

## Two New Species of *Geothelphusa* (Decapoda: Brachyura: Potamidae) from Taiwan

Swee-Hee Tan<sup>1,\*</sup> and Hung-Chang Liu<sup>2</sup>

<sup>1</sup>Department of Biological Sciences, National University of Singapore, Kent Ridge 119260, Republic of Singapore

<sup>2</sup>Department of Life Science, National Tsing Hua University, Hsinchu, Taiwan 300, R.O.C.

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**Swee-Hee Tan and Hung-Chang Liu (1998)** Two new species of *Geothelphusa* (Decapoda: Brachyura: Potamidae) from Taiwan. *Zoological Studies* 37(4): 286-290. Two new species of freshwater potamids, *Geothelphusa pingtung* and *G. hirsuta* are described from Taiwan with notes on their ecology. *G. pingtung* is found in Pingtung County and *G. hirsuta* is found in Miaoli and Hsinchu Counties. These 2 species can be differentiated from all the other 28 species of *Geothelphusa* in Taiwan mainly by the shape of their male 1st pleopods.

**Key words:** Taiwan, Crab, *Geothelphusa*, Taxonomy, New species.

The freshwater potamid crab genus *Geothelphusa* was erected by Stimpson (1858) for *G. dehaani* (White, 1847) and *G. obtusipes* Stimpson, 1858. Stimpson (1858), however, did not designate a type species. Rathbun (1898) subsequently designated *G. obtusipes* as the type species. Both species are, thus far, found in Japan but not in Taiwan (see Shy et al. 1994: 785). Wu et al. (1962) reported *Potamon (Geothelphusa) dehaani* from Inho-ton, U-lai, Pa-tu and Chi-tu. Shy et al. (1994) revised the *Geothelphusa* of Taiwan but did not discuss the identity of the specimens reported by Wu et al. (1962). They also did not discuss the previously reported presence of *G. dehaani* in Taiwan, although they listed it as being found only in Japan (Shy et al. 1994: 785). It is difficult to ascertain the identity of the specimens reported by Wu et al. (1962) from their brief description. They did not provide any figures and the whereabouts of the their specimens cannot be presently located (C.-H. Wang pers. comm.). Considering the superficial similarity of most *Geothelphusa* species and the fact that the taxonomy of the genus was quite unstable until the study by Shy et al. (1994), the presence of *G. dehaani* in Taiwan is suspected.

The identity of *G. chiui* Minei, 1974 remains

unsatisfactory (see Shy et al. 1994: 792). Some crabs were collected by the 2nd author on a recent trip to Hsinchu, Taiwan, to obtain topotypic material of *G. chiui*. However, the specimens obtained were of a smaller size, the carapace was more rugose, and the ambulatory legs were longer than in *G. chiui*. Close examination of the specimens revealed that they are not *G. chiui* as we had hoped and neither do they fit the description of the *Geothelphusa* species recorded by Shy et al. (1994). Another series of specimens of *Geothelphusa* from Taiwu Village and Machia Village, Pingtung County, was also found to be new. This report serves to describe the 2 new species.

### MATERIALS AND METHODS

Terminology essentially follows Ng (1988). Measurements, by use of dial calipers, of the crabs are those of the carapace breadth and length, respectively. The abbreviations G1 and G2 are used for the 1st and 2nd pair of male pleopods, respectively. All specimens are deposited in the Taiwan Museum (TMCD), Taipei, Taiwan and the Zoological Reference Collection (ZRC), National University

\*To whom correspondence and reprint requests should be addressed.

of Singapore, Singapore. All specimens were obtained from Taiwan, Republic of China.

## RESULTS

### *Geothelphusa pingtung* n. sp.

(Fig. 1)

**Material examined:** Holotype, male (TMCD 3282) (34.6 by 26.6 mm), Taiwu Village, Pingtung County, coll. H.-C. Liu, 3 June 1997.

