台灣寄居蟹類誌

A CATALOG OF THE HERMIT CRABS (PAGUROIDEA) OF TAIWAN

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序

台灣是熱帶島嶼，有各式各樣的沿岸地形，又位於全球海洋生物多樣性最高的地區內，孕育有豐富的海洋生物。寄居蟹是大型甲殼類，可常見於各種海域，而台灣的寄居蟹調查研究在 1913 年才開始，早期都是由外國學者進行，並只記錄有很少的種類。直到 1969 年才開始有本土的生物學家從事台灣寄居蟹類的分類工作，在國立台灣海洋大學游祥平教授回國任教後更有較積極的調查研究，近年在行政院國家科學委員會大力資助下使台灣學者能自潮間帶至三千多公尺深海地區的調查中採獲大量寄居蟹標本，並經由行政院國家科學委員會補助的研究計畫「編撰台灣無脊椎動物誌—台灣甲殼類」邀請國際最著名的寄居蟹分類專家共同編撰台灣寄居蟹類誌，共整理出 5 科 37 屬 133 種寄居蟹 (其中 15 屬 57 種爲台灣新記錄)，較普遍認爲是海洋生物天堂的夏威夷所記錄的 45 種寄居蟹多出近 3 倍，並是全世界目前已知的寄居蟹 (約 1,069 種) 之十分之一，其中更有 1 屬 4 種爲台灣特有，可見台灣海洋生物多樣性的確是十分豐富，值得國人珍惜與保護。

本誌記述的 133 種台灣寄居蟹，每種都有提供形態描述、重要特徵線繪圖和檢索等，而其中 115 種亦附有彩色標本照以便其鑑別。

本誌之編輯是由行政院國家科學委員會計畫「編撰台灣無脊椎動物誌—台灣甲殼類」補助，初版登錄於 TaiBNET 台灣生物多樣性資訊網 http://www.taibif.org.tw/nbrpp/nbrpp.php，而印刷是由國立台灣海洋大學水產生物科技頂尖研究中心補助，謹致上由衷謝意。同時感謝國立台灣海洋大學何平合博士及國立中興大學施習德博士提供數種寄居蟹相片使用，林芝君小姐在編輯上的協助。本誌僅獻給甫退休的游祥平教授，以推崇其對台灣甲殼十足類分類研究的重大貢獻。

INTRODUCTION

Taiwan is a large tropical island, separated from the Asian continent on the west by the Taiwan Strait and bordered on the east by the Pacific Ocean. Its coastline is diverse, varying from shallow coral reefs in some areas to rapid drop-offs to the deep sea in others. Despite its extensive marine environments, studies of Taiwan's hermit crab fauna were begun less than a century ago. The first records are those of four species by Balss (1913), with a fifth added by Terao (1913). Two subsequent early studies, those of Maki & Tsuchiya (1923) and Takahashi (1934), focused specifically on Taiwan species, but nonetheless were limited in their coverage of the fauna. Maki & Tsuchiya's (1923) monograph dealt with all of the decapods known from the area at the time, while Takahashi (1934) restricted his account to the semiterrestrial species of the hermit crab genus *Coenobita* Latreille, 1829. It was learned recently that the identifications included in Maki & Tsuchiya's account were provided by Waldo L. Schmitt, at the time Assistant Curator at the United States National Museum in Washington, D.C. (now National Museum of Natural History) (Chace, 1990). According to museum records, the majority of the specimens were returned to Maki & Tsuchiya; however, one specimen each of what Schmitt identified as *Dardanus haani* Rathbun, 1903 [= *Dardanus pedunculatus* (Herbst, 1791)], *Clibanarius pacificus* Stimpson, 1858, and *Coenobita cavipes* Stimpson, 1858 were retained in the museum's collections.

Not until 35 years later was attention to Taiwan hermit crabs revived with Lee's (1969) descriptive report of 22 species of the family Diogenidae. Sixteen additional species and/or records were subsequently added to the coenobitid and diogenid faunal lists by Yu (1985, 1987, 1988) and Foo & Yu (1988). In a landmark publication, Yu & Foo (1991) presented a catalog, encompassing five families, 15 genera and 46 species, illustrated with color photos, of the hermit crab fauna reported from Taiwan. Since that publication, extensive sampling throughout the region has resulted in the accounts of numerous additional taxa (Shih & Yu, 1995; Shih & Lee, 1997; Komai, 1998, 2003, 2004a; Komai & Yu, 1999; Komai & Hung, 2000; McLaughlin & Lemaitre, 2000; Lemaitre, 2003, 2004a, b, c; Komai & Osawa, 2006; Komai & Chan, 2006), bringing the total to 75 species.

Under projects supported by the National Science Council, Taiwan, R.O.C., and in cooperation with the staff of the Muséum national d'Histoire naturelle, Paris, France, an expanded sampling program was initiated. These efforts have resulted in the recognition that the Taiwanese hermit crab fauna is far richer than previously imagined. Knowledge of bathymetric distributions has also been increased considerably, with species ranging from the supratidal to depths of 3,070 m. The existing records, together with these latest collections have provided the basis for this revised and updated catalog, which includes the same five families, but now represented by 37 genera and 133 species, of which 15 genera and 57 species are new records for Taiwan. Photographs of 115 of the species, together with line drawings for each of the 133 accompany the specific diagnoses. All photographs are based on Taiwanese material, although not every photographed specimen is listed in the "Material Examined" as some could not be located (e.g. specimens lost or transferred to different institutions). The first version of this catalog is online at the TaiBENT (http://www.taibif.org.tw/nbrpp/nbrpp.php, supported by the National Science Council, Taiwan, R.O.C.) and in this printed version the content have been revised with supplementary data and photographs.

The number of species now recorded from Taiwan represents slightly more than one-tenth of the 1069 hermit crab species currently recognized world-wide (McLaughlin, unpublished), showing that Taiwan has a remarkably high marine biodiversity compared, for example, with Hawaii where only 45 species are documented (McLaughlin et al., 2005). Of the 133 species, one genus (*Chanopagurus* Lemaitre, 2003) and

four species (*Chanopagurus atopos* Lemaitre, 2003, *Paragiopagurus ventilatus* Lemaitre, 2004c, *Sympagurus chani* Lemaitre, 2004b, and *Pagurus luticola* Komai & Chan, 2006) still are reported only from Taiwan.

Although all previously records for Taiwan are included in this catalog, since the early accounts there have been numerous nomenclatorial changes, some corrected identifications, and some reports where specific identities could not be verified. Each of these is discussed in either generic or specific remarks as appropriate for the particular taxon. For example, Maki and Tsuchiya's (1923) *Clibanarius pacificus* Stimpson, 1858 and *Pagurus samuelis* (Stimpson, 1857), are not found in the present list of species. The explanation of the omission of *C. pacificus* is found in the remarks for the genus *Clibanarius*, whereas information regarding *P. samuelis* is found in the remarks under the genus *Pagurus*. It is highly probable that still additional hermit crab species will be found in Taiwan, particularly those of very small size such as have been found in the neighboring Ryukyu Islands (Komai & Osawa, 2005, 2006, 2007; Komai, 2006; Komai & Takada, 2006) and Hawaii (e.g., McLaughlin, 1986; Asakura, 2005b) or restricted to subtidal zones accessible primarily to divers (e.g., Osawa & Okuno, 2003; Osawa & Takeda, 2004; Osawa et al., 2006).

The specimens utilized in this catalog primarily have come from the collections of the National Taiwan Ocean University (NTOU), supplemented by specimens from the National Museum of Natural Science (NMNS). With three exceptions, at least one Taiwanese specimen of each species has been examined and illustrated. The diagnosis of *Aniculus maximus* Edmondson, 1952 is based on literature accounts as the specimen now is in very poor condition. The diagnosis and line drawings of *Clibanarius arethusa*, De Man, 1888a are based on specimens from Thailand in the Natural History Museum and Institute, Chiba, Chiba, Japan (CBM-ZC) as the Taiwan specimen could not be located. The photographs of these two species in the handbook of Taiwanese hermit crabs by Yu & Foo (1991) supplement the diagnoses given here. The accuracy of the photographic identifications was verified by the color patterns of the specimens. The diagnosis and line drawings of *Tomopaguroides valdiviae* (Balss, 1911) are also based on photographic and literature accounts as the Taiwan specimen could not be located, but its identification is unmistakable from the photograph.

For each species in the catalog, a restricted synonymy is presented that includes changes in nomenclature, misspellings, misidentifications, illustrated reports, and records for Taiwan. The diagnosis and line drawings given for each species underscore the diagnostic characters of the taxon, and these vary from genus to genus. Descriptions of coloration are based on observations of living animal color and/or photos taken at the time of capture or of specimens preserved by freezing, except when noted to the contrary, but it must emphasized that intraspecific variations frequently have been observed. The majority of the species also are accompanied by one or more colored photos.

The maximum size given for each species is based on the length of the shield, the standard protocol for hermit crabs, measured from the tip of the rostrum or the midpoint of the rostral lobe (exclusive of the intercalary rostral process) to the midpoint of the posterior margin of the shield. This measurement is an indication of animal size, but does not reflect the overall body length of the animal. For most, shield length is provided in the ( ) following the sex, of all specimens both sexed and measured. Estimates of ocular peduncle lengths include the corneas. The abbreviation ovig. refers to ovigerous females; abbreviations of gear types CP, PCP, OCP, CD, DW, CH, refer to the four-meter French beam trawl, the three-meter French beam trawl, the three-meter ORE beam trawl, the Otter Trawl Le Drézén type JUNEAUX, the Warén Dredge, and the Otter Trawl used by commercial trawlers, respectively. For materials collected by the "TAIWAN" cruises between 2000 and 2006, these are listed after the gear types. The institutional abbreviation MNHN refers to the Muséum national d'Histoire naturelle, Paris, France, UF to the University of Florida, Gainesville, Florida, U.S.A., and USNM to the National Museum of Natural History, Smithsonian Institution, Washington, D.C.,

U.S.A.

This hermit crab catalog is dedicated to Professor Hsiang-Ping Yu who retired a few years ago. Following tutelage by the great Japanese anomuran taxonomist Sadayoshi Miyake, Professor Yu devoted himself fully to work on the decapod crustaceans of Taiwan from the time of his return in 1971 until his retirement. Through his vision, and with his success in acquiring ample grants, as well as his training of numerous students in the skills of decapod crustacean taxonomy (and most importantly helping them to find jobs), decapod crustacean studies are now flourishing in Taiwan and will likely continue to do so for many more years. It is our pleasure to dedicate this rich and colorful Taiwan hermit crab catalog to Professor Yu in recognition of his important contributions to the studies of the decapod crustacean fauna of Taiwan.

We are indebted Dr. Rafael Lemaitre, National Museum of Natural History, Smithsonian Institution, for verifications and/or identification of the species of the Parapaguridae, and who also was instrumental in obtaining information on the Maki & Tsuchiya (1923) collection. We would like to thank Drs. Ping-Ho Ho of the National Taiwan Ocean University and Hsi-Te Shih of the National Chung Hsing University for kindly allowing us to use some of their photographs, and Miss Chih-Chun Lin for her efforts in editing the manuscript and preparing some of the line drawings. Grateful acknowledgement is extended to the Center for Marine Bioscience and Biotechnology of the National Taiwan Ocean University for support in publishing this catalog.

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SYSTEMATICS

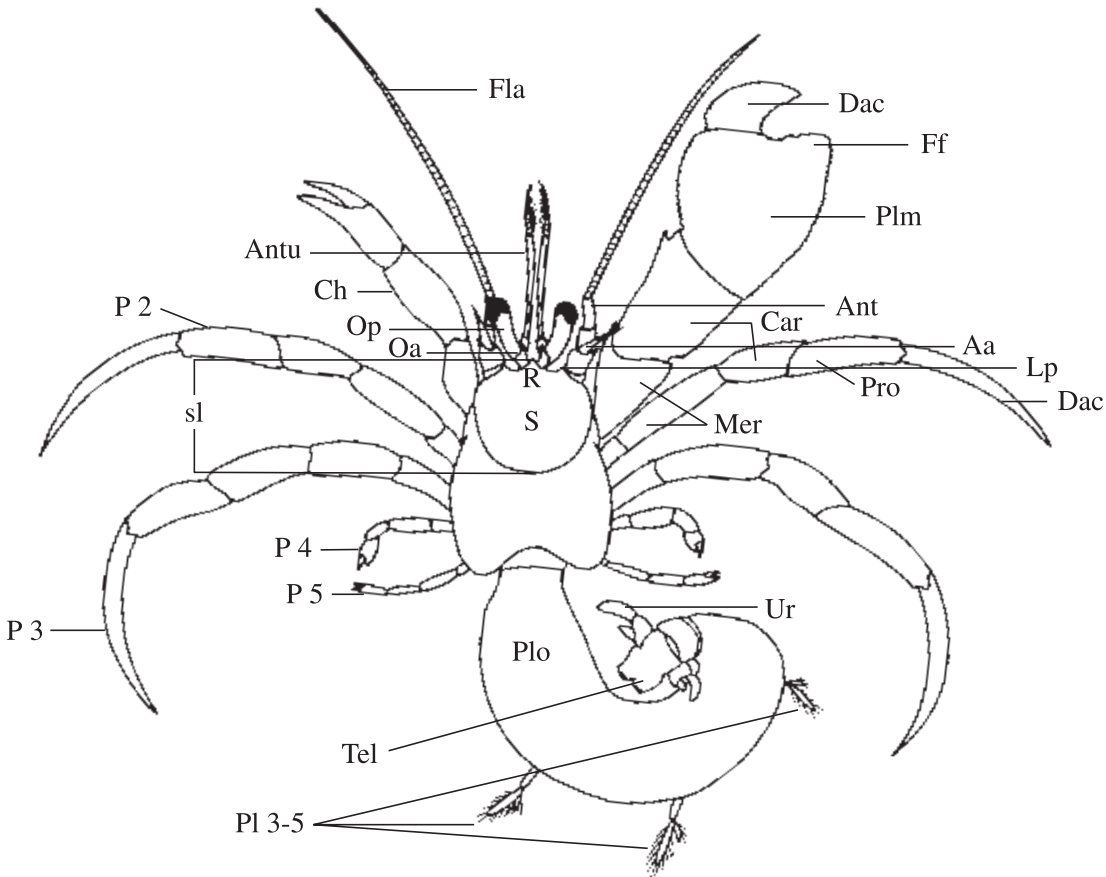
Infraorder Anomura MacLeay, 1838
Superfamily Paguroidea Latreille, 1802

Until very recently, the Paguroidea included those decapod crustaceans commonly known as both hermit crabs and king crabs. However, McLaughlin et al. (2007) demonstrated the necessity of transferring the king crabs to their own superfamily, Lithodoidea, with families Hapalogastridae and Lithodidae. Of the six families still assigned to the superfamily Paguroidea sensu stricto, i.e., Pylochelidae, Coenobitidae, Diogenidae, Pylojacquesidae, Paguridae, and Parapaguridae, Pylojacquesidae is the only family not represented in Taiwanese waters. Keys are presented for the families, genera and species that have been reported from Taiwan. The placement of species within each genus follows the key for that genus and is not meant to indicate phylogenetic relationships. Terms used in the keys and diagnoses are illustrated in the following figures.

Key to the Taiwanese families of the Paguroidea

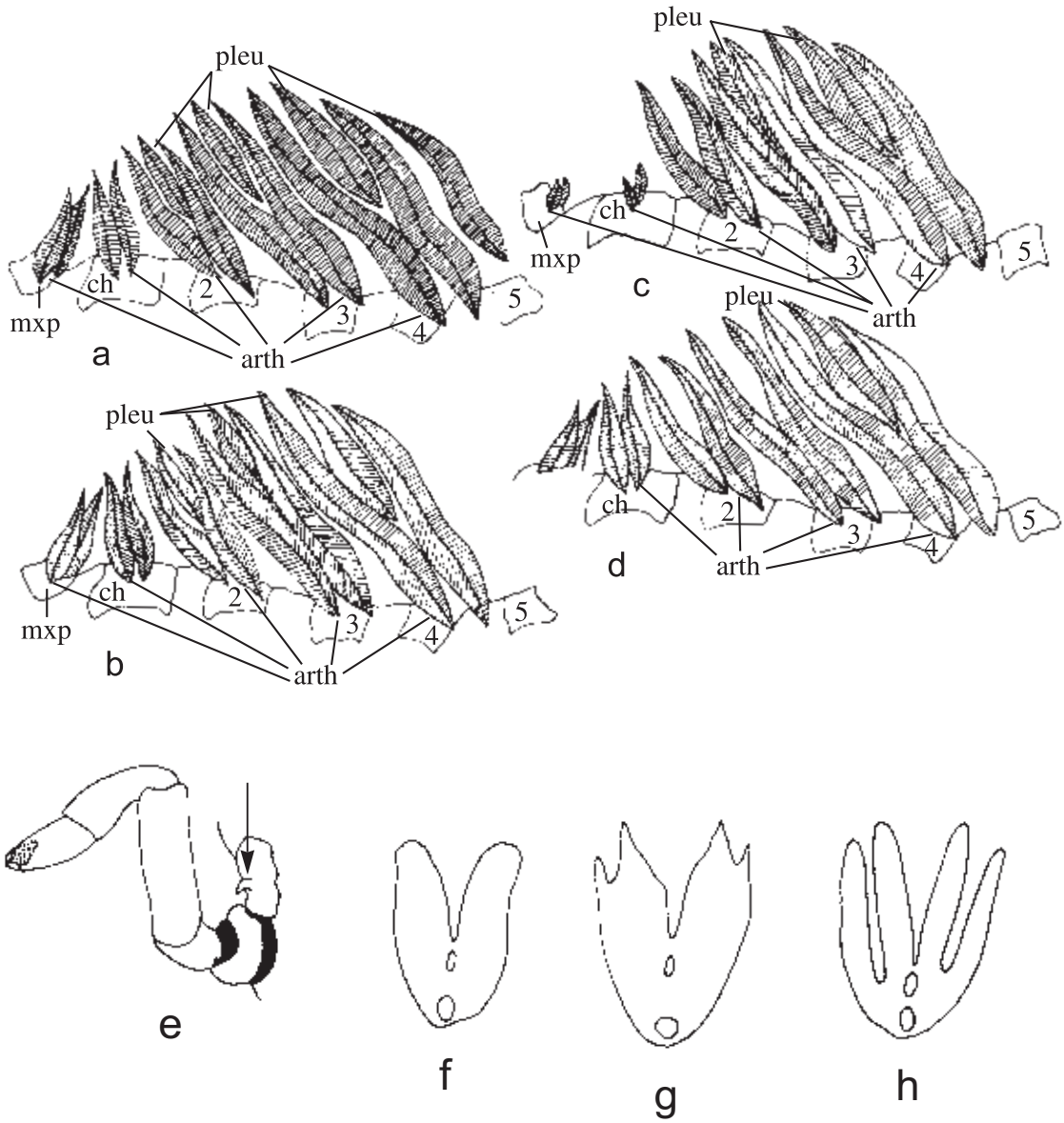
1. Antennules with upper rami of flagella terminating bluntly, somewhat "stick-like" ……Coenobitidae
- Antennules with upper rami of flagella terminating in tapered filaments, not "stick-like" ……2
2. Paired pleopods on pleomeres 2-5; pleonal tergites 1-5 well defined, well calcified ……Pylochelidae
- No paired pleopods on pleomeres 4 and 5; pleonal tergites variable, but usually not well calcified ……3
3. Third maxillipeds generally approximate basally; chelipeds equal, subequal or unequal, left frequently largest ……Diogenidae
- Third maxillipeds generally widely separated basally; chelipeds equal, subequal or unequal, right usually largest ……4
4. First maxilliped with exopodal flagellum ……Paguridae
- First maxilliped without exopodal flagellum ……Parapaguridae

