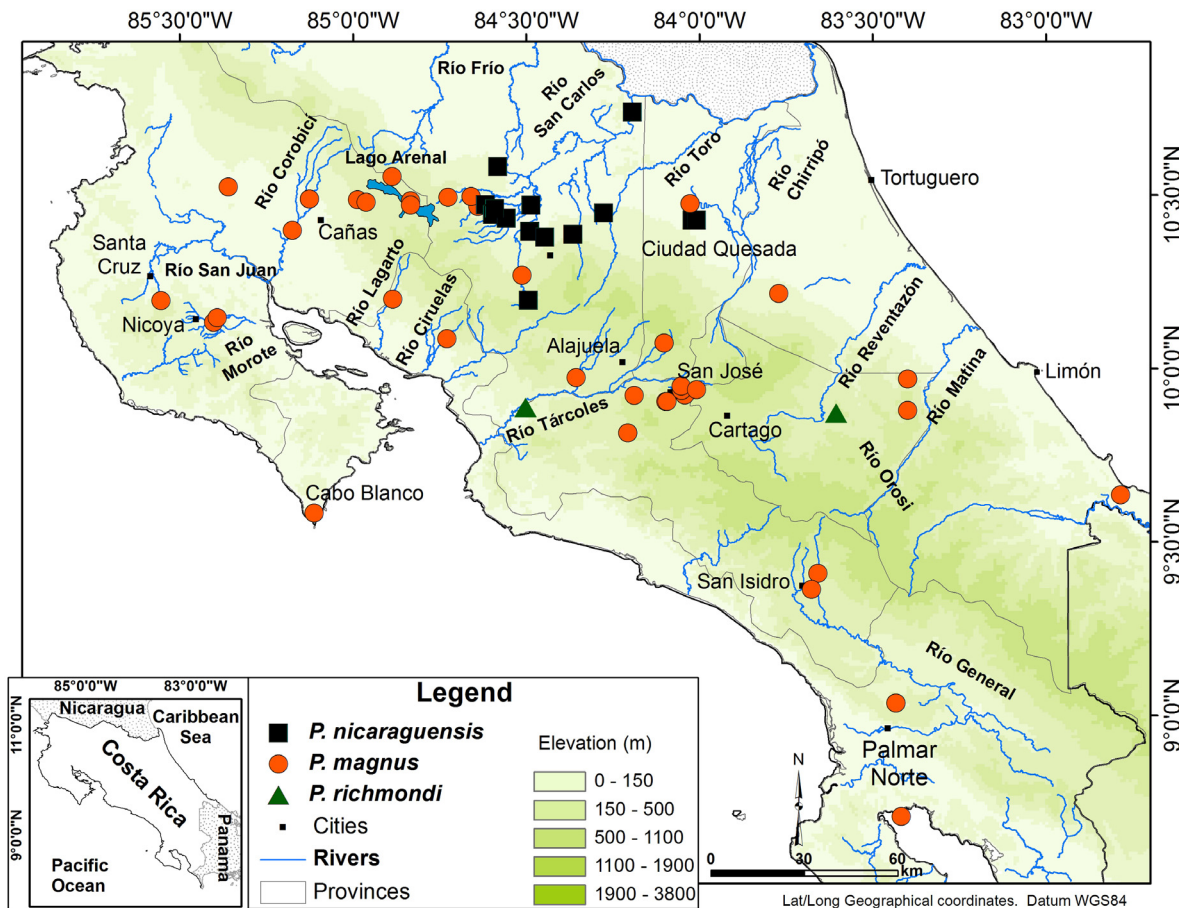


FIGURE 86. Distribution map of *Potamocarcinus magnus* (Rathbun, 1896), *P. nicaraguensis* Rathbun, 1893, and *P. richmondi* (Rathbun, 1893).

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