**Paratypes:** 2 males (ZRC), same data as holotype; 2 males, 1 female, 1 juvenile (TMCD 3283), Taiwu Village, Pingtung County, coll. H.-C. Liu, 21 Apr. 1997; 1 male, 1 female (ZRC), Taiwu Village, Pingtung County, coll. H.-C. Liu, 21 Apr. 1997.

**Others:** 2 males, 1 female, 1 juvenile (TMCD 3284), Machia Village, Pingtung County, coll. H.-C. Liu and C.-H. Wang, 18 Jul. 1997.

**Diagnosis:** Carapace broader than long, dorsal surface smooth, glabrous; carapace length about 1.5 times depth; epigastric and epibranchial re-

gions inflated, cardiac and intestinal regions flat; anterolateral margins convex, cristate, cristae smooth, continuous with posterolateral margins; posterolateral margins converging towards posterior margin, not cristate, smooth; posterolateral regions with very fine striae; posterior margin straight; frontal margin straight, cristate, entire; epigastric lobes low, not continuous with postorbital cristae; postorbital cristae low, smooth; epibranchial tooth absent; deep pit present at base of external orbital angle on postorbital cristae; cervical groove very shallow; H-shaped depression distinct. Distance between tip of male abdomen and anterior margin of sternite 4 about 2 times length of sternites 1-3. Width of 6th abdominal segment 2.4 times length. Male telson short, width about 1.5 times length.

Adult male cheliped asymmetrical, female cheliped less so; forms oval gap when closed in major chela; external and internal surfaces of palm smooth; carpus of cheliped smooth, inner margin with a strong spine and a small auxiliary spine at base. Ambulatory legs normal, slender, glabrous; 2nd pair longest, about 1.8 times carapace length; 2nd ambulatory leg dactylus length 1.2 times propodus length; merus length 4.1 times height.

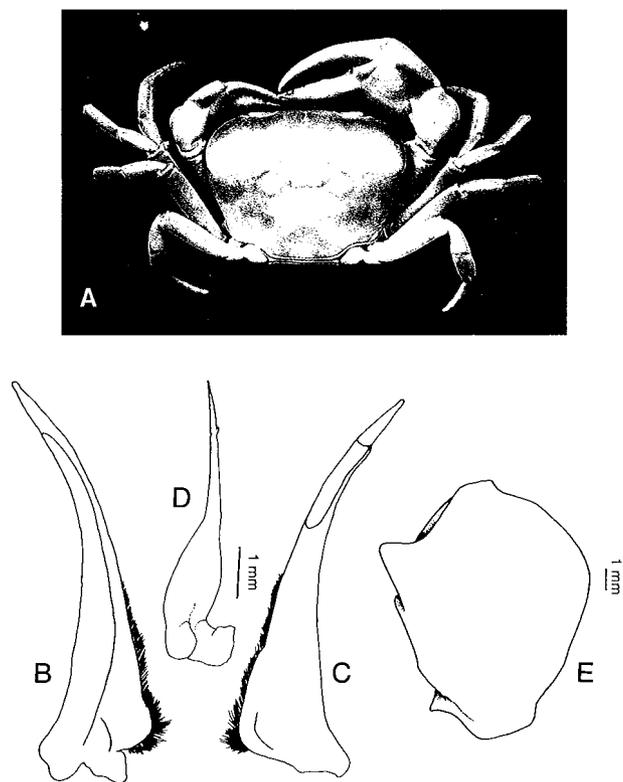
G1 slender, curving outwards; subterminal segment tapering, conical distally. Synovial membrane about twice length of G1 terminal segment. G2 slender.

**Coloration in life:** Anterior half of carapace brown, posterior half yellowish-white or the entire carapace brown or purple.