Glossary of Terms



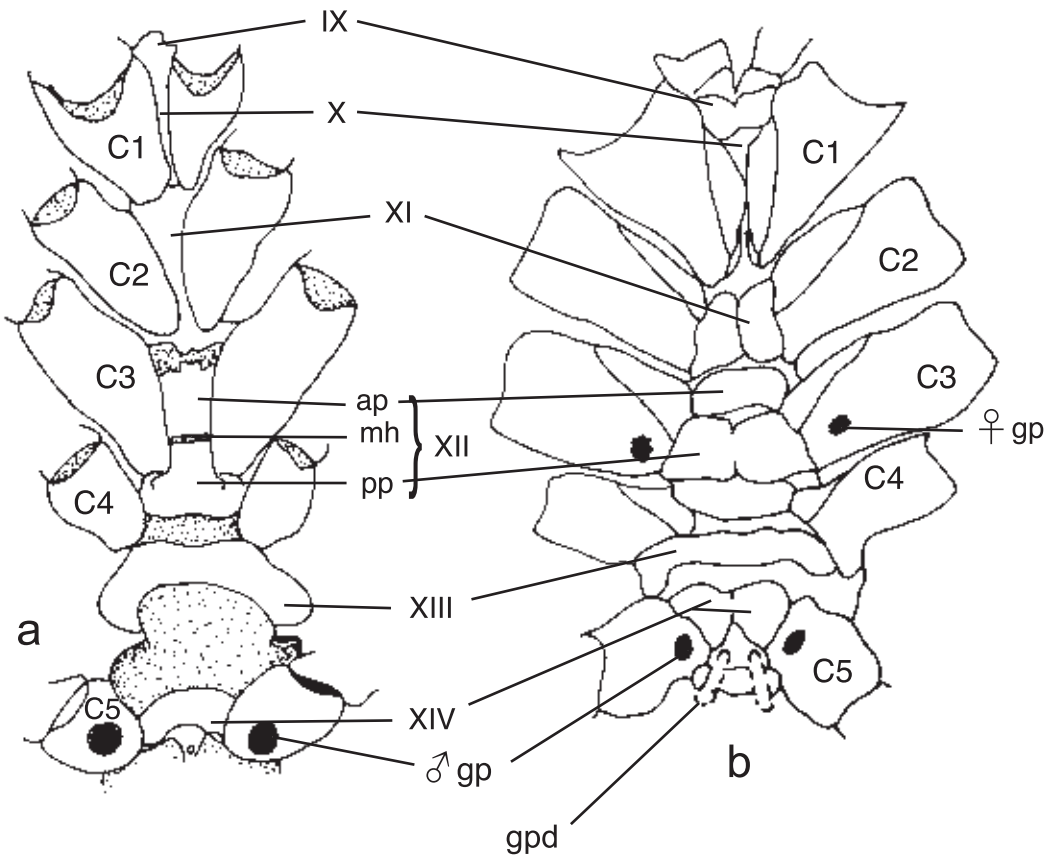
Diagrammatic pagurid. Abbreviations: **Aa** = antennal acicle; **Ant** = antenna; **Antu** = antennule; **Car** = carpus; **Ch** = cheliped; **Dac** = dactyl; **Ff** = fixed finger; **Fla** = antennal flagellum; **Lp** = lateral projection; **Mer** = merus; **Oa** = ocular acicle; **Op** = ocular peduncle; **P2-5** = pereopods 2-5; **Pl3-5** = pleopods 3-5; **Plm** = palm; **Plo** = Pleon; **Pro** = propodus; **R** = rostrum or rostral lobe; **S** = shield; **sl** = shield length; **Tel** = telson; **Ur** = uropod.

Glossary of Terms



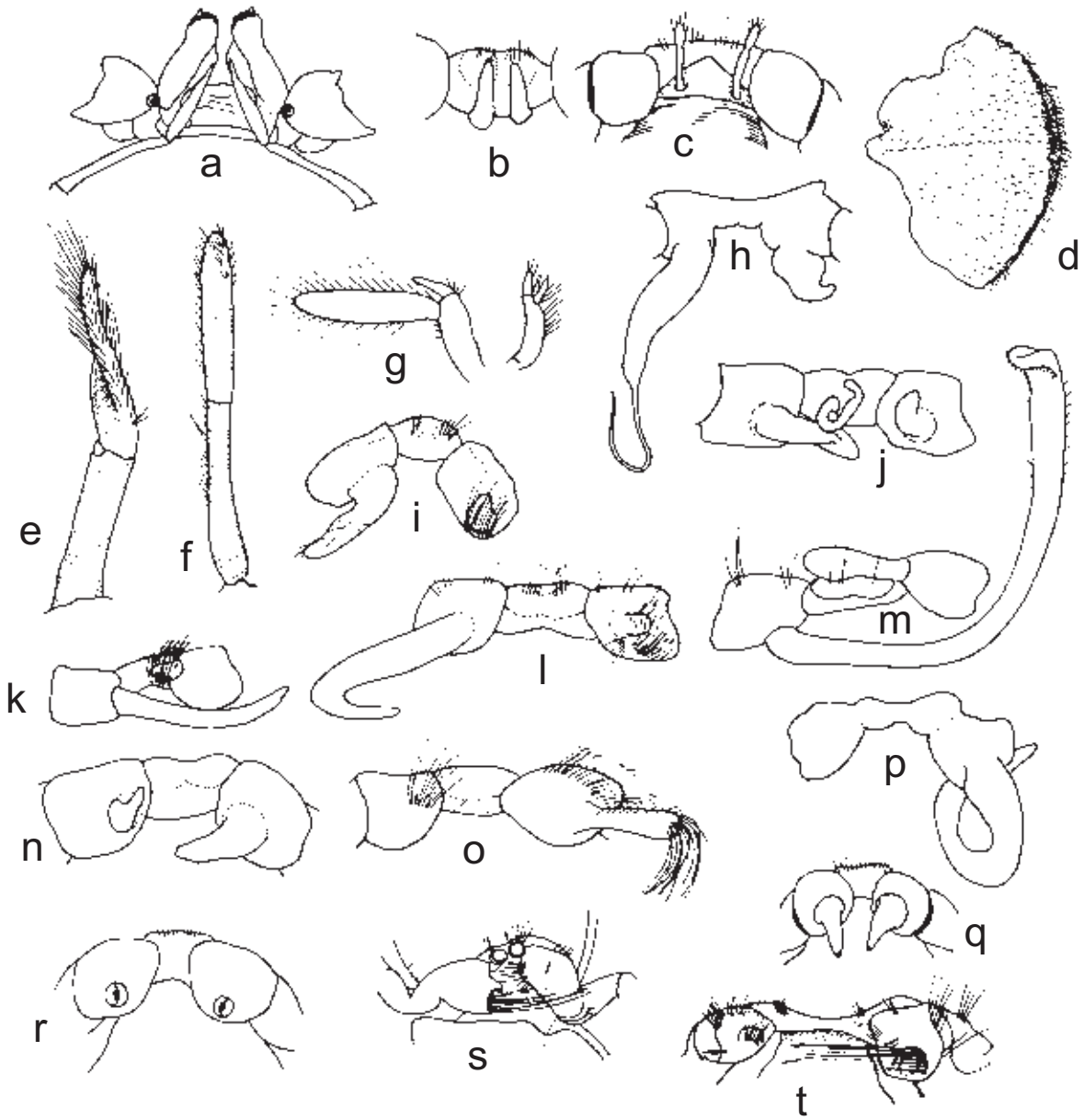
Gills: **a,** left gill series of 14 pairs (paired arthrobranchs on arthrodial membranes of maxilliped 3, chelipeds, and pereopods 2-4; single pleurobranchs on somites XI, XII, XIII, and XIV (thoracomeres 5-8, above pereopods 2-5); **b,** left gill series of 13 pairs (paired arthrobranchs on arthrodial membranes of maxilliped 3, chela, and pereopods 2-4; single pleurobranchs on somites XI, XII, and XIII (thoracomeres 5-7, above pereopods 2-4); **c,** left gill series with paired arthrobranchs reduced or vestigial on arthrodial membranes of maxilliped 3 and cheliped; pleurobranchs absent from somites XI and XIV (thoracomeres 5 and 8, above pereopods 2 and 5); **d,** left gill series of 11 pairs (paired arthrobranchs on arthrodial membranes of maxilliped 3, chelipeds, and pereopods 2-4; single pleurobranch on somite XIII (thoracomere 7, above pereopod 4); **e,** vestigial pleurobranch (indicated by arrow) on somite XIV (thoracomere 8, above pereopod 5) in some parapagurids; **f,** biserial gill lamella; **g,** distally divided quadriserial gill lamella; **h,** deeply divided quadriserial gill lamella [after McLaughlin, 2003].

Glossary of Terms



Thoracic sternites and coxae of pereopods: **a,** *Pylojacquesia colemani* McLaughlin & Lemaitre; **b,** generalized Paguridae. Abbreviations: **ap** = anterior portion; **C 1-5** = coxae of pereopods 1-5; **gp** = gonopore; **gpd** = paird first gonopods; **mh** = membranous hinge; **pp** = posterior portion [after McLaughlin, 2003].

Glossary of Terms



Secondary sexual appendages and structures: **a**, coxae of pereopods 5 and pleonal somites 1 and 2 of male with pleopods 1 and 2 paired, modified; **b-c**, coxae of pereopods 5 and abdominal somite 1 of female with pleopod 1 paired, modified; **d**, female brood pouch; **e-g**, male pleopod 2; **h-q**, male sexual tubes; **r**, male gonopores without sexual tube development; **s**, coxa of right pereopod 5 of male with gonopore masked by tuft of stiff setae; **t**, coxa of left pereopod 5 of male with gonopore masked by tuft of stiff setae [after McLaughlin, 2003].

Family Coenobitidae Dana, 1851

The family consists of two genera, both distinguished from other hermit crabs by their adaptations to terrestrial life. Only the larvae require the marine environment for development. With the molt to the megalopal stage, young coenobitids migrate to land. Both genera are found in southern Taiwan.

Key to the genera of the Coenobitidae

1. Pereopod 4 elongate, chelate; pleon somewhat flexed; rostrum well developed ..... *Birgus*
- Pereopod 4 short, not chelate; pleon spirally twisted; rostrum obsolete ..... *Coenobita*

Birgus Leach, 1815

The single species in this genus is well known as the coconut or robber crab, a common name given by early naturalists who found that it stole and ate coconuts. It is one of the largest terrestrial arthropods, with individuals weighing as much as five kilograms. Once very abundant throughout the tropical Indo-Pacific, populations have decreased rapidly in the past 50 years to where it is classified as "endangered" by the International Union for Conservation of Nature. The flesh of *Birgus latro* is a food prized by many people in the Indo-Pacific, particularly the deposit of fat found under the telson. On many islands the species also has a major socio-cultural significance.

Birgus latro (Linnaeus, 1767)

Lanyu, Taitung County, Jul 1997.

Cancer latro Linnaeus, 1767: 1049; Herbst, 1791: 34, pl. 24.

Pagurus latro– Fabricius, 1798: 411; Quoy & Gaimard, 1824: 534, pl. 53.

Birgus latro– Leach, 1815: 337; Desmarest, 1825: 180, pl. 30, fig. 3; Alcock, 1905: 150, pl. 14; Takahashi, 1934: 508; Yu, 1985: 59, pl. 1, fig. A; Yu & Foo, 1991: 61, unnumbered photo; Wang, 1992: 61 (list); Poupin, 1994: 10, fig. 6, pl. 1h; Wang, 1994: 570 (list).

Material examined.– Meilun, Hualien County, Aug 1999: 1 male (45.0 mm), (NTOU); Hengchun, Pingtung County, 10 Dec 1985: 2 females, (29.6, 42.9 mm), (NTOU).

Diagnosis.– Anterior carapace very narrow, with well developed rostrum, posterior carapace broad and subcircular. Pleon reduced, flexed beneath cephalothorax; with tergal plates distinct and calcified. Ocular peduncles moderately long, but much shorter than antennal and antennular peduncles. Left cheliped larger than right but not markedly so; surfaces of both chelae and carpi rugose. Second pereopods longer than third, both with rugose, often spinulose transverse ridges. Fourth pereopods equal to or less than half length of third, distinctly chelate. Coxae of fifth pereopods in males each with very short cone-like protrusions of vas deferens. Males without pleopods; uropods symmetrical, reduced; females with unpaired biramous left pleopods on pleomeres 2-4.

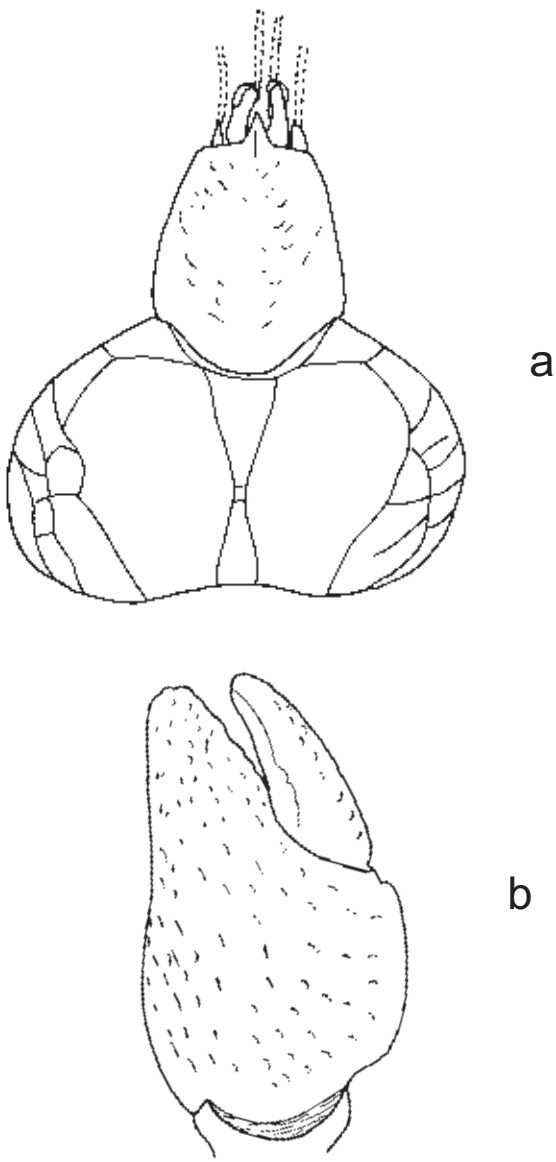
Coloration.– Considerably variable; ocular, antennular and antennal peduncles dark brown; carapace reddish or light purplish-red to dark purplish-blue, occasionally uniformly black. Pereopods and chelipeds similarly colored, but pereopods often with darker gray-brown ridges.

Size.– Maximum recorded shield length 74.9 mm.

Habitats.– Holes among coral rocks; burrows at bases of trees and crevices in limestone and volcanic boulder areas among stands of coconut trees; Pandanus thickets.

Distribution.– East coast of Africa to Line and Bambier Islands including northern Indian Ocean around Nicobar and part of Andaman Islands, western part of Malay Archipelago, Philippine Islands, Taiwan, Ryukyu Islands of Japan, eastward to French Polynesia and Easter Island; primarily restricted to insular habitats.

Remarks.– Yu (1985) and Yu & Foo (1991) cited the date of publication of the first description of *Birgus latro* as Linnaeus, 1758; however, it was not until the twelfth edition that Linnaeus (1767) included a description of this species.



Female (42.9 mm), Hengchun, Pingtung County, 10 Dec 1985: **a,** cephalothorax (dorsal view); **b,** left chela (outer face). Not to scale.

Coenobita Latreille, 1829

In recent years, several species of this shell-dwelling terrestrial hermit crab genus have become very popular as household pets. Three species of *Coenobita* have been recorded in Taiwan, *C. rugosus*, *C. brevimanus*, and *C. violascens*, the latter at one time thought to be synonymous with *C. cavipes* Srimpson, 1858, but now recognized as a distinct species (Nakasone, 1988). Wang (1992, 1994) also reported *Coenobita perlatus* H. Milne Edwards, 1837 from Taiwan; however, these are unsubstantiated records. Yu (1985) noted the similarities between *C. perlatus* and *C. rugosus* H. Milne Edwards, 1837, but found only the latter species. Nakasone (1988) questioned whether even De Haan's (1849) record of *C. perlatus* from Kagoshima and the Ryukyu Islands of Japan was correct. *Coenobita perlatus* is not considered a species of the Taiwanese fauna.

Key to the Taiwanese species of *Coenobita*

1. Palm of left chela with brush of setae on upper margin ……2
- Palm of left chela without brush of setae on upper margin ……*C. brevimanus*
2. Upper outer surface of left chela with stridulatory mechanism; coxa of right fifth pereopod of male with sexual tube ……*C. rugosus*
- Upper outer surface of left chela without stridulatory mechanism; coxa of right fifth pereopod of male without sexual tube ……*C. violascens*

Coenobita brevimanus Dana, 1852

No specific locality (photographed by P.H. Ho).

Coenobita clypeata– H. Milne Edwards, 1837: 239; Ortmann, 1892: 316, pl. 12, fig. 20; Boone, 1935: 40, pl. 6; Fize & Serène, 1955: 7, pl. 1, fig. 1 [not *Coenobita clypeatus* (Fabricius, 1787)].

Cenobita clypeata var. *brevimanus* Dana, 1852b: 473; Dana, 1855, pl. 30, fig. 4b.

Coenobita clypeatus– Alcock, 1905: 142, pl. 15, fig. 1, 1a [not *Coenobita clypeatus* (Fabricius, 1787)].

Coenobita hilgendorfi Terao, 1913: 388; Takahashi, 1934: 514; Yu, 1985: 61, pl. 1, fig. C.

Coenobita clypeata var. *Puerto-galera* Yap-Chiongco, 1938: 213.

Coenobita brevimanus– Rathbun, 1910: 314; Nakasone 1988: 174, figs. 8, 9F; Yu & Foo, 1991: 60, unnumbered photo; Wang, 1994: 570 (list).

Material examined.– Dasi, Yilan County, 27 Jun 1985: 2 females (9.8, 12.6 mm), 2 ovig. females (8.7, 9.2 mm), (NTOU); Hualien County, May 1985: 1 male (20.0 mm), (NTOU); Kaohsiung County, 29 Oct 1984: 1 male (19.5 mm), (NTOU); Jialeshuei, Pingtung County, 27 Aug 1985: 1 female (11.1 mm), (NTOU).– 15 Nov 1988: 1 male (13.4 mm), 4 females (12.2-16.3 mm), (NTOU); SiaoLiouciou, Pingtung County, 13 Dec 1984: 1 male (21.7 mm), (NTOU); Pingtung County, 6 May 1992: 1 male (20.5 mm), (NTOU).

Diagnosis.– Shield strongly convex, surface profusely punctate. Ocular peduncles subcylindrical, extending just beyond proximal margins of ultimate antennal peduncular segments; ocular acicles with anterior margins serrate or crenulate. Antennal acicle usually not fused to second segment of peduncle. Meri of chelipeds transversely rugose; outer surfaces of carpi each with irregularly scattered tubercles, becoming spinulose near inner margin; chelae similarly armed, but tending to be worn or lacking on medial outer face of

left palm, no stridulatory ridge on upper outer surface; upper margin of palm of only right cheliped with thick brush of long, coarse setae. Ambulatory legs with rugose and punctate lateral faces; upper surfaces of carpi, propodi and dactyls with numerous small corneous-tipped, spinulose tubercles, most abundant on dactyls; mesial faces of dactyls of left second and third pereopods each with corneous, serrated ridge. Coxae of males slightly separated, stout, but no stouter than in females; no sexual tube developed from either coxa.

