



***Geothelphusa makatao* sp. nov. (Crustacea: Brachyura: Potamidae), a new freshwater crab from an uplifted Pleistocene reef in Taiwan**

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Abstract

A new species of potamid freshwater crab, *Geothelphusa makatao*, is described from southwestern Taiwan, based on morphological characters and mitochondrial DNA evidence. The new species differs from close congeners, *G. pingtung* Tan & Liu, 1998, *G. shernshan* Chen, Cheng & Shy, 2005, and *G. ancylorhynchus* Shy, Ng & Yu, 1994 and a superficially similar species, *G. albogilva* Shy, Ng & Yu, 1994, in the structure of its ambulatory legs, thoracic sternum, male abdomen, and male first pleopods. The unique gene sequences of 16S rRNA and cytochrome oxidase I also support the recognition of this coastal population, which is isolated from other closely related species inhabiting montane areas. Except for *G. makatao*, the phylogenetic analysis showed that there are three additional hill subclades within the *G. pingtung* clade, *G. shernshan*, *G. pingtung* and the Liangshan subclade, situated in different watersheds of rivers or streams near the Central Range in the southwestern Taiwan.

Key words: 16S rRNA, cytochrome oxidase I, *Geothelphusa makatao*, *G. pingtung*, Brachyura, Potamidae, Taiwan, taxonomy, new species

Introduction

The genus *Geothelphusa* Stimpson, 1858, are endemic and dominant, either in species diversity or abundance, freshwater crabs on islands of East Asia (Taiwan, the Ryukyus, and mainland Japan) (Shih *et al.* 2009). More than 50 *Geothelphusa* species have been described, making it the second largest genus of the family Potamidae after *Sinopotamon* Bott, 1967, which is endemic to China and has around 80 species (see Dai 1999; Ng *et al.* 2008). The highest diversity (36 species) of *Geothelphusa* is found in Taiwan (Shy *et al.* 1994; Shy & Ng 1998; Shy & Yu 1999; Ng *et al.* 2008; Shih *et al.* 2008), though some species have been suggested to be synonyms (Ng *et al.* 2001, 2008; Shih *et al.* 2004, 2007b). Recent molecular phylogenetic and phylogeographic studies of Taiwanese freshwater crabs (Shih *et al.* 2004, 2005, 2006, 2007a, b, 2008) have helped clarify the taxonomy and systematics of some problematic and cryptic species.

A population of *Geothelphusa* at Chaishan (= Shoushan), Kaohsiung City, southwestern Taiwan, an area isolated from the Central Range of Taiwan, was previously misidentified as *G. albogilva* Shy, Ng & Yu, 1994, based on morphology and coloration (Chen *et al.* 2001, 2003). However, based on a molecular study using two mitochondrial gene markers (haplotypes of 16S rRNA (Gp-1 and Gp-2) and cytochrome oxidase I (COI; Gp-C1 and Gp-C2)) (see Shih *et al.* 2007b: table 1, fig. 2), this population should instead belong to the *G. pingtung* clade, which includes *G. pingtung* Tan & Liu, 1998 (considered a senior synonym of *G. neipu* Chen, Cheng & Shy, 1998) and *G. shernshan* Chen, Cheng & Shy, 2005. As to its monophyly, basepair (bp) differences, and the disjunct geographic distributions between Chaishan and the Central Range populations led Shih *et al.* (2007b) to suggest that the latter is at least a geographic subspecies of *G. pingtung*.