**Etymology:** Named after the type locality, Pingtung County. Used as a noun in apposition.

**Remarks:** *Geothelphusa pingtung* n. sp., is closest to *G. albogilva* Shy, Ng and Yu, 1994, *G. ancylophallus* Shy, Ng and Yu, 1994, *G. caesia* Shy, Ng and Yu, 1994, and *G. wangi* Shy, Ng and Yu, 1994. *G. pingtung* can be easily recognized from *G. albogilva* by its life coloration — *G. pingtung* is brown on the anterior half and yellowish white on the posterior half or entirely brown purple, while the entire body of *G. albogilva* is yellowish-white. The anterolateral margin has a distinct smooth crista in *G. pingtung*, but it is faint in *G. albogilva*.

*G. ancylophallus* differs from *G. pingtung* mainly in the shape of the male G1. The subterminal segment of the male G1 of *G. ancylophallus* is slightly curved, but the terminal segment is bent sharply outwards. The entire male G1 of *G. pingtung* is gently curved with no sharp bend at the terminal segment. The length of the synovial mem-



**Fig. 1.** *Geothelphusa pingtung* n. sp. Holotype male, 34.6 by 26.6 mm. A. Carapace, dorsal surface; B. Right G1, ventral view; C. Right G1, dorsal view; D. Right G2; E. Right cheliped carpus.

brane of *G. ancylophallus* is about the same as the length of the terminal segment, but in *G. pingtung*, it is slightly less than twice the length of the terminal segment. The terminal segment of the male G2 in *G. ancylophallus* also appears to be slightly longer in proportion to the rest of the G2 than is that of *G. pingtung*. The life coloration of *G. ancylophallus* was reported to be yellowish-gray with no brown coloration present (Shy et al. 1994: 792). *G. pingtung* is never entirely uniform yellowish-white in color; there is always some brown or purple coloration present.

*G. caesia* can be recognized from *G. pingtung* by the shape of the male G1 which is straight. The male G1 of *G. pingtung* is not straight but curved outwards. The life coloration of *G. caesia* is also very distinctive, being bluish in the anterior half of the carapace, while it is brown or purple in *G. pingtung*.

*G. pingtung* is also very similar to *G. wangi*. The latter can be recognized from *G. pingtung* by the crista on the anterolateral margin being lined

with small, very low granules. The anterolateral margin crista is smooth in *G. pingtung*. The G1 of *G. wangi* is almost straight and the terminal segment is cone shaped, while that of *G. pingtung* curves outwards and the terminal segment is cylindrical. The G1 is also proportionately longer in *G. pingtung*.

According to Shy et al. (1994), 3 species of *Geothelphusa* are found in Pingtung County, i.e., *G. albogilva* Shy, Ng and Yu, 1994, *G. ferruginea* Shy, Ng and Yu, 1994, and *G. wutai* Shy, Ng and Yu, 1994. *G. pingtung* is not closely allied to any of the 3 species. Differences with *G. albogilva* have already been discussed. *G. ferruginea* and *G. wutai* are very different from *G. pingtung* in having a rather flatter carapace, a prominent epibranchial tooth, striae on the anterolateral region, and both are relatively small in size as adults. *G. pingtung* on the other hand, has a relatively inflated carapace, no epibranchial tooth, smooth anterolateral regions, and is relatively large sized.

*G. pingtung* is found at elevations between 100 to 200 m, usually in water, hiding under stones in streams during the day, but can be found foraging in the open at night. This species occurs sympatrically with *Candidiopotamon rathbuni* (De Man, 1914) and *G. caesia* Shy, Ng and Yu, 1994. According to the locals, gravid females can be found in great numbers during the full moon periods of August and September.