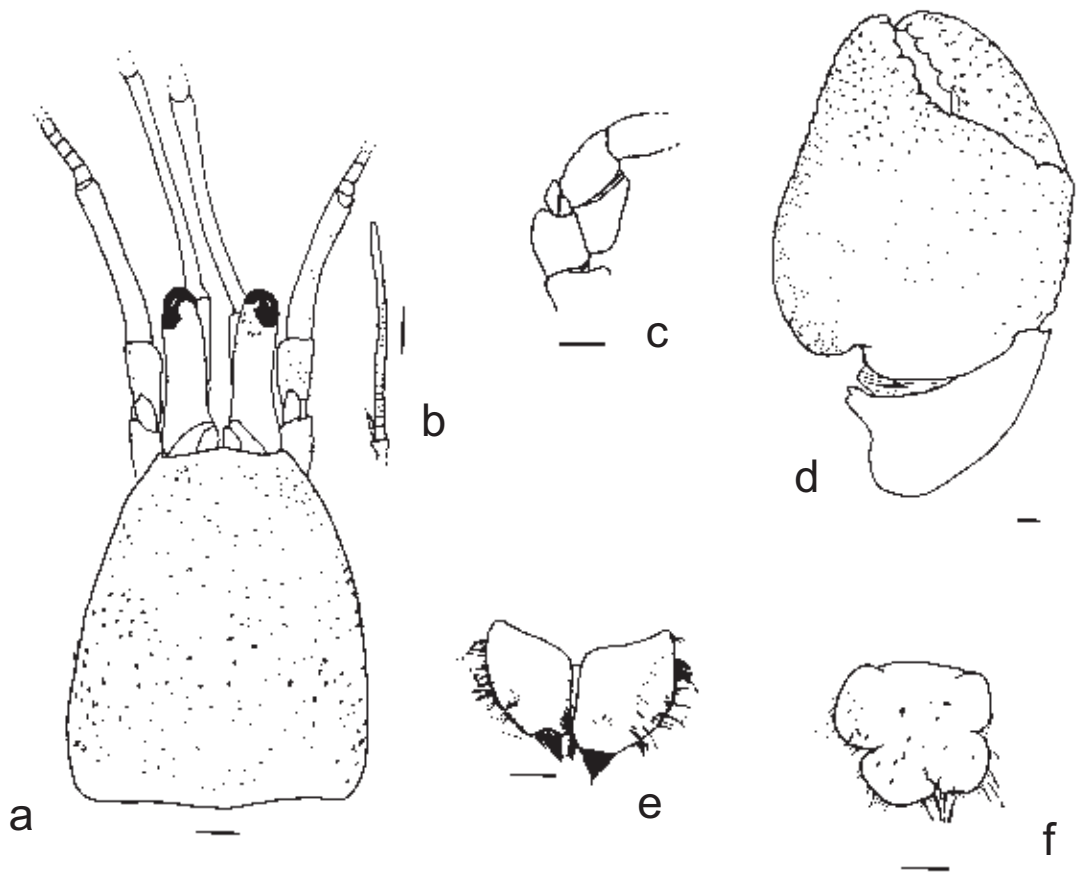
Coloration.– Bluish-gray, dusky or reddish-violet to livid purple.

Size.– Maximum recorded shield length 29.8 mm.

Habitats.– Frequenting forested areas near beaches.

Distribution.– East coast of Africa to Line Islands and Tuamotu Archipelago, including southern Ryukyu Islands, Japan and Taiwan.

Remarks.– Takahashi (1934) and Yu (1985) reported this species from southern Taiwan as *Coenobita hilgendorfi* Terao, 1913. Yu & Foo (1991) recognized that the correct name for the taxon was *C. brevimanus*; however, they still credited authorship to Terao (1913) rather than to Dana (1852b).



Male (20.5 mm), Pingtung County, 6 May 1992: **a,** shield and cephalic appendages; **b,** upper flagellum of antennule; **c,** proximal segments of antenna and antennal acicle; **d,** carpus and chela of left cheliped (outer face); **e,** coxae of male fifth pereopods (ventral view); **f,** telson. Setae partially omitted. Scales equal 2 mm.

Coenobita rugosus H. Milne Edwards, 1837

Magang, Taipei County, 23 Aug 2006.

Cream color form, Pratas, South China Sea (territory of Taiwan), Sep 2006.

Purple color form, Pratas, South China Sea (territory of Taiwan), Sep 2006.

Dark blue color form, Pratas, South China Sea (territory of Taiwan), Sep 2006.

Bluish color form, Pratas, South China Sea (territory of Taiwan), Sep 2006.

Coenobita clypeatus Fabricius, 1787: 328 (in part), fig. 117, not fig. 116 (see remarks).

Cancer clypeatus– Herbst, 1791: 22 (in part), pl. 23, fig. 2B, not pl. 23, fig. 2A (see remarks).

Cenobita rugosa H. Milne Edwards, 1837: 241; Dana, 1852b: 471; Dana, 1855, pl. 30, fig. 1.

Caenobita clypeata Owen, 1839: 85, pl. 25, fig. 3 [not *Coenobita clypeatus* (Fabricius, 1787)].

Coenobita rugosus– Ortmann, 1892: 317, pl. 12, fig. 22; Alcock, 1905: 143, pl. 14, fig. 3, 3a; Takahashi, 1934: 510; Yap-Chiongco, 1938: 210, pl. 2, fig. 7; Yu, 1985: 61, pl. 1, fig. D; Nakasone, 1988: 168, fig. 3A-G; Yu & Foo, 1991: 58, unnumbered photo; Wang, 1992: 61 (list); Wang, 1994: 560 (list).

Coenobita rugosa– Fize & Serène, 1955: 12, figs. 2, 3A, pl. 1, figs. 3, 5, 7-10.

Coenobita rugosa var. A. *granulata*– Bouvier, 1890: 146.

Coenobita var. B. *compressa* Bouvier, 1890: 147 [not *Coenobita compressus* H. Milne Edwards, 1837].

Coenobita compressus– De Man, 1902: 742, pl. 24, fig. 45 [not *Coenobita compressus* H. Milne Edwards, 1837].

Material examined.– Fulong, Taipei County, Jun 2006: 1 male (7.1 mm), (NTOU); Rueibin, Taipei County, 21 Jun 1997: 3 juveniles (not measured), (NTOU); Dasi, Yilan County, 29 Oct 1984: 1 ovig. female (11.2 mm), (NTOU); Shihtiping, Hualien County, 19 Sep 2006: 1 juvenile (2.8 mm), (NTOU); Hualien County, 6 Sep 1977: 5 males (6.8-11.4 mm), 4 females (11.7-12.9 mm), (NTOU); Hsinchu County, Dec 1998: 1 female (7.6 mm), (NTOU); Nanbao fishing port, Changhua Country, 7 Jun 1993: 1 juvenile (4.8 mm), (NTOU); Hou Bay, Pingtung County, 4 Jun 1992: 1 male (8.2 mm), (NTOU); Jialeshuei, Pingtung County, 29 Oct 1984: 1 male (9.2 mm), (NTOU); Kending, Pingtung County, 3 Jun 2005: 1 female (10.8 mm), (NTOU); Guoye, Penghu County: 1 female (5.6 mm), (NTOU); Cingluo, Penghu County, 20 Jul 2001: 1 male (7.4 mm), (NTOU).– no specific date: 1 female (10.6 mm), (NTOU); no specific locality: 1 female (12.0 mm), (NTOU).

Diagnosis.– Ocular peduncles reaching beyond middle of ultimate segments of antennular peduncles; ocular acicles narrow, sharply acuminate. Antennal acicle fused to second peduncular segment. Upper margins of both chelae with brush of setae; stridulatory mechanism composed of series of oblique laminar tubercles on upper outer surface of palm of left chela; strong longitudinal ridge on middle of inner surface of palm of left chela below brush of setae; mesial face of merus of right cheliped without dense tuft of setae. Lateral surfaces of propodus and dactyl of left third pereopod flattened and separated from dorsal surface by distinct ridge or crest; ventromesial surfaces of dactyls of left second and third pereopods each with longitudinal ridge of closely-set, regular tubercles, forming part of stridulatory mechanism. Coxae of male fifth pereopods asymmetrical, produced posteriorly as short sexual tubes.

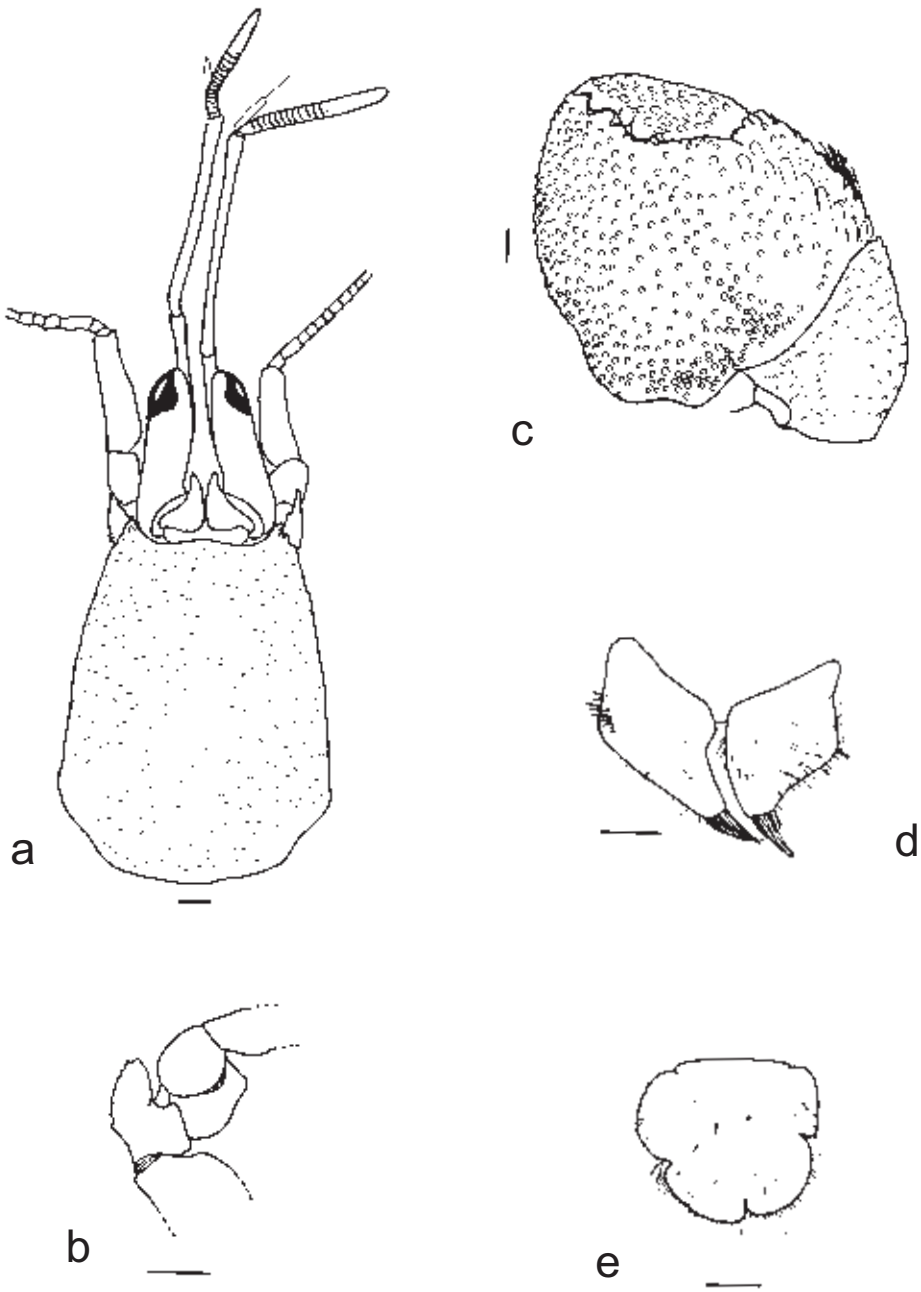
Coloration.– Color variable; cream, purplish, bluish-gray to dark blue, or mixture of these colors.

Size.– Maximum recorded shield length 15.9 mm.

Habitats.– Supralittoral zone of sandy beaches; daytime aggregations found under bushes and among debris.

Distribution.– East Africa, Madagascar and Seychelles, to Line Islands and Tuamotu Archipelago, including Japanese Chichijima and Anijima Islands and Okinawa, Taiwan.

Remarks.– As pointed out by McLaughlin & Holthuis (2002), the description of *Pagurus clypeatus* Fabricius, 1787 was based on the as yet unpublished figures of Herbst (1791), which Fabricius (1787) mistakenly thought represented a single specimen. Because of a subsequent misinterpretation by Hilgendorf (1869), the type locality of *Pagurus clypeatus* was thought to be the West Indies, rather than the East Indies as cited by Herbst (1791). Thus *Coenobita clypeatus* became regarded as the Atlantic representative of the genus, although in early years it was known as *Coenobita diogenes* (Linnaeus, 1767). The true identities of Herbst's (1791) specimens were not recognized until they were reexamined by McLaughlin (McLaughlin & Holthuis, 2002). The larger specimen (Herbst, 1791, pl. 23, fig. 2B) proved to be a specimen of *C. rugosus*; the smaller specimen (ibid., pl. 23, fig. 2A) represented *C. violascens*, but both were syntypes of *Pagurus clypeatus* Fabricius. In the interest of stability in nomenclature, McLaughlin & Holthuis (2002) applied to the International Commission on Zoological Nomenclature to replace the two existing syntypes of *P. clypeatus* with a neotype from the West Indies, which would also conserve the names of the two well known Indo-Pacific species, *C. rugosus* and *C. violascens*. In Opinion 2052 (2003) the Commission ruled in favor of that application.



Female (10.8 mm), Kending, Pingtung County, 3 Jun 2005, **a-c, e;** male (8.2 mm), Hou Bay Pingtung County, 4 Jun 1992, **d: a,** shield and cephalic appendages; **b,** proximal segments of antenna and antennal acicle; **c,** carpus and chela of left cheliped (outer face); **d,** coxae of male fifth pereopods (ventral view); **e,** telson. Setae partially omitted. Scales equal 2 mm.

Coenobita violascens Heller, 1862

Kending, Pingtung County, Feb 2007.

Pagurus clypeatus Fabricius, 1787: 328 (in part) fig. 116, not p. 328, fig. 117 (see remarks).

Cancer clypeatus– Herbst, 1791: 22, (in part), pl. 23, fig. 2A, not pl. 23, fig. 2B [not *Pagurus clypeatus* Fabricius, 1787].

Cenobita violascens Heller, 1862: 524; Heller, 1865: 82, pl. 7, fig. 1.

Coenobita violascens– Hilgendorf, 1869: 99 (in part), ? not pl. 6, fig. 3b; Nakasone, 1988: 172, fig. 7; McLaughlin, 1998: 218b, unnumbered figure; McLaughlin & Dworschak, 2001: 140, figs. 1-8; McLaughlin & Holthuis, 2002: 18.

Coenobita cavipes– Stebbing, 1917: 24; Takahashi, 1934: 513; Yap-Chiongco, 1938: 211; Barnard, 1950: 470; Yu, 1985: 60, pl. 1, fig. B; Yu & Foo, 1991: 59, unnumbered photo; Wang, 1992: 61 (list); Wang, 1994: 560 (list) [not *Coenobita cavipes* Stimpson, 1858].

Material examined.– Hualien County, 6 Sep 1997: 1 male (11.2 mm), (NTOU); Singda Harbor, Kaohsiung County, 1 Dec 1984: 1 male (19.7 mm), (NTOU); Hou Bay, Pingtung County, 4 Jun 1992: 2 males (8.4-11.3 mm), (NTOU).– 4 May 1992: 3 ovig. females (12.1-15.9 mm), (NTOU); Kending, Pingtung County, 3 Jun 2005: 1 female (11.3 mm), (NTOU).– Feb 2007: 1 female (11.0 mm), (NTOU); SiaoLiouciou, Pingtung County, 13 Sep 1984: 1 female (11.0 mm), (NTOU); no specific locality, 5 Dec 1985: 1 male (10.1 mm), (NTOU).

Diagnosis.– Dorsal surface of shield with scattered granules and punctations, tip of anterolateral margin produced into spinule. Ocular peduncles compressed, reaching almost to midlength of ultimate antennal

segments. Antennal acicle fused with second peduncular segment. Left cheliped without stridulating ridge on upper outer surface of palm; upper half of outer face with numerous scattered granules, fewer in lower half and nearly smooth in lower central region; lower margin of palm straight or slightly concave, lower proximal angle produced into lobe-like projection. Left third pereopod with lateral surface of propodus nearly smooth, separated from dorsal surface by well-marked longitudinal crest; inner margin of propodus strongly projected inwardly, surface concave; ventral surface with very small, almost indistinct ridge; dactyl of third left pereopod broad, short, with dorsolateral margin distinctly angular. Coxae of males subequal, approximate, both thick and short; no sexual tube developed; sternal protuberance very small.

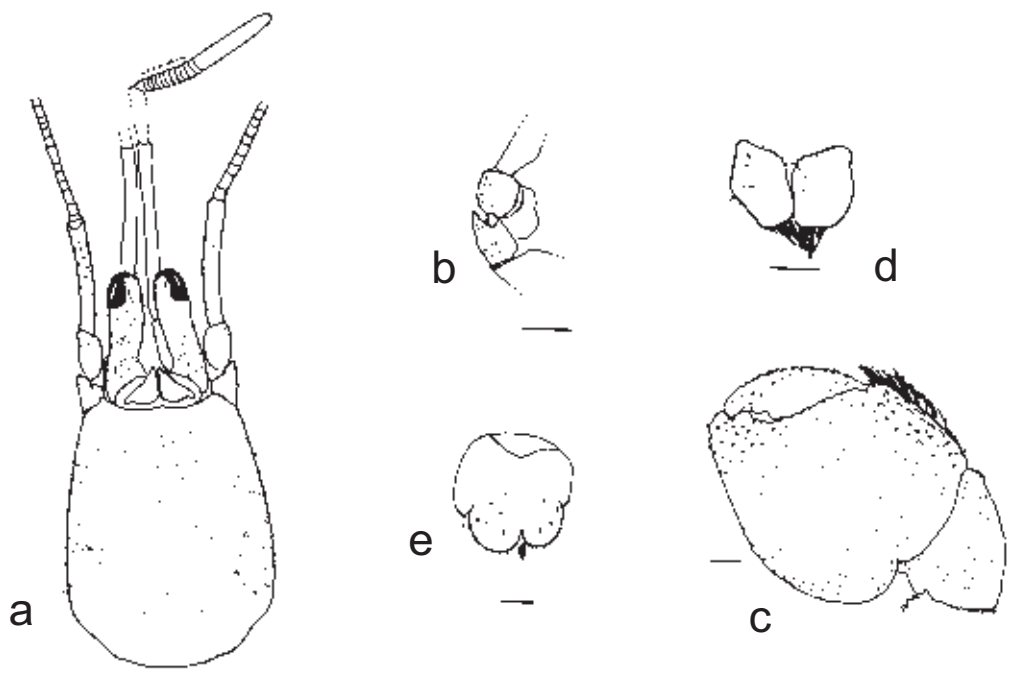
Size.– Maximum reported shield length 19.7 mm.

Coloration.– Entire body violaceous, but varying from light lavender to dark violet; dark patch of blue or brown on outer lower surface of palm of left cheliped.

Habitats.– Supralittoral; juveniles, at least, frequent mangrove forests; in Tanzania adults found on beaches under cliffs.

Distribution.– Tanzania, Nicobar Islands, Cebu Island, Philippine Islands, several Japanese Islands, and Taiwan.

Remarks.– The confusion with the name *Pagurus clypeatus* was discussed under the remarks for *C. rugosus*. As pointed out by McLaughlin & Dworschak (2001), Hilgendorf (1869) also reported on specimens of *C. violascens*. He did not identify the specimens used in his illustrations; however, his illustrated specimen (ibid., pl. 6, fig. 3b) appears to represent the specimen in his collection that is correctly identified as *C. cavipes*.



Male (10.7 mm), Hou Bay, Pingtung County, 4 Jun 1992: **a,** shield and cephalic appendages; **b,** proximal segments of antenna and antennal acicle; **c,** carpus and chela of left cheliped (outer face); **d,** coxae of male fifth pereopods (ventral view); **e,** telson. Scale equals 2 mm.

Family Pylochelidae Bate, 1888

Members of this family are often referred to as "symmetrical" hermit crabs because their chelipeds are generally symmetrical and their pleomeres each bears a pair of symmetrical appendages. With few exceptions, the pleons of these crabs are straight with well calcified tergal plates. In contrast to the majority of hermit crabs, the habitats of pylochelids are typically tusk shells, or hollows formed in pieces of wood, soft rocks such as pumice, or in sponges and occasionally corals. In the Indo-West Pacific, where the vast majority of species occur, pylochelids are broadly distributed from South Africa to the Kermadec Islands of New Zealand and north to Japan, at depths ranging from 30 to 1570 m, with most species found between 200 and 500 m. Seven species, in four genera, are now known from Taiwanese waters.

