



A new cryptic species in the “*Calcinus anani* Poupin & McLaughlin, 1998” species complex (Decapoda: Anomura: Diogenidae): evidence from colouration and molecular genetics*

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Abstract

A new species of *Calcinus* is described from western Pacific material, including specimens previously identified as *Calcinus anani* Poupin & McLaughlin, 1998. The new species *C. fuscus* n. sp. differs from *C. anani* in the colouration in life, and their specific distinction is genetically supported by the barcoding gene cytochrome oxidase I (COI). The two species also have different geographic distributions, with *C. fuscus* n. sp. ranging from Japan to the Philippines, Papua New Guinea, and New Caledonia, while *C. anani* is restricted to French Polynesia. Moreover *C. fuscus* n. sp. is found at shallower depths than its sister species *C. anani*.

Key words: Hermit crab, cryptic species, colour pattern

Introduction

The small diogenid hermit crab *Calcinus anani* Poupin & McLaughlin, 1998, was originally described from French Polynesia, and subsequently reported from Japan with slight morphological differences (Asakura 2002; Okuno & Arima 2004). Later collections from Papua New Guinea hinted at genetic differences between New Guinean and Polynesian *C. anani* (Malay & Paulay 2010). Recent marine biodiversity expeditions in the Philippines (PANGLAO 2004) and the Ryukyus (KUMEJIMA 2009) collected many more specimens of *C. anani* in the Western Pacific, and allowed a detailed comparison of the morphology, colour pattern, and molecular genetics of the material from various localities. Although no morphological differences were found between the different populations, material from the western part of the Pacific always have the chelipeds with a distinctive tri-colour pattern of brown, purplish-grey and white, which is very different from the uniformly orange chelipeds in the specimens from the South Pacific. Moreover, the Western Pacific material inhabits sublittoral waters less than 82 m deep but specimens from the South Pacific were mostly collected at depths of more than 100 m. Molecular analysis of the barcoding gene cytochrome oxidase I (COI) (Bucklin *et al.* 2011; Hebert *et al.* 2003) reveals that these two morphs are specifically distinct. Therefore, we herein describe the Western Pacific form as a new species.

Material and Methods

The specimens examined are deposited in the National Taiwan Ocean University, Keelung (NTOU); Ryukyu University Museum, Fujukan, Okinawa (RUMF); Natural History Museum and Institute, Chiba (CBM); Coastal