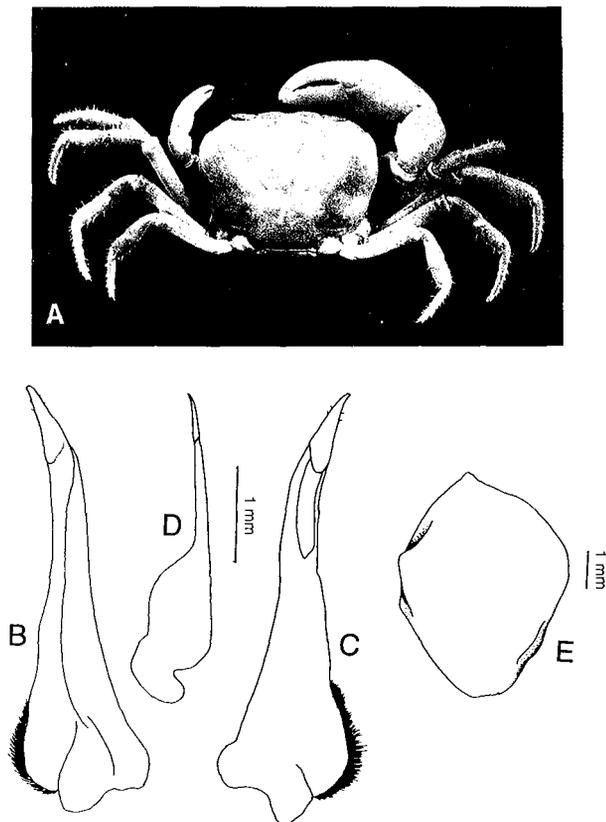
### *Geothelphusa hirsuta* n. sp.

(Fig. 2)

*Material examined*: Holotype, male (TMCD 3285)(17.1 by 12.8 mm), Kuanwu *Sassafras randaiense* protected area, Taian Village, Miaoli County, coll. H.-C. Liu, 13 Nov. 1993.

*Paratypes*: 1 male, 1 female, 1 juvenile (TMCD 3292), 1 male, 1 female (ZRC), same data as holotype.

*Others*: 1 male (TMCD 3286), Kuanwu, Taian Village, Miaoli County, coll. Hsinchu Bird Society, 19 Dec. 1993; 2 males, 1 female, 1 juvenile (TMCD 3287), Kuanwu waterfall, Taian Village, Miaoli County, coll. H.-C. Liu, 12 Nov. 1993; 4 males, 3 female (TMCD 3288), Kuanwu Peony Garden, Taian Village, Miaoli County, coll. H.-C. Liu, 12 Nov. 1993; 3 males, 2 females (TMCD 3289), Dalu forest trail, east trail, about 13.5 km from Kuanwu, Taian Village, Miaoli County, coll. H.-C. Liu, 18 Nov. 1993; 4 males, 3 females, 1 juvenile (TMCD 3290), Dalu forest trail, 10.5 km, Wufeng Village, Hsinchu County, coll. H.-C. Liu, 18 Nov. 1993; 3 males



**Fig. 2.** *Geothelphusa hirsuta* n. sp. Holotype male, 17.1 by 12.8 mm. A. Carapace, dorsal surface; B. Right G1, ventral view; C. Right G1, dorsal view; D. Right G2; E. Right cheliped carpus.

(TMCD 3291), Dalu forest trail, 10.5 km, Wufeng Village, Hsinchu County, coll. H.-C. Liu, 24 July 1996.

**Diagnosis:** Carapace broader than long, dorsal surface finely pitted; carapace depth 1.7 times carapace length; epigastric and epibranchial regions slightly raised; cardiac and intestinal regions flat; anterolateral margins convex, cristate, cristae granulated, continuous with posterolateral margins; posterolateral margins gently converging towards posterior margin, not cristate, smooth; posterolateral regions with fine hairs; posterior margin straight; frontal margin cristate, entire, notched medially; epigastric lobes distinct, not continuous with postorbital cristae; postorbital cristae low, smooth, continuous with epibranchial tooth; epibranchial tooth low but present; cervical groove shallow; H-shaped depression distinct. Distance between tip of male abdomen and anterior margin of sternite 4 about 1.6 times length of sternites 1-3. Width of 6th abdominal segment 2.9 times length. Male telson short, width about 1.3 times length.