Key to the Taiwanese genera of the Pylochelidae

1. Shield incompletely separated from posterior carapace; telson divided into anterior and posterior articulating plates 2
- Shield completely separated from posterior carapace; telson not divided into anterior and posterior articulating plates 3
2. Shield approximately as broad as long; anterior margin of shield with median concavity, with or without median spinule; corneas variable in size but always hemispherical ..... *Pylocheles*
- Shield distinctly broader than long; anterior margin of shield with well developed, rounded rostral lobe; corneas reduced, conical ..... *Cheiroplatea*
3. Chelipeds operculate; ocular acicles without squamiform or spiniform anterior projections ... *Pomatocheles*
- Chelipeds not operculate; ocular acicles with squamiform or spiniform anterior projections ... *Trizocheles*

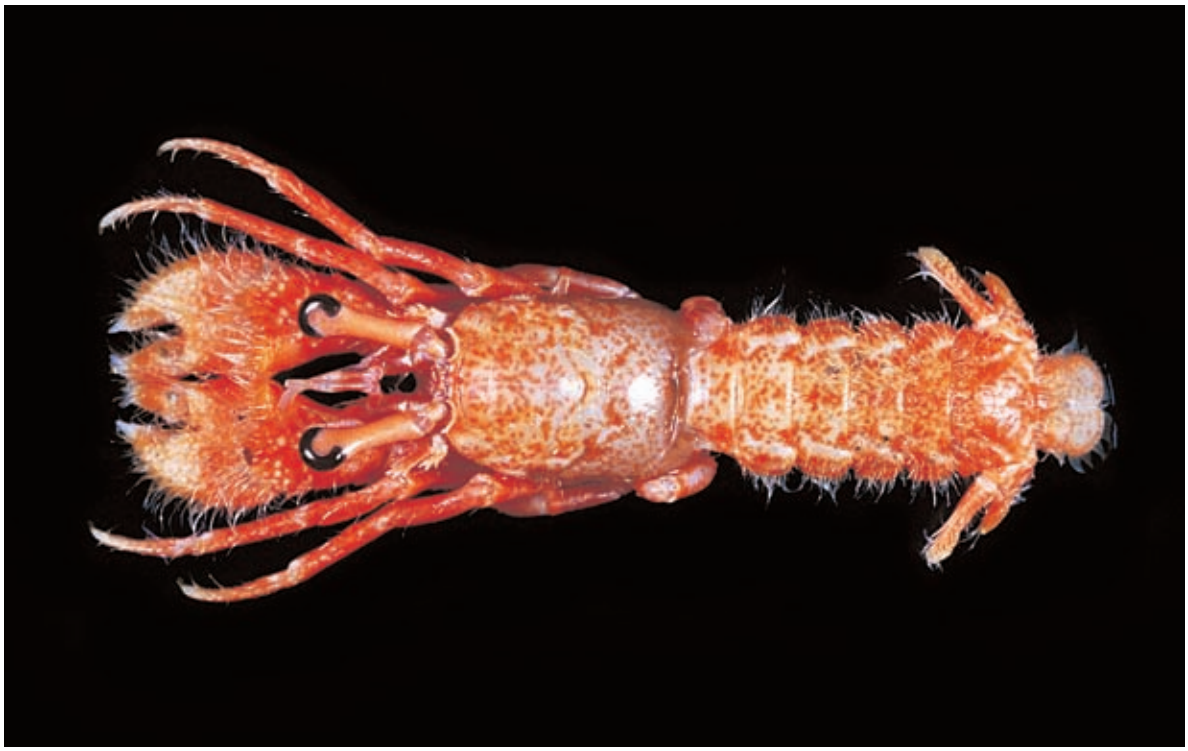
Genus *Pylocheles* A. Milne-Edwards, 1880

The genus is divided into three subgenera, each of which has one representative in Taiwanese waters. The two species of the nominal subgenus, *Pylocheles (Pylocheles)* dwell in cavities in soft stone such as pumice or in coral and sponge. Species of both *Pylocheles (Xylocheles)* and *Pylocheles* (*Bathycheles*) are typically wood-dwellers (Forest, 1987b) but sometimes also occupy tusk shells. As the subgeneric names suggest, these subdivisions correspond to ecological and bathymetric preferences and/or requirements.

Key to the Taiwanese subgenera of *Pylocheles*

1. Chelipeds together forming circular or subcircular operculum; carpus without cluster of tubercles on dorsomesial face distally ..... *Pylocheles* A. Milne-Edwards, 1880
- Chelipeds not forming operculum; carpus with cluster of tubercles on dorsomesial face distally 2
2. Ocular peduncles moderately long, considerably more than half shield length; corneas distinctly dilated ..... *Xylocheles* Forest 1987
- Ocular peduncles short, not more than half shield length; corneas not dilated ..... *Bathycheles* Forest 1987

Pylocheles (Pylocheles) mortensenii Boas, 1926



CP58.

CP269.

CP216, having sought shelter in a piece of sponge.

CP269, a cylindrical burrow in pumice rock affords a safe dwelling for the animal whose chelipeds provide an effective “door”.

Pylocheles Mortensenii Boas, 1926: 40, figs. 1, 5, 6, 10A, 11B, 13, 14, 18, 25A.

Mixtopagurus rigidus Yokoya, 1933: 71, fig. 31; Miyake 1947: 741, fig. 2144.

Pylocheles rigidus– Miyake 1949: 740, fig. 2125; Miyake, 1960: 94, pl. 47, fig. 6; Miyake, 1965: 640, fig. 1064; Miyake, 1978: 11, fig. 4; Miyake, 1982: 95: pl. 32, fig. 3.

Pylocheles mortenseni– Pilgrim 1965: 556.

Pylocheles (Pylocheles) mortensenii– Forest, 1987a: 52, figs. 2a, 3a, 5a, b, 7a, 8a-i, 9a-d, 10a, b, 12a-d, 41a; pl. 2C; Forest & McLaughlin 2000: 33, fig. 5.

Material examined.– DW26, 22°13.4'N, 120°23.1'E, 328-350 m, 30 Jul 2000: 1 female (2.9 mm), (NTOU); DW34, 22°01.9'N, 120°36.4'E, 246-240 m, 31 Jul 2000: 2 males (2.8, 4.1 mm), (MNHN Pg 7644), 1 male (4.4 mm), (NTOU); CP35, 22°01.8'N, 120°36.5'E, 228-222 m, 31 Jul 2000: 1 male (2.4 mm), 1 ovig. female (3.5 mm) (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 3 males (2.4-4.4 mm), 2 females (2.3, 4.6 mm), (NTOU); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 male (4.1 mm), 4 females (3.3-4.4 mm), 1 ovig. female (4.7 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 2 males (3.5, 5.3 mm), 1 female (damaged), 4 ovig. females (4.0-4.4 mm), (NTOU); CP269, 24°30.55'N, 122°05.78E, 399-397 m, 2 Sep 2004: 3 males (4.6-4.9 mm), (MNHN Pg 7631), 3 ovig. females (4.7-6.2 mm), (NTOU); CP270, 24°32.7'N, 122°02.26'E, 340-407 m, 2 Sep 2004: 2 males (4.3, 4.6 mm), 3 ovig. females (5.4-6.7 mm), (NTOU).

Diagnosis.– Shield shorter than broad and clearly longer than posterior carapace; anterior margin with pair of antennular lobes, each armed with acute spine; rostral spine reduced or absent. Ocular peduncles approximately 0.8 shield length; corneas dilated and pigmented, maximum diameter nearly double peduncles at mid-length. Antennular peduncles reaching beyond distal margins of corneas by length of ultimate segments; antennal peduncles not reaching or reaching to bases of corneas; antennal acicles triangular, each with 2 strong spines dorsolaterally posterior to tip and row of sharp spinules on nearly straight ventromesial margin. Chelipeds equal, symmetrical; dorsal faces of both palms and sloping anterodorsal surfaces of the carpi forming subcircular operculum. Second and third pereopods approximately same length as chelipeds; dorsal margins of carpi of second pereopods each with 5 or 6 spines. Telson generally slightly shorter than broad; posterior part divided into 2 circularly outlined lobes, completely separated by deep median notch and by membranous suture.

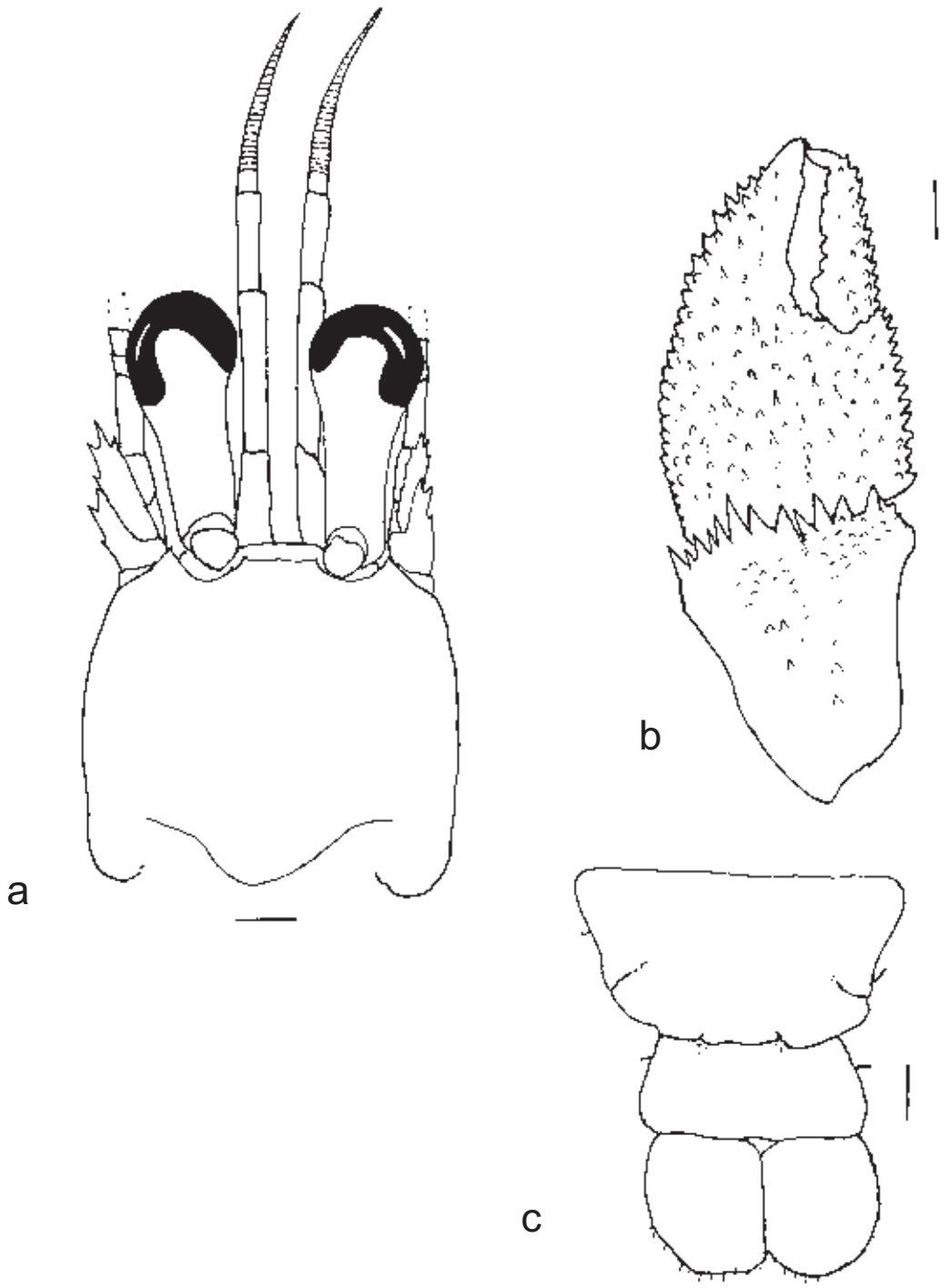
Size.– Maximum reported shield length 15.5 mm.

Coloration.– Body uniformly rose to intense rose, sometimes chelae whitish.

Habitats.– Excavations in pumice and occasionally in sponge and coral; on substrates of silt or sand.

Distribution.– Kai Islands and Seram, Indonesia, southern and southwest Japan, Philippine Islands, Taiwan, Australia, New Zealand; 100-407 m.

Remarks.– Although an abundant and relatively common species, this is the first report of its occurrence in Taiwanese waters.



Ovig. female (6.2 mm), CP269: **a,** shield and cephalic appendages (aesthetascs and setae omitted); **b,** carpus and chela of left cheliped; **c,** tergite of sixth pleonal somite and telson. Scales equal 1 mm.

Pylocheles (Xylocheles) macrops Forest, 1987

Donggang, Pingtung County, 4 Dec 2003, occupying the cylindrical cavity in a piece of sunken wood, prior to removal from burrow.

Pylocheles (Xylocheles) macrops Forest, 1987a: 61, figs. 2b, 9f-h, 10c, d, 13a-g, 15a-d, pl. 1A, 3A, 4D, E, 6C, D; Yu & Foo, 1991: 62, unnumbered fig.

Material examined.– Dasi fishing port, Yilan County, 4 May 1986: 1 female (10.5 mm), (NTOU).–5 Apr 1993: 1 male (11.0 mm), 1 female (7.3 mm), 1 ovig. female (8.2 mm), (NTOU).– Jul 2004: 1 male (8.5 mm), 1 female (10.2 mm), (NTOU).–10 Nov 2004: 9 males (4.7-9.0 mm), 3 ovig. females (8.3-11.8 mm), (NTOU).–10 Mar 2005: 1 male (6.4 mm), 1 female (6.3 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 22 May 1990: 1 male (5.7 mm), (NTOU).– 5 Mar 1991: 2 males (9.1, 10.8 mm), 2 females (10.3, 12.6 mm), (NTOU).–9 Dec 1992: 1 ovig. female (7.5 mm), (NTOU).– 1 Sep 1995: 1 female (8.1 mm), (NTOU); Donggang, Pingtung County, 4 Dec 2003: 2 males (8.2, 9.0 mm), 1 female (6.3 mm), (NTOU); CP27, 22°13.3'N, 120°23.4'E, 329-377 m, 30 Jul 2000: 1 female (5.5 mm), (NTOU); CP49, 22°55.7'N, 121°21.6'E, 266-262 m, 2 Aug 2000: 1 female (6.4 mm), (MNHN Pg 7645); CP90, 24°53.60'N, 122°01.39'E, 300-330 m, 10 May 2001: 1 male (10.6 mm), 1 female (5.2 mm), (MNHN); CP91, 24°50.60'N, 122°01.39'E, 400 m, 10 May 2001: 1 female (5.2 mm), 1 ovig. female (9.1 mm). (MNHN); CP165, 22°24.06'N, 120°13.03'E, 300 m, 25 May 2002: 1 female (9.6 mm), 3 ovig. females (9.1-9.6 mm), (MNHN); CH258, 24°30.47'N, 121°54.33'E, 173-225 m, 28 Aug 2004: 1 male (9.9 mm), 2 females (9.6, 10.4 mm), 2 ovig. females (9.4, 9.6 mm), (MNHN); CH260, 24°30.69'N, 121°54.43'E, 207-175 m, 29 Aug 2004: 1 male (9.9 mm), 1 female (10.4 mm), (MNHN); CP265, 24°28.65'N, 121°55.96'E, 350-345 m, 1 Sep 2004; 1 male (5.8 mm), (NTOU).

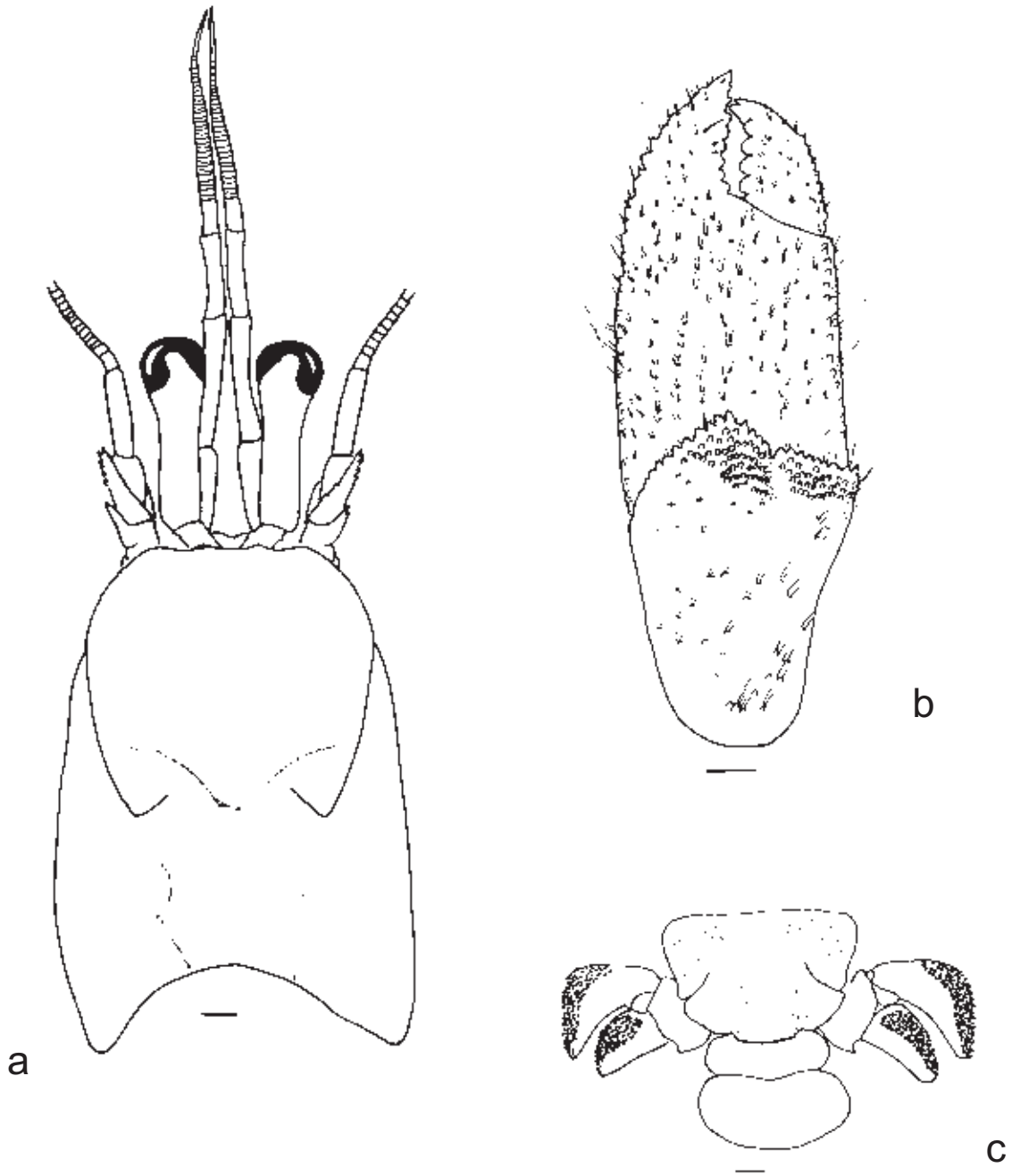
Diagnosis.– Shield longer than broad and slightly longer than very weakly calcified posterior carapace; dorsal surface without subrostral groove; rostrum absent, antennular lobes each with very small spinule; lateral projections obsolete. Ocular peduncles approximately 0.8 length of shield; corneas approximately 0.3 of peduncular length; ocular acicles as subquadrate plates; separated by breadth of margin between antennular lobes. Antennular peduncles overreaching distal corneal margins by almost half lengths of penultimate segments; antennal peduncles reaching slightly beyond midlength of corneas; second segment with dorsolateral distal angle produced, terminating in bifid spine, mesial margin with 3-5 tiny spinules; antennal acicles triangular, dorsolateral margins each with row of minute spinules. Chelipeds symmetrical, rectangular in shape, operculate; palms with dorsomesial and dorsolateral margins each with row of small tubercles, flattened dorsal surfaces of palms and fixed fingers each with rows of tufts of sparse setae; carpi subtriangular, dorsodistal margins somewhat elevated and slightly overhanging proximal margins of chelae, each with row of small spines or tubercles and fine long setae. Second and third pereopods slightly overreaching chelipeds; dactyls each with row of 25-30 tiny corneous spinules on ventral margin; carpi each with dorsodistal spine. Tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin with median area produced, denticulate. Telson with prominent lateral indentations; anterior lobes weakly calcified; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Size.– Maximum recorded shield length 24.0 mm.

