CLOSING A DISTRIBUTIONAL GAP OF OVER 3000 KM AND ENCOUNTERING AN INVISIBLE BARRIER: NEW PRESENCE/ABSENCE DATA FOR *JOHNGARTHIA PLANATA* STIMPSON, 1860 (DECAPODA, BRACHYURA, GECARCINIDAE) FOR CENTRAL AMERICA AND BIOGEOGRAPHIC NOTES ON EAST PACIFIC GECARCINIDAE

BY

R. PERGER, J. CORTÉS and C. PACHECO

Centro de Investigaciones en Ciencias del Mar y Limnología (CIMAR), University of Costa Rica, San Pedro, 11501-2060 San José, Costa Rica

ABSTRACT

*Johngarthia planata* (Stimpson, 1860) is an abundant and ecologically important land crab, distributed on East Pacific islands from the Gulf of California to Colombia. However, despite possible dispersal of planktotrophic larvae by sea currents, *J. planata* is not known from inshore islands and mainland of Central America. In this study, the presence of *J. planata* on Costa Rican inshore islands is reported for the first time, strongly supporting the significance of coastal currents for the distributional patterns of such species. Despite the proximity of the Costa Rican inshore islands to the mainland coast and larval dispersal by passing coastal currents, *J. planata* was not found in mainland locations. We suggest that a high diversity of continental land crab predators excludes *J. planata* from the continental mainland habitat, while the closely related *Gecarcinus quadratus* may have adaptations to high predation pressure.

RESUMEN

*Johngarthia planata* (Stimpson, 1860) es un cangrejo terrestre abundante y ecológicamente importante, que se encuentra en islas del Pacífico Oriental desde el Golfo de California a Colombia. Sin embargo, a pesar de la capacidad de dispersión de las larvas planctotróficas de *J. planata* no se conoce de islas cercanas a la costa o de la costa de América Central. En este estudio, se informa, por primera vez, de la presencia de *J. planata* en Costa Rica en islas cercanas a la costa, apoyando la importancia de corrientes costeras en los patrones de distribución de la especie. Aún así, *J. planata* no se encontró en el continente, a pesar de la cercanía de las islas costeras y su posibilidad de dispersión por corrientes. Sugerimos que la alta diversidad de cangrejos terrestres depredadores en el continente excluyen *J. planata* de hábitats allí, mientras que *Gecarcinus quadratus*, una especie relacionada, puede estar adaptada a altas presiones de depredación.
INTRODUCTION

Species of the land crab genus *Johngarthia* Türkay, 1970 are the most striking, abundant and ecologically important arthropods on many eastern Pacific and Atlantic islands (Ortega-Rubio et al., 1997; Hartnoll et al., 2006; López-Victoria & Werding, 2008; Bouchard & Poupin, 2009). *Johngarthia planata* (Stimpson, 1860) (in some studies cited with incorrect gender as *J. planatus*) is widespread occurring from the lower Baja California Peninsula, Tres Marias Islands and the Revillagigedo Archipelago, Mexico, and Clipperton Island, France (Rathbun, 1918; Türkay, 1970) to Gorgona Island, Colombia (Von Prahl, 1983). This last record extended the previously known distribution area of *J. planata* by more than 3200 km and Von Prahl (1983) proposed dispersal of the marine larvae of *J. planata* by the California Current and North Equatorial Counter Current between the Mexican islands over the Cocos and Malpelo islands to Gorgona Island.

However, the record of *J. planata* from Cocos Island given by Vargas-Castillo & Wehrtmann (2008) was recently referred to a new species, *J. cocoensis* Perger, Vargas & Wall, 2011, and Malpelo Island is inhabited by the endemic *J. malpilensis* (Faxon, 1893).

Despite possible dispersal by coastal currents (see Kessler, 2006), and dispersal ability and ecological flexibility suggested for this species (Von Prahl, 1983; Pérez-Chi, 2005), *J. planata* is not reported from Central American islands and absent from continental mainland in general (Türkay, 1970, 1987; Cuesta et al., 2007). The only species of Gecarcinidae reported from the Pacific mainland coast are *Cardisoma crassum* Smith, 1870, and *Gecarcinus quadratus* De Saussure, 1853 (see Bright, 1966; Sherman, 2002; Lindquist & Carroll, 2004; Griffiths et al., 2007).

In this study, we surveyed the Costa Rican mainland coast and inshore islands to test the significance of larval dispersal of *J. planata* by coastal currents along the Central American Pacific coast.

MATERIAL AND METHODS

Study area

Caño Island, Drake Bay (northern coast of the Osa Peninsula), San Josecito Beach (northern coast of the Osa Peninsula) and an unnamed island (8°40′12″N 83°43′04″W) close to San Josecito Beach were investigated. The unnamed island is hereafter referred to as “Nairita Island” (after Naira Martínez-Schütt, who supported this study). Caño Island is a rocky island of 320 ha situated about 17 km off the northern coast of the Osa Peninsula (fig. 1C). The temperature varies