Adult male cheliped strongly asymmetrical, forming oval gap when closed in major chela; chela of young males not strongly asymmetrical, female cheliped only slightly asymmetrical with external and internal surfaces of palm smooth, glabrous; carpus of cheliped smooth, inner margin with 2 low spines. Ambulatory legs slender; 2nd pair longest, about 1.9 times carapace length; 2nd ambulatory leg dactylus length 1.3 times propodus length; merus length 5.2 times height; all ambulatory legs with stiff hairs on propodus and dactylus, dactylus with strong spines.

G1 subterminal segment straight at base, curving slightly outwards distally; G1 terminal segment tapering, conical. G2 slender, tapering distally.

**Coloration in life:** Carapace and ambulatory legs generally dark brown.

**Etymology:** This species is named after the fine setae on the posterior portion of the crab, and the stiff setae on the ambulatory legs.

**Remarks:** According to Shy et al. (1994), *G. hirsuta* is closest to *G. eucrinodonta* Shy, Ng and Yu, 1994, *G. lanyu* Shy, Ng and Yu, 1994, and *G. lutao* Shy, Ng and Yu, 1994. The epibranchial tooth of *G. eucrinodonta* is distinct whereas the epibranchial tooth of *G. hirsuta* is low. The G1 of *G. hirsuta* curves strongly outwards, whereas it curves more gently in *G. eucrinodonta*. The G1 terminal segment of *G. eucrinodonta* is also relatively shorter than that of *G. hirsuta*. The anterolateral margin of *G. eucrinodonta* also appears

more convex than that of *G. hirsuta*.

*G. hirsuta* is closely akin to *G. lanyu*. It can, however, be recognized from *G. lanyu* by the presence of a low epibranchial tooth, which is absent in *G. lanyu*. *G. lanyu* possesses fine dorsal ridges at the anterolateral regions, whereas the anterolateral region is cristate in *G. hirsuta*. The G1 of *G. hirsuta* curves strongly outwards, whereas that of *G. lanyu* is relatively straight.

Another species closely related to *G. hirsuta* is *G. lutao*. However, *G. lutao* does not possess an epibranchial tooth (present in *G. hirsuta*). The G1s of both species are also quite different. The G1 of *G. lutao* is straight, stout, but is rather long and slender in *G. hirsuta*. The terminal segment of the G1 in *G. lutao* is proportionately shorter than that of *G. hirsuta*, but is straight in *G. lutao* and curves outwards in *G. hirsuta*. The anterolateral margin is also more convex in *G. lutao* than in *G. hirsuta*.

Only 1 other species of *Geothelphusa*, *G. olea*, was recorded by Shy et al. (1994) from Miaoli County. *G. olea* bears no resemblance to *G. hirsuta* as it has a smoother and inflated carapace, more convex anterolateral margin, less slender ambulatory legs, and a more slender G1. The life coloration of both species are also different, *G. olea* being greenish-grey to yellowish-green, while that of *G. hirsuta* is dark brown.

*G. hirsuta* was found at elevations between 1000 to 2000 m. This species appears to be wholly aquatic, living under boulders and stones in the streams. It is mainly nocturnal in habit. Brooding females can be found during the summer months. At lower elevations, *G. hirsuta* occurs sympatrically with *Candidiopotamon rathbuni*.

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## 臺灣二新種澤蟹屬蟹類

陳瑞熙<sup>1</sup> 劉烘昌<sup>2</sup>

本文報導臺灣產二新種澤蟹 *Geothelphusa pingtung* 及 *G. hirsuta*。其中 *G. pingtung* 分佈於屏東縣，*G. hirsuta* 則分佈於苗栗縣及新竹縣。兩種澤蟹可由其雄蟹之第一交接器與臺灣其它二十八種同屬之澤蟹區別。文中亦描述此二新種澤蟹之棲所。

**關鍵詞**：臺灣，螃蟹，澤蟹，分類學，新種。

<sup>1</sup>Department of Biological Sciences, National University of Singapore, Republic of Singapore

<sup>2</sup>國立清華大學生命科學系