Coloration.– Intense bright red somewhat fading toward lateral margins of the shield.

Habitats.– Hollowed stems or branches weathered by long immersion and typically covered with epifauna.

Distribution.– Taiwan, Philippine Islands, Indonesia; 148-400 m.



Male (6.4 mm), **a, b;** female (6.3 mm), **c,** Dasi fishing port, Yilan County, 10 Mar 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** sixth pleonal tergite, uropods and telson. Setae partially omitted. Scales equal 1 mm.

Pylocheles (Bathycheles) incisus Forest, 1987

CP214, occupying the cylindrical cavity in a piece of sunken wood, prior to removal from burrow.

Pylocheles (Bathycheles) incisus Forest, 1987a: 70, figs. 16a-g, 18a-g, pl. 4A-C, 6A, B; Komai & Hung, 2000: 130, figs. 1-3.

Material examined.– Dasi fishing port, Yilan County, 17 May 1998: 2 males (4.9, 9.0 mm), (NTOU); CP214, 24°28.59'N, 122°12.66'E, 490-1027 m, 27 Aug 2003: 1 male (8.9 mm), (NTOU).

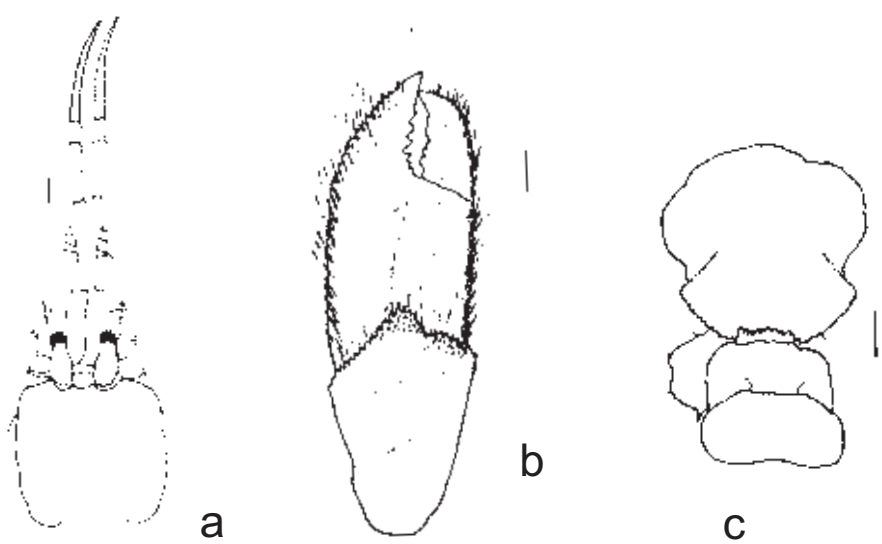
Diagnosis.– Shield slightly longer than broad to broader than long and approximately same length as poorly calcified posterior carapace, subrostral groove absent; rostral lobe with median, moderately deep U-shaped concavity; lateral projections with or without submarginal spine. Ocular peduncles short, 0.2 of shield length, corneas hemispherical but reduced, corneal diameter 0.4 of peduncular length; ocular acicles very small, not apparent in dorsal view. Antennular peduncles overreaching distal corneal margins by approximately 0.5 lengths of basal segments; antennal peduncles overreaching ocular peduncles by entire lengths of fourth peduncular segments; antennal acicle reaching to proximal margin of fifth segment, lateral margin with short row of spines distally, mesial margin with row of smaller spines proximally. Chelipeds symmetrical, subrectangular in shape; dorsomesial and dorsolateral margins of chelae each with row of subacute tubercles partially to completely concealed by long simple and modified setae, dorsal surfaces flat, unarmed, but with covering of sparse tufts of short setae and one median dense row of short modified setae; carpi each with dorsodistal margin considerably elevated and overhanging proximal margin of chela and armed with row of small tubercles. Second and third pereopods not reaching tips of chelipeds; dactyls each with row of 23-25 minute corneous spinules on ventral margin at least partially concealed by tufts of long setae; carpi lacking dorsodistal spine. Tergite of pleomere 6 irregularly subcircular, with deep lateral incisions and shallow median sulcus; terminal margin with row of tubercles or subacute spines and subrectangular median concavity armed with few spines. Telson with prominent lateral indentations; posterior lobes indistinctly separated by shallow concavity, terminal margins rounded, unarmed but with fringe of setae, dorsal surface also setose.

Size.– Maximum reported shield length 17.5 mm.

Coloration.– Grayish-white overall.

Habitats.– Occupies wooden cylinders as well as tusk shells.

Distribution.– Indonesia, Philippine Islands, Taiwan; 380-970 m, possibly to 1027 m.



Male (4.9 mm), Dasi fishing port, Yilan County,17 May 1998: **a**, shield and cephalic appendages (aesthetascs and setae omitted); **b**, carpus and chela of left cheliped; **c**, sixth pleonal tergite and telson (setae omitted). Scales equal 1 mm.

Cheiroplatea Bate, 1888

The six species currently assigned to *Cheiroplatea* are widely distributed, but each species appears to have a relatively limited geographic range. Of the five species for which depths are known, all are relatively stenobathic, found at depths between 300 and 565 meters. Only one species is known from Taiwnese waters.

Cheiroplatea mitoi Miyake, 1978

DW56.

Cheiroplatea mitoi Miyake, 1978: 13, fig. 5a-f; Forest, 1987a: 105, fig. 30a-e.

Material examined.– DW56, 24°29.8'N, 122°12.6'E, 438-539 m, 4 Aug 2000: 1 male (~ 2.4 mm, shield and posterior carapace damaged), (NTOU).

Diagnosis.– Shield apparently slightly broader than long, posterior carapace very weakly calcified; rostral lobe prominent, rounded, moderately broad; lateral projections rounded, each with terminal spinule. Ocular peduncles approximately 0.4 of shield length, more than 4 times broader proximally than at bases of corneas, corneas cone-shaped, pigment lacking; ocular acicles not apparent. Antennular peduncles overreaching ocular peduncles by 0.5-0.6 lengths of basal segments; antennal peduncles overreaching distal corneal tips by entire lengths of fifth segments; antennal acicles slightly overreaching ocular peduncles, lateral and mesial margins each with 2 or 3 small spines. Chelipeds symmetrical, operculate (left missing in Taiwan specimen); dorsomesial and dorsolateral margins of chela each with row of prominent spines, dorsal surface with scattered tiny spinules, 1 row of widely-spaced, long slender spines in midline of palm; carpus with dorsodistal margin appreciably elevated, distinctly projecting over proximal portion of palm and armed with row of large acute and subacute spines. Ambulatory legs somewhat damaged; dactyls each with row of 6 or 7 corneous spines on ventral margin, partially concealed by sparse tufts of moderately long setae; propodi of second pereopods each with few spinules on dorsal surface, armature of third microscopic; carpi each with row of prominent spines on dorsal margin of second pereopods, third each with small dorsodistal spine. Tergite of pleomere 6 with deep lateral incisions, terminal margin damaged in Taiwan specimen. Telson with

lateral margins of anterior portion weakly concave, posterior portion separated into weak lobes by shallow V-shaped concavity, terminal margins unarmed but fringed with long setae.

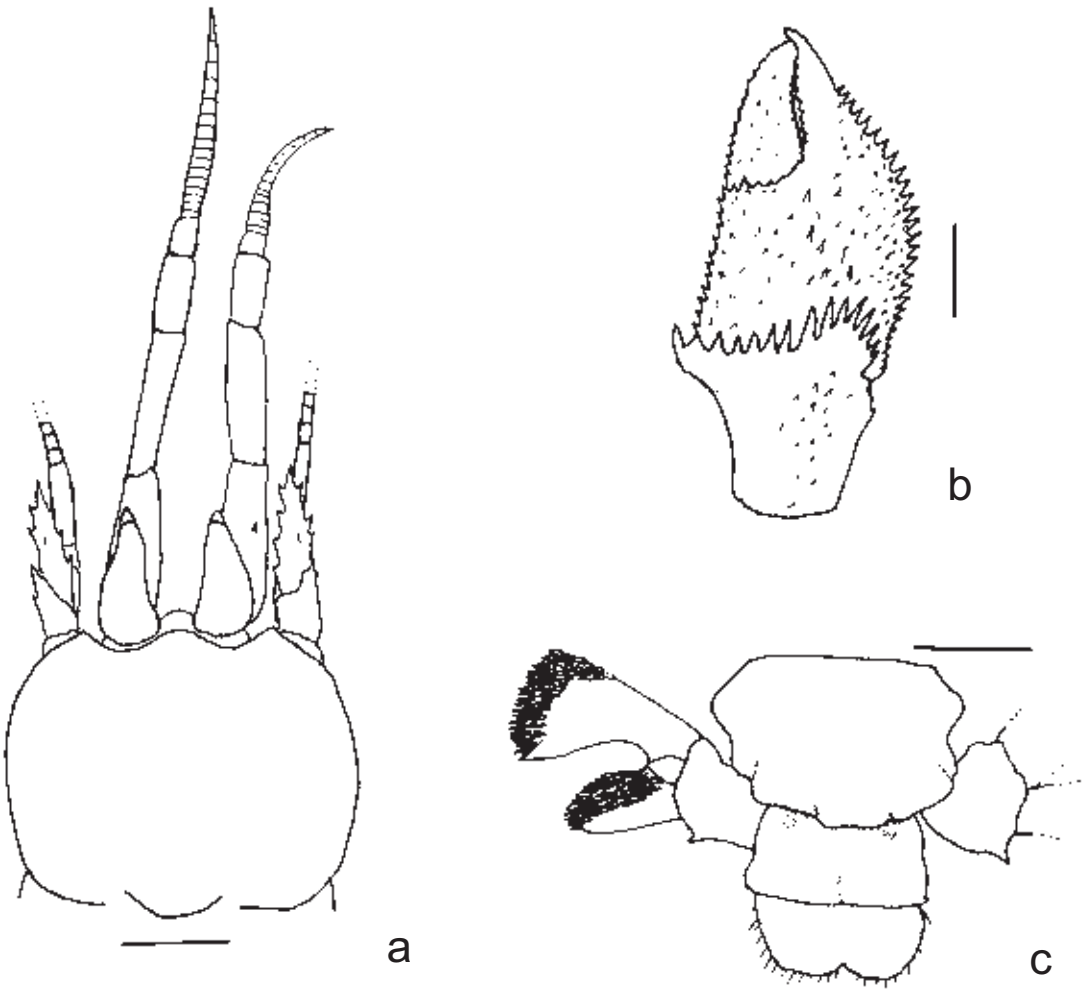
Size.– Maximum reported shield length 6.7 mm.

Coloration.– Overall whitish.

Habitat.– Cavities in pumice stone.

Distribution.– Known only from Kyushu, Japan, and now Taiwan; 300-438 m, possibly to 539 m.

Remarks.– This is the first record of *Cheiroplatea mitoi* since its original description and represents a major depth increase as well as range extension. The holotype, and only other known specimen, was missing the second pereopods. Although there is some damage to the ambulatory legs of the present specimen, the second pereopods were sufficiently intact to permit description of the armature of the propodi and carpi.



Male (- 2.4 mm, shield and posterior carapace damaged but reconstructed), DW56: **a,** shield and cephalic appendages (aesthetascs and setae omitted); **b,** carpus and chela of right cheliped; **c,** sixth pleonal tergite, left uropod and telson. Scales equal 1 mm.

Pomatocheles Miers, 1879

Three species have been described in this genus; but only *P. jeffreysii* is known from more than its holotype in one or holotype and two paratypes in the other. *Pomatocheles jeffreysii* is quite common in Japanese waters (Forest, 1987b), but has not previously been reported from Taiwan.

Pomatocheles jeffreysii Miers, 1879

CP216.

Pomatocheles jeffreysii Miers, 1879: 49, pl. 3, fig. 2, 2a-d; Forest, 1987a: 119, figs. 4a, 5c, d, 7c, 32a-i, 33a-h, 34a-d, 35a-d, pls. 1B, 3C, 7A, B.

Material examined.– CP101, 24°48.16'N, 122°06.70'E, 248-257 m, 19 May 2001: 1 male (5.5 mm), (MNHN); CP102, 24°48.38'N, 122°07.97'E, 326-331 m, 19 May 200: 1 male (5.8 mm), (MNHN); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 1 ovig. female (5.5 mm), (NTOU).

Diagnosis.– Shield longer than broad; dorsal surface with short but deep transverse groove subrostrally; rostrum as bluntly subtriangular or rounded lobe, reaching to level of moderately well-developed lateral projections. Ocular peduncles with ocular acicles as subquadrate plates. Antennular peduncles overreaching distal corneal margins by at least entire lengths of ultimate segments; antennal peduncles short; second segment with dorsolateral distal angle produced into multispinose lobe; antennal acicles short, triangular, mesial margins each with row of tiny spines, dorsal surfaces and lateral margins each with several tiny spines or spinules distally. Chelipeds symmetrical, rectangular in shape, operculate; palms with dorsomesial and dorsolateral margins each with row of quite small tubercles, dorsal surfaces of palms and fixed fingers with scattered tufts of sparse moderately long setae; carpi subtriangular; dorsodistal margins somewhat elevated and slightly overhanging proximal margins of chelae, each with of row small spines or tubercles and fine long setae; dorsomesial margins each with row of 6-8 small spines. Carpi and meri of second and third pereopods each with dorsal row of small spines, smallest on third pereopods. Tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin with 3 or 4 small subacute spines on either

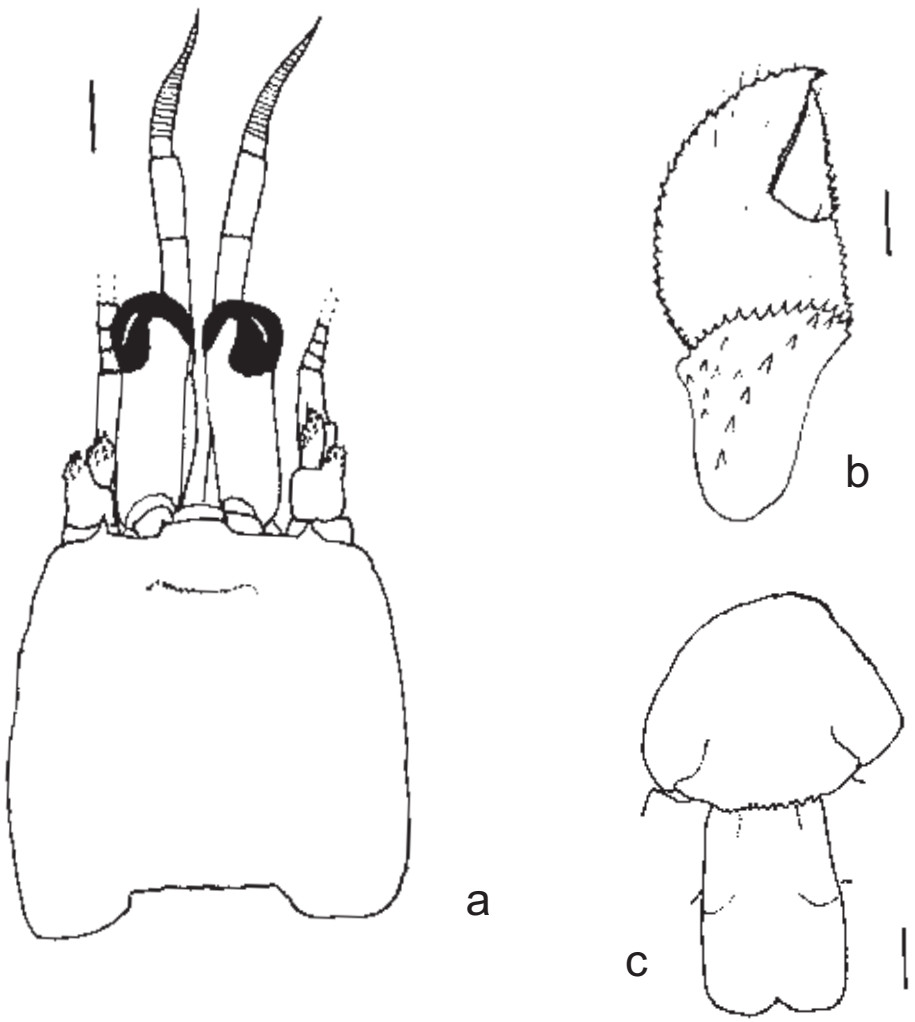
side of midline. Telson with prominent lateral indentations; anterior lobes with broad lateral thickenings; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed but with fringe of fine setae. Male with elongate paired first and second pleopods modified as gonopods; first pair uniramous, second unequally biramous.

Size.– Maximum reported shield length 12.5 mm.

Coloration.– Body generally orangish-red. Ocular peduncles white or cream, each with mesial and lateral red stripe; chelipeds reddish-orange, finger tips lighter; ambulatory legs generally reddish-orange, sometimes banded reddish-orange on white or cream background.

Habitat.– Scaphapod or tusk shells of the family Dentaliidae.

Distribution.– Japan, Taiwan; 23-250 m, possibly to 300 m.



Ovig. female (5.5 mm), CP216: **a,** shield and cephalic appendages (aesthetascs and setae omitted); **b,** carpus and chela of left cheliped; **c,** sixth pleonal tergite and telson. Scales equal 1 mm.

Trizocheles Forest, 1987

Among pylochelid genera, *Trizocheles* is represented by the most species, with 17 described species and one additional subspecies; all are inhabitants of the Indo-Pacific. Several species are found associated with sponges in what seems to be a permanent mutualistic association (Forest, 1987b). Others occupy tusk shells or serpulid worm tubes and even gastropod shells. These latter carcinoecia are used by *Trizocheles sakaii*, the only member of the genus presently found in Taiwan.

Trizocheles sakaii Forest, 1987

CP269.

Pylocheles spinosus– Ortmann, 1892: 274 [not *Pylocheles spinosus* Henderson, 1888].

Mixtopagurus spinosus– Balss, 1913: 34 [not *Pylocheles spinosus* Henderson, 1888].

Pomatocheles spinosus– Miyake, 1965: 640, fig. 1065; Miyake, 1978: 7, fig. 2; Miyake, 1982: 95, pl. 32, fig. 2 [not *Pylocheles spinosus* Henderson, 1888].

Trizocheles sakaii Forest, 1987a: 189, figs. 46a-h, 48d, e, 61b, 63d, 64, pls. 5A, B, F, G, 8A, B.

Material examined.– DW56, 24°29.8'N, 122°12.6'E, 438-539 m, 4 Aug 2000: 2 males (4.3, 6.6 mm), 1 female (4.2 mm), (NTOU); CP269, 24°30.55'N, 122°05.78'E, 399-397 m, 2 Sep 2004: 2 females (5.4, 5.8 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 516-613 m, 26 Aug 2006: 3 males (4.6-5.7 mm), 1 female (4.5 mm), 2 ovig. females (4.5, 5.9 mm), (NTOU).

Diagnosis.– Shield broader than long; dorsal surface with transverse groove subrostrally; rostrum broadly triangular, with marginal spine or spinule, usually equaling or overreaching level of well developed lateral projections. Ocular peduncles with ocular acicles small, triangular, terminally acute or subacute. Antennular peduncles overreaching distal corneal margins by 0.7 to entire lengths of ultimate segments; antennal peduncles not overreaching distal margins of corneas; second segment with dorsolateral distal angle produced, with terminal bi- or trifid spine; antennal acicles each terminating in simple or bifid spine, mesial and lateral margins each with or without spine. Chelipeds generally equal and symmetrical; propodal-carpal rotation of approximately 45°; upper margin of palms each with row of prominent large spines, outer surfaces each with 2-4 rows of very small to moderately large spines, accompanied by tufts of long or moderately long setae;

carpi subtrapezoidal; dorsomesial margins each with 2 or 3 large spines, dorsal surfaces each with 4-7 smaller spines; lateral faces each with few to covering of stridulatory tubercles. Second pereopods each with small to prominent spine on dorsodistal margin of propodus; mesial faces each with stridulatory ridges varying from proximal cluster to irregular triple longitudinal rows; third pereopods unarmed; carpi each with dorsal row of spines on second pereopods or only dorsodistal spine on third; mesial faces of second pereopods each with numerous short stridulatory ridges. Tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin entire or with tiny median cleft, unarmed. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by moderately deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae. Male gonopods typical for genus.

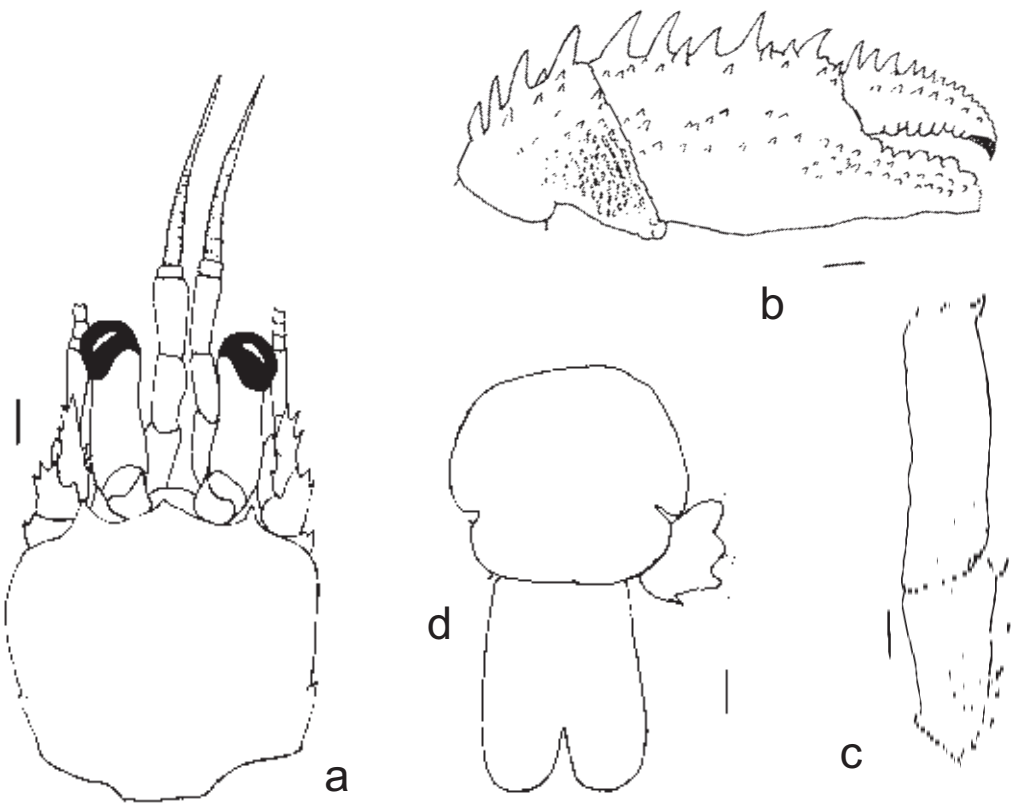
Size.– Maximum reported shield length 8.0 mm.

Coloration.– Shield and ocular peduncles orange. Chelipeds and ambulatory legs generally orange. Posterior carapace, fourth and fifth pereopods, and pleon mostly whitish with few faded orange patches.

Habitats.– Gastropod and tusk shells; serpulid worm tubes.

Distribution.– Japan, Taiwan; 100-438 m, possibly to 539 m.

Remarks.– This is the first report of the genus *Trizocheles* in Taiwanese waters, and the first record of the species outside Japan.



Male (4.3 mm), DW56: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped (outer face); **c,** propodus and carpus of right second pereopod (mesial view); **d,** sixth pleonal tergite and telson. Setae omitted. Scales equal 1 mm.

Family Diogenidae Ortmann, 1892

Hermit crabs of this family are frequently referred to as "left-handed" hermits because members of most genera are characterized as having the left cheliped appreciably larger than the right. The family is principally tropical and warm temperate in its distribution, with the majority of genera occurring primarily in the Indo-Pacific region. Of the 20 genera assigned to the family, eight have representatives in Taiwanese waters.

Key to the Taiwanese genera of Diogenidae

1. Males with first and second pleopods present, paired and modified as gonopods; females with first pleopods present and modified ……*Paguristes*
- Males without first pleopods; females without first pleopods ……2
2. Chelipeds each with stridulating mechanism developed on mesial face of palm ……3
- Chelipeds each without stridulating mechanism developed on mesial face of palm ……4
3. Chelipeds with acute, corneous-tipped spines on chelae and carpi; males with or without paired second pleopods ……*Strigopagurus*
- Chelipeds with transverse striae on chelae and carpi; males without paired second pleopods …*Ciliopagurus*
4. Pleurobranch present on thoracic wall above each fifth pereopod; females with triramous pleopods ……5
- No pleurobranch present on thoracic wall above each fifth pereopod; females with biramous pleopods …6
5. Rostrum broadly rounded or obsolete; ocular acicles each with subrectangular or subquadrate acicular projection; posterior lobes of telson armed with spines or spinules; females without brood pouch ……*Dardanus*
- Rostrum triangular; ocular acicles each with prominent triangular or subtriangular acicular projection; posterior lobes of telson unarmed; females with brood pouch ……*Aniculus*
6. Chelipeds subequal ……*Clibanarius*
- Chelipeds unequal, left appreciably larger ……7
7. Rostrum obsolete, roundly triangular or broadly rounded; intercalary rostral process present, well developed, reduced, or vestigial ……*Diogenes*
- Rostrum moderate to well developed, triangular; intercalary process absent ……*Calcinus*

Paguristes Dana, 1851

Until the recent revision by Rahayu (2005), *Paguristes* sensu lato was considered a pan-tropical genus of extreme diversity. Because of the reduction in gill number indicative of evolutionary advancement found by Rahayu, she divided the genus into three distinct genera, *Paguristes*, sensu stricto with 13 pairs of gills, *Stratiotes* Thomson, 1899 with 12 pairs, and *Pseudopaguristes* McLaughlin, 2002b with eight pairs. *Paguristes* s.s. is the only genus presently known in Taiwanese waters, and it is represented by ten species.

Key to the Taiwanese species of *Paguristes*

1. Terminal margins of telson unarmed ……2
- Terminal margins of telson armed with spines or spinules ……8
2. Ventromesial proximal angles of chelipeds each with prominent acute or blunt spine ……*P. acanthomerus*
- Ventromesial proximal angles of chelipeds each without prominent acute or blunt spine ……3
3. Chelipeds distinctly unequal ……4

- Chelipeds equal or subequal ……6

4. Chelipeds similar in armature; lateral faces of dactyl and propodus of left third pereopod with 4 or 5 irregular rows of pointed tubercles [ocular peduncles orange with broad white stripe dorsally] *P. arostratus*
- Chelipeds dissimilar in armature ……5

5. Mesial face of dactyl of left cheliped with 1 row of small spines or tubercles medianly and few scattered tubercles ventrally [meri (in preservative) with network of faint red lines on mesial faces] ……*P. calvus*
- Mesial face of dactyl of left cheliped with covering of small spines, densely packed dorsally [chelipeds with chelae whitish; meri each with patch of red on mesial face distally] ……*Paguristes seminudus*

6. Mesial faces of dactyls of chelae each with distinct row of spinules or spiniform tubercles near ventral margin; ventral margins of dactyls of second and third pereopods each with row of 15-22 corneous spinules ……7
- Mesial faces of dactyls of chelae each with scattered small spines or spinules, but not forming distinct row near ventral margin; ventral margins of dactyls of second and third pereopods each with row of 25-42 corneous spinules [ocular peduncles each with dorsal longitudinal orange stripe; chelipeds and ambulatory legs generally red-orange with white spines and tubercles] ……*P. palythophilus*

7. Mesial faces of dactyls of chelae each with numerous scattered small spines or spinules above ventral row; antennular peduncles overreaching distal corneal margins little, if at all; females without dense setae on pleomeres 2-4 concealing pleopods [ocular peduncles white dorsally, remainder uniformly red; chelipeds and ambulatory legs red or red-orange with scattered white spots] ……*P. albimaculatus*
- Mesial faces of dactyls of chelae each with few scattered small spines above ventral row; antennular peduncles overreaching distal corneal margins by 0.3-0.5 length of ultimate segment; females with dense setae on pleomeres 2-4 concealing pleopods [ocular peduncles reddish-brown with white spots; chelipeds reddish-brown with white spines and tubercles; ambulatory legs with dactyls reddish-brown, other segments mottled red and white] ……*P. versus*

8. Antennal flagella longer than carapace, exceptionally thick; mesial faces of dactyls of second and third pereopods each lacking row of small or very small corneous spinules ventrally [shield and ocular peduncles light reddish-brown dorsally; proximal portions of chelipeds and ambulatory legs reddish-brown, lighter distally] ……*P. miyakei*
- Antennal flagella variable in length but never exceptionally thick; mesial faces of dactyls of second and third pereopods with 1 or more rows of corneous spinules ventrally ……9

9. Antennal peduncles never reaching beyond bases of corneas; dactyls of third pereopods each with row of corneous spines on dorsal surface; terminal margins of telson each with 5 or 6 spines [ocular peduncles solid orange-red; chelipeds orange-red, spines lighter; ambulatory legs orange-red, propodi and meri white distally] ……*P. doederleini*
- Antennal peduncles usually overreaching distal margins of corneas; dactyls of third pereopods unarmed or with few calcareous spines proximally; terminal margins of telson each with numerous small spines ……10

10. Mesial faces of propodi of third pereopods each with 3 rows of corneous spinules [chelipeds generally orange, meri each with white band distally; carpi and meri of ambulatory legs each with broad orange stripe dorsally] ……*P. antennarius*
- Mesial faces of propodi of third pereopods each with or without 1 row of corneous spinules [ocular peduncles and appendages generally overall pink] ……*P. puniceus*

Paguristes acanthomerus Ortmann, 1892

CP216.

Paguristes acanthomerus Ortmann, 1892: 279, pl. 12, fig. 6; Miyake, 1978: 32, fig. 11; Takeda, 1982: 58, fig. 172; Kim, 1985: 71, fig. 2B; Baba, 1986: 191, 298, fig. 138; Yu, 1988: 2, fig. 1; Yu & Foo, 1991: 50, unnumbered fig.; Komai, 2001: 378, figs. 11-14.

Paguristes kagoshimensis– Miyake, 1978: 32 (in part) [not *Paguristes kagoshimensis* Ortmann, 1892].

Material examined.– Dasi fishing port, Yilan County, 29 Feb 1977: 1 male (9.0 mm), (NTOU).– 12 Dec 1986: 1 male (9.5 mm), (NTOU).– 23 Mar 1988: 1 male (9.5 mm), (NTOU).– 3 May 1988: 2 males (10.1, 15.5 mm), (NTOU).– Nov 1996: 1 male (17.1 mm), (NTOU).– 5 Jul 2005: 1 male (14.0 mm), 1 ovig. female (15.3 mm), (NTOU).– No date: 1 male (12.9 mm), (NTOU); Gueishan Island, Yilan County, normal sta. 4, 24°53.563'N, 122°00.342'E, PCP, 230 m, 13 Jul 2005: 1 male (9.7 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254, 4 Aug 2000: 4 males (5.7-9.8 mm), 3 females (5.5-7.0 mm), (NTOU); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 1 male (6.4 mm), 1 female (4.6 mm), (MNHN Pg 7665); CP75, 24°56.72'N, 122°01.81'E, 139 m, 7 May 2001: 1 male (9.5 mm), 2 females (7.5, 10.0 mm), (MNHN Pg 7660); CP76, 24°56.54'N, 122°01.51'E, 115-170 m, 7 May 2001: 1 male (12.5 mm), (MNHN Pg 7661); CP79, 24°50.36'N, 121°59.93'E, 145-200 m, 8 May 2001: 5 males (11.5-18.0 mm), 1 female (9.5 mm), (MNHN Pg 7662); CP93, 24°50.13'N, 121°55.70'E, 66-110 m, 8 May 2001: 4 males (9.5-18.5 mm), (MNHN Pg 7663); CP94, 24°53.42'N, 121°57.97'E, 153 m, 10 May 2001: 5 specimens not removed from shells, (MNHN Pg 7664); CP114, 24°51.03'N, 121°58.30'E, 128-250 m, 21 May 2001: 1 ovig. female (8.6 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 3 males (5.6-8.5 mm), 3 females (4.6-

7.4 mm), (NTOU); no specific locality: 1 male (13.8 mm), (NTOU).

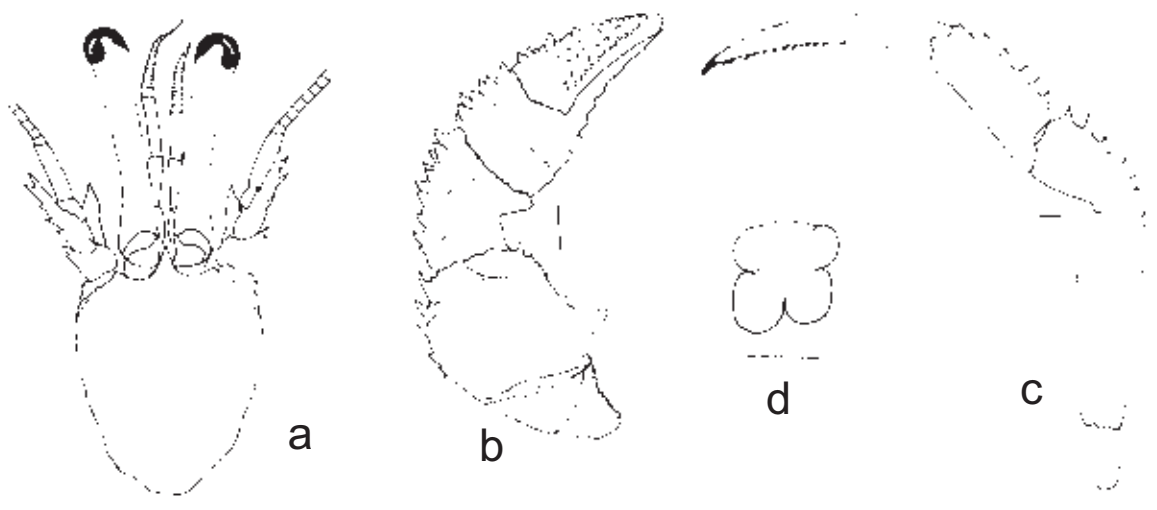
Diagnosis.– Gills biserial. Shield longer than broad; rostrum long, narrowly triangular. Branchiostegites each with row of small spines on anterodorsal and distal margins. Ocular peduncles long, slender, corneas not dilated; ocular acicles each with acute spine. Antennular peduncles not reaching distal margins of corneas; antennal peduncles usually reaching midlength of ocular peduncles; fourth segment unarmed; second segment with dorsolateral distal angle slightly produced, terminating in simple or bifid spine, lateral margin with 1 or 2 small spines and tufts of long setae; antennal acicle reaching or over-reaching distal margin of fifth segment, terminating in simple or bifid spine; mesial margin with row of 3-5 spines; lateral margin with 1-3 spines; antennal flagellum moderately long, articles each with short to moderately long setae. Chelipeds subequal or slightly unequal with right slightly larger; armature generally similar; mesial surface of dactyl with scattered moderately small spines and 1 distinct row of moderately small, occasionally corneous-tipped spines ventrally; palm with 4 or 5 spines on dorsomesial margin, dorsal surface with several irregular rows of prominent, occasionally corneous-tipped spines, and numerous tufts of long setae; dorsolateral margin with row of strong, occasionally corneous-tipped spines; carpus with row of 5-7 spines, sloping dorsal surface with 5 or 6 irregular rows of moderately large to small spines and tufts of long stiff setae; merus with moderately to extremely large, conical spine proximally on ventromesial surface. Second pereopods with dactyls longer than propodi; ventral margins each with 20-29 slender corneous spinules; propodi and carpi each with 1 or 2 rows of prominent spines on dorsal surfaces, partially obscured by tufts of long setae; third pereopods with dorsal surfaces of propodi unarmed; carpi each with row of small spines on dorsal surface. Male first pleopod with row of fused spines on distal margin of inferior lamella. Female with very large brood pouch. Telson with posterior lobes strongly asymmetrical, each lobe subtriangular with rounded apex; terminal and lateral margins unarmed.

Size.– Maximum recorded shield length 21.3 mm.

Coloration.– Carapace, chelipeds and ambulatory pereopods generally reddish-brown to orange-red and indistinctly mottled with white dots. Ocular peduncles generally red, with two white stripes (dorsolaterally and mesially), sometimes not reaching to bases of corneas.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kyushu, East China Sea, Korea, Taiwan; 50-254 m.



Male (8.5 mm), CP216: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (mesial view); **c,** left third pereopod (lateral view); **d,** telson. Setae omitted. Scales equal 1 mm.

Paguristes arostratus Rahayu, 2006

Donggang fishing port, Pingtung County, 4 Apr 2003.

Paguristes arostratus Rahayu, 2006: 356, figs. 1B, 4, 5.

Material examined.– Donggang fishing port, Pingtung County, 4 Apr 2003: 2 females (3.6, 4.6 mm), (NTOU).

Diagnosis.– Gills quadriserial. Shield as long as broad; rostrum nearly obsolete. Branchiostegites each with 1-5 small spines on anterior margin. Ocular peduncles moderately long, subequal in length; corneas weakly dilated; ocular acicles triangular, terminally acute. Antennular peduncles exceeding distal margins of corneas by 0.3 lengths of ultimate segments; antennal peduncles slightly more than half lengths of ocular peduncles; fourth segment with small dorsodistal spinule; second segment with dorsolateral distal angle produced, terminating in bifid spine and tufts of long setae; antennal acicle reaching from 0.7 of fifth peduncular segment to slightly overreaching distal segmental margin, with bifid terminal spine; lateral and mesial margins each with 3 spines obscured by long setae; antennal flagellum moderately long, each article with 1 or 2 long setae or with numerous setae, becoming longer and denser distally. Chelipeds unequal, left distinctly larger, generally similar in armature; mesial face of dactyl with longitudinal row of corneous-tipped spines accompanied by short stiff setae; palm with row of prominent spines and tufts of short setae on dorsomesial margin, dorsal surface covered with irregular rows of spinulose tubercles, dorsolateral margin not delimited; carpus with row of prominent spines on dorsomesial margin, irregular rows of smaller spines on dorsal surface, each accompanied by short tuft of setae. Second and third pereopods with dactyls longer than propodi; dorsal margins of second each with low protuberances, both with long setae; ventral margins each

with row of small spines; lateral faces of third each with row of pointed tubercles near dorsal and ventral margins; propodi of second and third pereopods each with row of small spines on dorsal margin, lateral face of left third pereopod with 4 irregular rows of small spines concealed by long setae, ventral margins of both right and left with row of small spines; carpi of both pereopods each with row of spines, smaller on third. Male first pleopod with 1 row of curved spines on distal margin of inferior lamella. Female brood pouch small, subtriangular with marginal long setae. Telson with moderately deep lateral incisions; asymmetrical posterior lobes separated by V-shaped median cleft; rounded terminal margins unarmed.

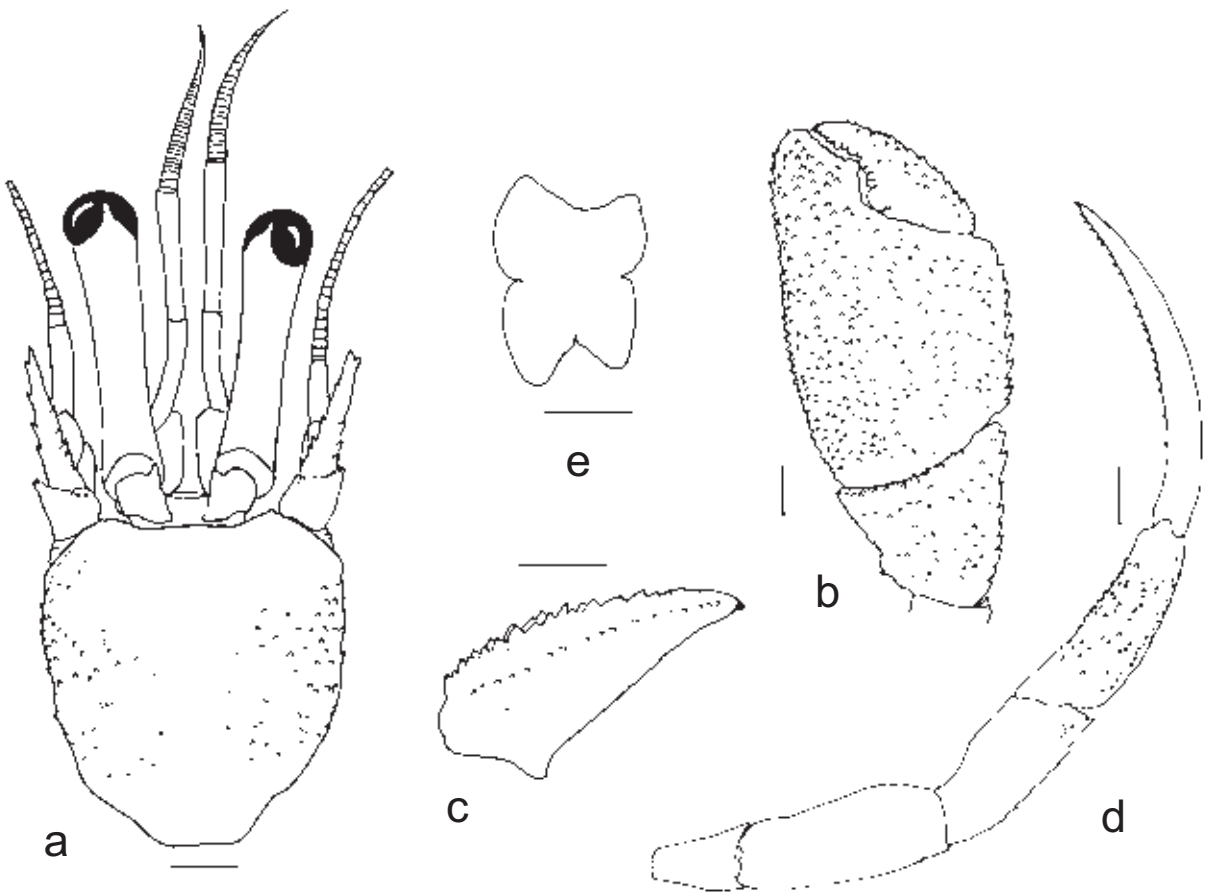
Size.– Maximum recorded shield length 4.6 mm.

Coloration.– General body and appendage color reddish to reddish-orange; chelae lighter. Ocular peduncles red dorsally, white mesially.

Habitat.– Gastropod shells.

Distribution.– Kai Islands and Macassar Strait of Indonesia, Taiwan; 51 to 90 m.

Remarks.– This is the first record of this species in Taiwanese waters and represents a major range extension.



Female (3.6 mm), Donggang fishing port, Pingtung County, 4 Apr 2003: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Paguristes calvus Alcock, 1905

Nanfang-ao fishing port, Yilan County, 27 Aug 1996.

Paguristes calvus Alcock, 1905: 35, pl. 1, fig. 4; Balss, 1915: 9; Lewinsohn, 1969: 13; Türkay, 1986: 132; Rahayu & McLaughlin, 2006: 875, figs. 4, 5.

Material examined.– Keelung fishing port, 5 Apr, 1985: 3 males (3.0-5.5 mm), (NTOU); Dasi fishing port, Yilan County, 19 May 1997: 1 female (3.6 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 27 Aug 1996: 1 female (6.7 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 female (6.0 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 3 males (5.7-6.2 mm), 1 female (4.5 mm), (NTOU); no specific locality: 14 Jun 2002: 1 female (7.3 mm), (NTOU).– 2 males (5.1, 6.0 mm), (NTOU).– May 1998: 1 female (6.4 mm), (NTOU).

Diagnosis.– Quadriserial gills. Shield longer than broad; rostrum long, slender, terminating acutely. Branchiostegites each with few spinules on distal margin and dorsal margin distally. Ocular peduncles moderately long, corneas very weakly dilated; ocular acicles subtriangular, terminating acutely or in simple spine. Antennular peduncles slightly longer than ocular peduncles; antennal peduncles reaching bases of corneas, fourth segment with small dorsodistal spine and few setae, second segment with dorsolateral distal angle produced, terminating in simple or bifid spine; antennal acicle not quite reaching distal margin of fifth peduncular segment, terminating in prominent bifid spine, 2 spines on lateral margin, 4 or 5 spines on mesial margin, with scattered setae not concealing armature; antennal flagellum moderately long, articles each with 1 or 2 short setae proximally, slightly more numerous distally. Chelipeds unequal, left larger; dissimilar in armament; left cheliped with row of small corneous-tipped spines medially on mesial face of dactyl, several

tubercles and small corneous-tipped spines below midline accompanied by sparse setae; palm with row of moderate to large spines on dorsomesial margin, convex dorsal surface with covering of prominent corneous-tipped spines and sparse tufts of setae, dorsolateral margin weakly delimited by row of large and small corneous-tipped spines; carpus with row of moderately prominent spines on dorsomesial margin accompanied by tufts of sparse setae, dorsal and lateral surfaces with numerous spines. Right cheliped with row of small corneous-tipped spines on mesial face of dactyl dorsally, second irregular row and few tubercles ventrally; palm with prominent, corneous-tipped spines on dorsomesial margin, dorsal surface with irregular rows of moderately large, sometimes corneous-tipped spines, dorsolateral margin not delimited; carpus with row of prominent corneous-tipped spines on dorsomesial margin, dorsal and lateral surfaces each with numerous small, tuberculate, sometimes corneous-tipped spines. Second and third pereopods differing somewhat in armature; dactyls about twice length of propodi; dorsal margins of second pereopods each with row of spinules, long setae on both second and third; ventral margins each with 29-40 corneous spines; lateral faces each with sparse tufts of setae and weak longitudinal sulcus proximally; mesial face of second left pereopod slightly flattened, with row of small corneous spines near ventral margin and scattered small corneous spines, right with row of stiff setae near ventral margin, sparse corneous spines near dorsal margin, and weak longitudinal sulcus proximally; mesial faces of third pereopods each with shallow longitudinal sulcus proximally; propodi of second pereopods each with irregular row of moderately small spines and tufts of long setae on dorsal surface; ventral margins each with row of spinules and tufts of setae, mesial faces with numerous scattered tubercles (left) or sparse tubercles and corneous-tipped spinules (right), propodi of third pereopods each with dorsal row of low protuberances and tufts of setae on dorsal surface, mesial faces each with few tiny tubercles; carpi each with row of spines on dorsal surface, smaller third. Male first pleopod with single row of small hook-like corneous spines on distal margin of inferior lamella. Female brood pouch small to moderately large, subrectangular to subtriangular, margin slightly scalloped, fringed with long, plumose setae. Telson with moderately deep lateral incisions; median cleft small, shallow; posterior lobes markedly asymmetrical, terminal and lateral margins unarmed, each with row of long setae.

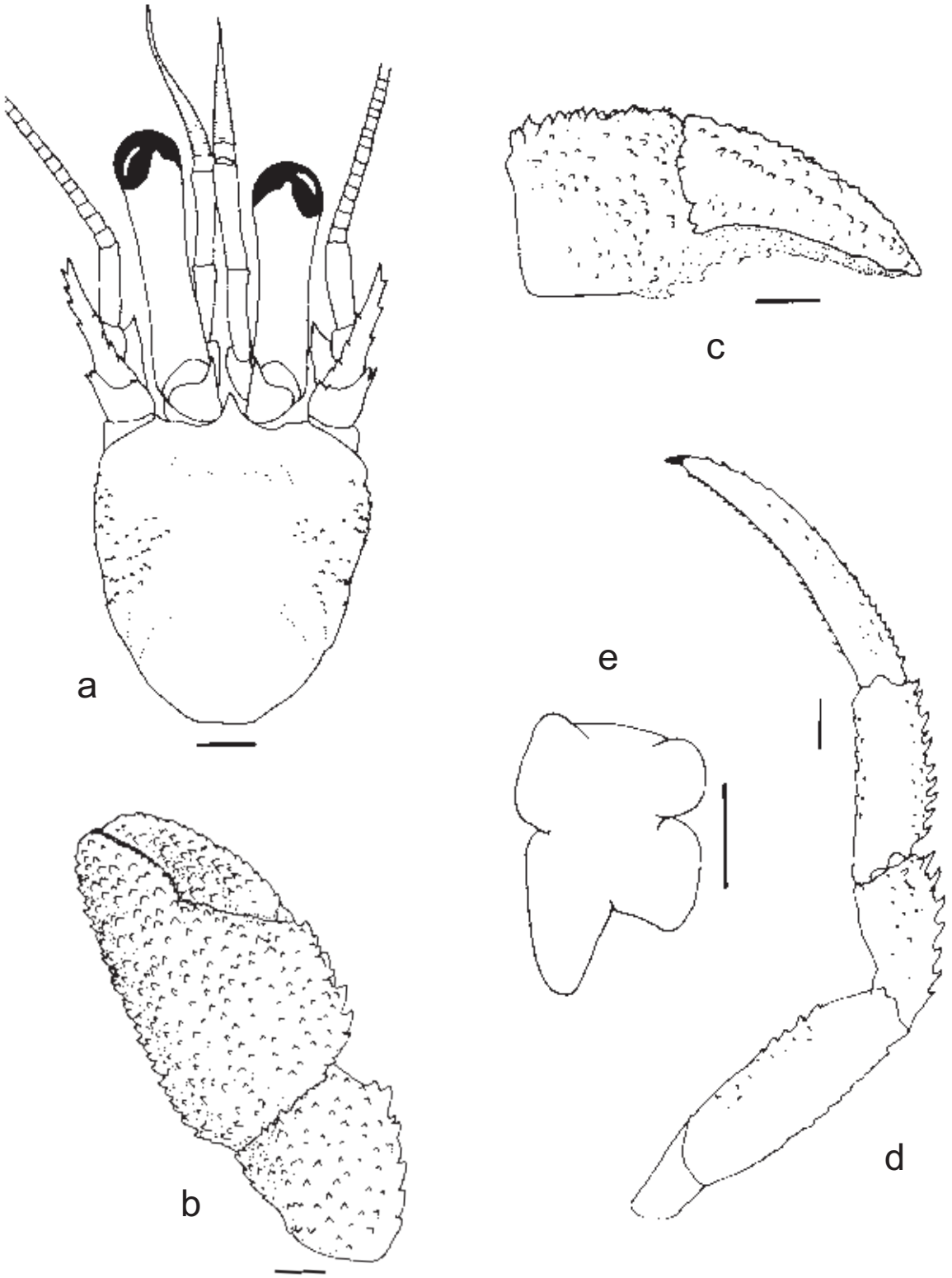
Size.– Maximum recorded shield length 7.3 mm.

Coloration.– Shield light reddish-brown, with few darker patches. Ocular peduncles uniformly light rust-color. Chelipeds more or less whitish, meri each with reddish-brown band subdistally. Dactyls of ambulatory legs reddish-brown, tips white; propodi with distal halves white, proximal halves reddish-brown; carpi reddish-brown; meri whitish, each with reddish-brown band distally and subdistally, patch or band proximally.

Habitat.– Gastropod shells, often encrusted with epiphytes.

Distribution.– Northern Bay of Bengal, Andaman and Red Seas, Taiwan; 120-490 m.

Remarks.– This is the first report of *Paguristes calvus* in Taiwanese waters and a new record for the western Pacific.



Male (5.7 mm), CP216: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped; **c**, dactyl and palm of left cheliped (mesial view); **d**, left third pereopod (lateral view); **e**, telson. Setae omitted. Scales equal 1 mm.

Paguristes seminudus Stimpson, 1858

CP216.

Paguristes seminudus– Miyake, 1978: 25 (key); Miyake & Imafuku, 1980a: 3; Baba, 1986: 193, 299, fig. 140; Yu & Foo, 1991: 53, unnumbered fig. (see remarks).

Material examined.– Dasi fishing port, Yilan County, 14 Oct 2004: 1 ovig. female (7.1 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 female (5.7 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 1 male (9.4 mm), (NTOU); no specific locality, 6 Nov 2000: 1 male (7.0 mm), (NTOU).– 2 Jun 2004: 3 males (all 7.1 mm), (NTOU).

Diagnosis.– Gills quadriserial. Shield longer than broad; rostrum slender, elongate, terminating acutely. Branchiostegites each with few spinules on distal margin, and dorsal margin distally. Ocular peduncles moderately long and slender; corneas not dilated; ocular acicles subtriangular, terminating acutely. Antennular peduncles reaching from proximal margins to midlengths of corneas; antennal peduncles reaching 0.7 lengths of ocular peduncles, fourth segment without dorsodistal spine, second segment with dorsolateral distal angle produced, terminating in small bifid or simple spine; antennal acicle reaching to distal 0.2 or nearly to distal margin of fifth peduncular segment, terminating in prominent bifid spine, 3-4 spines on dorsal surface mesially, 2 or 3 spines on lateral margin; antennal flagellum short; articles each with 1 or 2 short setae proximally, slightly more numerous distally. Chelipeds unequal, left larger; somewhat dissimilar in armament; dactyl of left cheliped with covering of irregular rows of small, sometimes corneous-tipped spines on mesial face, dense and closely-spaced dorsally, each spine accompanied by 1 short seta; palm with row of small spines on dorsomesial margin, convex dorsal surface with covering of closely-spaced small spines, each

accompanied by 1 or 2 short setae, dorsolateral margin not delimited; carpus with row of small spines on dorsomesial margin, dorsal and lateral surfaces with numerous small spines. Right cheliped with rows of small corneous-tipped spines, each spine accompanied by 1 short seta on mesial face of dactyl; palm with small corneous-tipped spines on dorsomesial margin, dorsal surface with covering of closely-spaced spinules, each accompanied by 1 short seta, dorsolateral margin not delimited; carpus with row of small spines on dorsomesial margin, dorsal surface and lateral face each with numerous small spines. Second and third pereopods differing somewhat in armature; dactyls longer than propodi, dorsal margins each with row of spinules, sometimes corneous-tipped (second), and long setae (second and third); ventral margins each with 29-50 corneous spines and sparse stiff setae; lateral faces of second pereopods each with transverse rows of short setae near dorsal margin on proximal half, third with sparse tufts of short to moderately long setae; mesial faces of second pereopods each with longitudinal sulcus proximally, left also with irregular rows of small spines, and several tufts of short setae near ventral margin, right with row of spinules near ventral and dorsal margins proximally, mesial faces of third pereopods each with scattered tufts of setae and shallow longitudinal sulcus proximally; propodi of second pereopods each with irregular row of corneous-tipped spines and tufts of long setae on dorsal surface, third each with dorsal row of low protuberances, few additional small spines; ventral margins of second pereopods each also with row of spinules, third only with tufts of setae; lateral faces of second pereopods each with rows of small spines and tubercles dorsally, and ventrally, lateral faces of third lacking row near each ventral margin; mesial faces of propodi each with 2 (second) or 1 (third) row(s) of small spines or spinules; carpi each with each with irregular row(s) of spines and tufts of long setae on dorsal margin, more prominent on second. Male first pleopods each with single row of small hook-like corneous spines on distal margin of inferior lamella. Female brood pouch large, subquadrate, marginally scalloped and fringed with long, plumose setae. Telson with moderately deep lateral incisions; median cleft small, shallow; posterior lobes markedly asymmetrical, terminal and lateral margins unarmed.

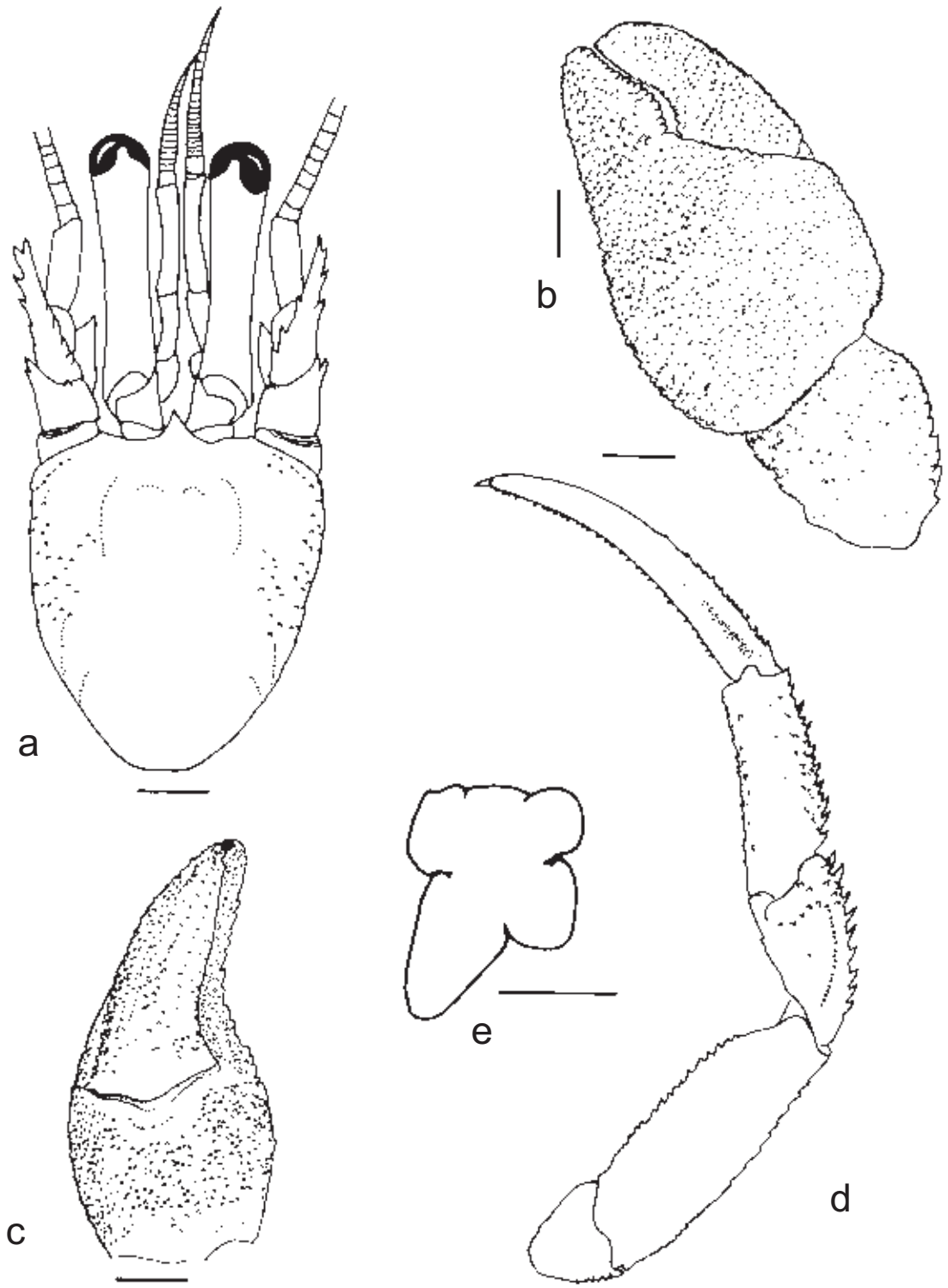
Size.– Maximum recorded shield length 9.4 mm.

Coloration.– Shield and ocular peduncles reddish-orange. Chelipeds with chelae white or whitish, tinged with red or reddish-brown; carpi whitish to reddish-orange; meri also whitish to reddish-orange, each with darker band. Ambulatory legs with dactyls light reddish-orange, tips white; propodi reddish-orange, whitish distally; carpi mottled reddish-orange and white; meri generally reddish-orange, each with darker band subdistally.

Habitat.– Gastropod shells.

Distribution.– Kii Peninsula, Tosa Bay, east coast of Kyushu, Japan, East China Sea, Taiwan; 130-280 m.

Remarks.– Although *Paguristes seminudus* was originally described from Kagosima Bay, Japan, by Stimpson (1858), the species reported by Miyake (1978), Baba (1986), Yu & Foo (1991) and herein differs from Stimpson's (1858) original description. Stimpson's species reportedly had chelipeds that differed in size, but not in armament. The armament of the chelipeds of the present species is somewhat dissimilar. Similarly, Stimpson's species was described as having the palms and carpi of the chelipeds densely setose, with only the dactyls and fixed fingers naked dorsally. The species from Taiwan has very sparse setae on the palms and carpi of the chelipeds. It is quite possible that further study will show that the species reported here actually represents an undescribed taxon.



Male (9.4 mm), CP216: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped; **c**, dactyl and palm of left cheliped (mesial view); **d**, left third pereopod (lateral view); **e**, telson. Setae omitted. Scales equal 1 mm.

Paguristes palythophilus Ortmann, 1892

Donggang fishing port, Pingtung County, 14 May 1995.

Paguristes palythophilus Ortmann, 1892: 277, pl. 12, fig. 5, 5p, 5q; Miyake, 1978: 32 (in part), not fig. 10; Miyake & Imafuku, 1980a: 3 (in part); Yu, 1988: 4, fig. 3; Yu & Foo, 1991: 51, unnumbered fig.; Komai, 2001: 359, figs. 3-6; Rahayu, 2006, 359.

? *Paguristes palithphilus*– Yokoya, 1933: 73 (misspelling).

? *Paguristes palythophilus*– Terao, 1913: 374; Miyake, 1961: 11; Miyake et al., 1962: 125 (list).

Paguristes kagoshimensis– Miyake, 1978: 35 (in part).

Not *Paguristes palythophilus*– Miyake, 1982: 96, pl. 32, fig. 4; Takeda, 1982: 58, fig. 174 [= *Paguristes albimaculatus* Komai, 2001].

Material examined.– Dasi fishing port, Yilan County, 11 Feb 2004: 1 male (8.3 mm), (NTOU).– 10 Mar 2005: 1 male (5.6 mm), (NTOU); Gueishan Island, vent st. 4, 24°49.210'N, 121°59.960'E, PCP, 355 m, 12 Jul 2005: 1 male (8.1 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: 1 female (8.0 mm), (NTOU); Donggang fishing port, Pingtung County, 30 May 1997: 3 males (5.2-8.7 mm), (NTOU).– 2 Jun 1999: 3 males (6.6-7.9 mm), 1 ovig. female (5.1 mm), (NTOU).– 6 Nov 2000: 1 male (5.4 mm), (NTOU); CP159, 22°14.61'N, 120°59.94'E, 208 m, 23 May 2002: 2 males (8.0, 10.0 mm), 1 ovig. female (7.0 mm), (MNHN Pg 7666); CH176, 22°14.83'N, 120°27.10'E, 160 m, 27 May 2002: 1 male (8.5 mm), (MNHN Pg 7667); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 male (4.7 mm), (NTOU); CP362, 22°15.954'N, 120°02.156'E, 945-1052 m, 23 Aug 2006: 1 female (6.2 mm), (NTOU); no specific locality: 1 male (4.7 mm), (NTOU).

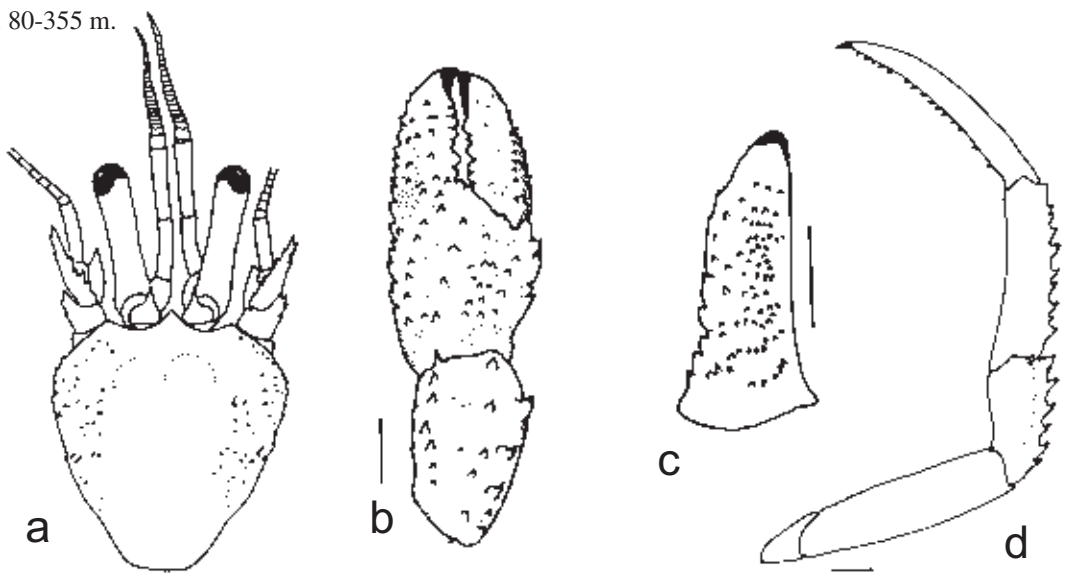
Diagnosis.– Gills quadriserial. Shield longer than broad; rostrum triangular or subtriangular, terminating acutely, bluntly or with small spine. Branchiostegites each with row of small spines on anterodorsal and distal margins. Ocular peduncles moderately long; corneas slightly dilated; ocular acicles each with acute terminal spine. Antennular peduncles reaching or overreaching distal corneal margins; antennal peduncles sometimes reaching slightly beyond bases of corneas, fourth segment with small dorsodistal spine, second segment with dorsolateral distal angle weakly to prominently produced, terminating in simple or bifid spine; antennal acicle sometimes reaching nearly distal margin of fifth peduncular segment, terminating in simple or bifid spine, mesial margin with 3-6 spines, lateral margin with 0-3 spines; antennal flagellum slightly shorter to considerably longer than carapace, with sparse to moderately numerous long and short setae. Chelipeds equal or slightly subequal, with left slightly larger; similarly armed; mesial faces of dactyls each with 3-5 irregular rows of small to moderate spinules; palm with 4-6 prominent spines on dorsomesial margin; dorsal surface with several irregular rows of small to moderately large spines or tubercles; carpus with row of 4-7 spines on dorsomesial margin, dorsal surface with small spines or spinulose tubercles. Second pereopods with dactyls longer than propodi; dorsal surfaces each with 1 to short row of several moderately small spines proximally; ventral margins each with row of 19-29 corneous spines; propodi and carpi each with 1 or 2 rows of moderately prominent spines on dorsal surface; third pereopods with dactyls and propodi unarmed, carpi each with dorsodistal spine and occasionally 1 to few additional spinules on dorsal surface. Male first pleopod with 1 row of hook-like spines on distal margin of inferior lamella. Female brood pouch ovately triangular, left pleonal tergites 2-4 with marginal thickenings and dense fringe of long, plumose setae. Telson with triangular posterior lobes unarmed marginally.

Size.– Maximum recorded shield length 11.2 mm.

Coloration.– Entire animal generally reddish-orange; spines, tubercles, protuberances on chelipeds and ambulatory pereopods appearing as white or lighter colored spots. Ocular peduncles with two white longitudinal stripes dorsolaterally and mesially, dorsal surface between two white stripes generally orange or reddish-orange, sometimes becoming darker mesially, sometimes also with longitudinal row of white spots.

Habitat.– Gastropod shells often encrusted with *Epizoanthus* species.

Distribution.– Sagami and Tosa Bays, off Boso Peninsula, Japan, Taiwan, Indonesia, northern Western Australia; 80-355 m.



Male (5.6 mm), Dasi fishing port, Yilan County, 10 Mar 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl of left cheliped (mesial view); **d,** left third pereopod (lateral view). Setae omitted. Scales equal 1 mm.

Paguristes albimaculatus Komai, 2001

CP216.

Paguristes palythophilus– Miyake, 1978: 31 (in part), fig. 10; Miyake & Imafuku, 1980a: 3 (in part); Miyake, 1982: 96, pl. 32, fig. 4; Takeda, 1982: 58, fig. 174 [not *Paguristes palythophilus* Stimpson, 1858].

Paguristes kagoshimensis– Baba, 1986: 91, fig. 139; Yu, 1988: 3, fig. 2; Wang, 1995: 586 (list) [not *Paguristes kagoshimensis* Ortmann, 1892].

Paguristes Kagoshimensis– Wang, 1992: 60 (list) [not *Paguristes kagoshimensis* Ortmann, 1892].

Paguristes albimaculatus Komai, 2001: 369, figs. 2A, 7-10.

Material examined.– DW34, 22°01.9'N, 120°36.04'E, 246-240 m, 31 Jul 2000: 1 female (4.3 mm), (NTOU); CP35, 22°01.8'N, 120°36.5'E, 228-222 m, 31 Jul 2000: 1 male (3.5 mm), (MNHN Pg 7650), 1 male (3.1 mm), 1 female (3.7 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 3 males (4.2-5.0 mm), 2 females (4.1-4.6 mm), (NTOU); no specific locality: 4 males (4.0-4.3 mm), 2 ovig. females (5.0, 5.0 mm), (NTOU).

Diagnosis.– Gills quadriserial. Shield longer than broad. Branchiostegites each with row of small spines on anterodorsal and distal margins. Ocular peduncles moderately slender, corneas slightly dilated; ocular acicles each with small spine. Antennular peduncles reaching or slightly overreaching distal corneal margins; antennal peduncles reaching bases of corneas, fourth segment with small spine at dorsodistal margin, second segment with dorsolateral distal angle terminating in simple or bifid spine, mesial and lateral margins unarmed; antennal acicle not reaching to base of cornea, terminating in simple or bifid spine, mesial margin with 4-6 spines proximally, lateral margin with 2 or 3 spines; antennal flagellum long, articles with scattered

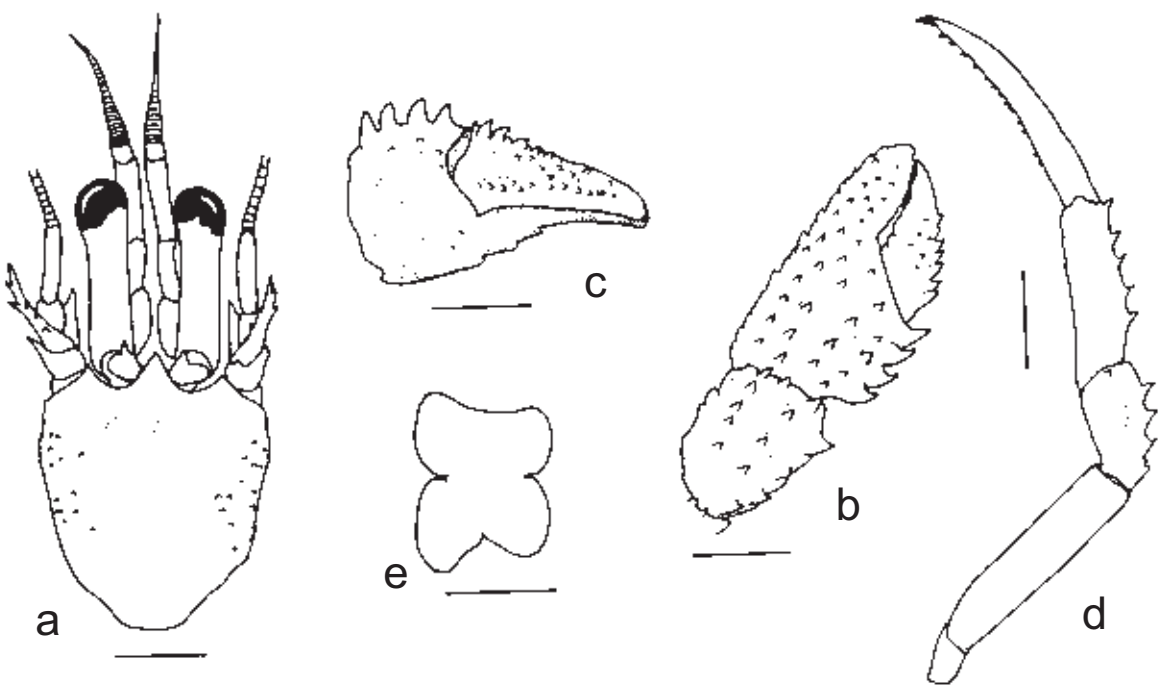
long and short setae. Chelipeds equal or slightly subequal with left slightly larger, similar in armament; mesial surface of dactyl with scattered small, corneous-tipped spines with ventral spines forming single row along margin; palm with 4-6 spines on dorsomesial margin, sloping dorsal surface with several irregular rows of small to moderately large spines or tubercles, dorsolateral margin not delimited; carpus with 4 or 5 large spines on dorsomesial margin, dorsal surface with small spines or spinulose tubercles mesial to sinuous sulcus, dorsolateral margin with row of small spines or tubercles. Second pereopods with dactyls longer than propodi, dorsal margins each with few small corneous-tipped spines proximally, ventral margins each with row of 15-20 slender corneous spines; propodi each with row of moderately strong spines on dorsal surface; carpi each with single or double row of moderately prominent spines dorsally. Third pereopods with dorsal surfaces of propodi unarmed; carpi each with dorsodistal spine and occasionally with 1 or 2 small proximal spines on dorsal surface. First male pleopod with single row of moderately prominent, closely-set, hooked corneous spines on distal margin of inferior lamella. Female brood pouch relatively small, subtriangular; second to fourth left pleonal tergites each with marginally moderately dense, long setae obscuring pleopods. Telson with terminal margins of posterior lobes unarmed.

Size.– Maximum recorded shield length 7.5 mm.

Coloration.– Shield generally red with scattered small white spots. Ocular peduncles with white dorsal surfaces, laterally reddish. Chelipeds and ambulatory legs red or reddish-orange with numerous scattered small white spots.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japanese main islands, from Sagami Bay to Amami Islands, Taiwan; 120-280 m.



Male (3.1 mm), CP35: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Paguristes versus Komai, 2001

Dasi fishing port, Yilan County, 15 Dec 1997.

Paguristes kagoshimensis– Kim, 1973: 214, 597, fig. 44, pl. 69, fig. 25; Miyake, 1978; 35, fig. 12; Miyake & Imafuku, 1980a: 3; Miyake & Imafuku, 1980b: pl. 2, fig. 2; Miyake, 1982: 96, pl. 32, fig. 5; Yu & Foo, 1991: 52, unnumbered figure [not *Paguristes kagoshimensis* Ortmann, 1892].

Paguristes versus Komai, 2001: 406, figs. 23-27.

Material examined.– Dasi fishing port, Yilan County, 31 Dec 1984: 1 male (7.1 mm), paratype, (NTOU).– 15 Dec 1997: 1 male (6.2 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County: 1 male (6.0 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 female (3.0 mm), (NTOU); CP75, 24°56.72'N, 122°01.81'E, 139 m, 7 May 2001: 2 males (3.6, 5.2 mm), (MNHN).

Diagnosis.– Gills quadriserial. Shield longer than broad; rostrum long, triangular, moderately narrow. Branchiostegites each with row of small spines on anterodorsal and distal margins. Ocular peduncles relatively stout, corneas slightly dilated; ocular acicles each with acute spine. Antennular peduncles overreaching distal corneal margins; antennal peduncles not reaching to bases of corneas, fourth segment with small spine at dorsodistal margin, second segment with dorsolateral distal angle terminating in simple or bifid spine, mesial and lateral margins usually unarmed; antennal acicle overreaching midlength of ocular peduncle, terminating in simple acute spine; mesial margin with 3 or 4 moderately large spines, lateral margin with 1-3 spines; antennal flagellum long, articles each with several short to long setae. Chelipeds equal or slightly subequal, with left stouter, armature generally similar; mesial face of dactyl with irregular double row of sparse, small corneous-tipped or corneous spines and single row of 10-15 smaller corneous-tipped spines near ventral margin; palm with 4-6 large spines on dorsomesial margin; sloping dorsal surface with irregular rows of moderately large spines; carpus with 4 or 5 large spines on dorsomesial margin, dorsal surface with 2

irregular rows of moderately small spines or tubercles. Second pereopods with dactyls longer than propodi, dorsal surfaces each with few spinules proximally; ventral margins each with row of 15-22 slender corneous spinules; propodi and carpi each with row of spines on dorsal surfaces; third pereopods also each with few spinules on dorsal surface of dactyl, propodi with unarmed dorsal surfaces, carpi each with small dorsodistal spine. First male pleopod with 2 or 3 rows of closely-set, hooked corneous spines on distal margin of inferior lamella. Female brood pouch large, narrowly subtriangular; pleonal tergites 2-4 each with dense, extremely long setae on left margin.

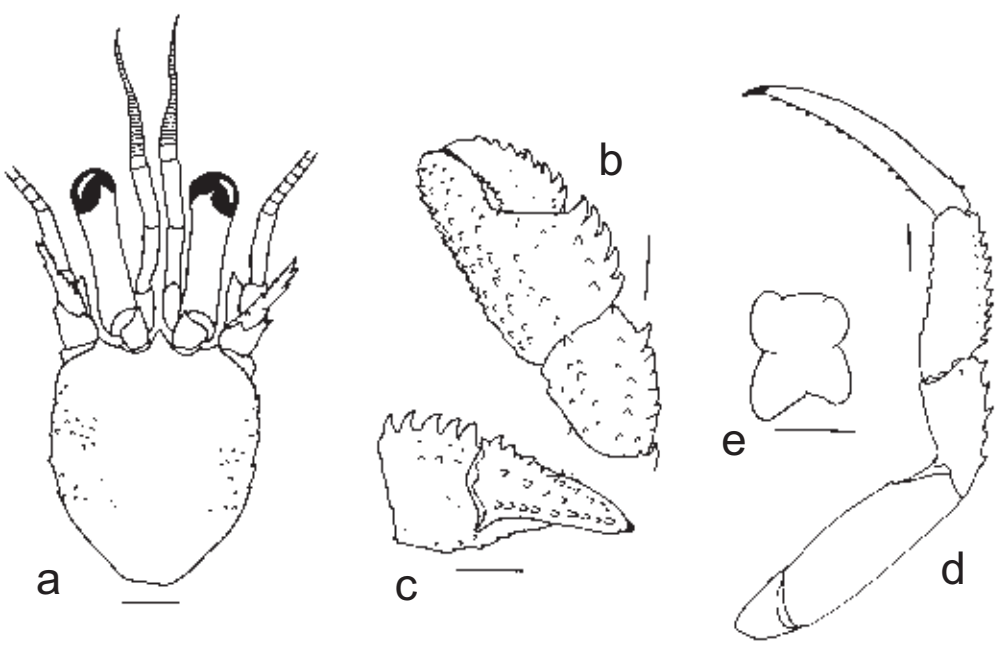
Size.– Maximum recorded shield length 7.2 mm.

Coloration.– Carapace generally reddish-brown dorsally, shield with pair of darker spots laterally. Ocular peduncles with ventral surfaces uniformly red; dorsal surfaces reddish-brown with small white spots, bordered with obscure, narrow white longitudinal stripes. Antennular peduncles cream; antennal peduncles with tinge of reddish-brown. Chelipeds generally reddish-brown, spines and protuberances white, appearing as scattered white spots. Ambulatory legs reddish-brown, each with tinge of darker red around segmental articulations; propodi, carpi and meri with complex pattern of white and red (after Komai, 2001). Shield reddish-gold. Ocular peduncles entirely light reddish-brown. Antennular peduncles whitish, tinged with light red; antennal peduncles reddish-gold. Chelipeds generally reddish-gold, spines and protuberances slightly lighter. Dactyls of ambulatory legs light reddish-gold; propodi each with faint reddish band distally; carpi and meri mottled reddish-gold and slightly darker red (photo).

Habitat.– Gastropod shells.

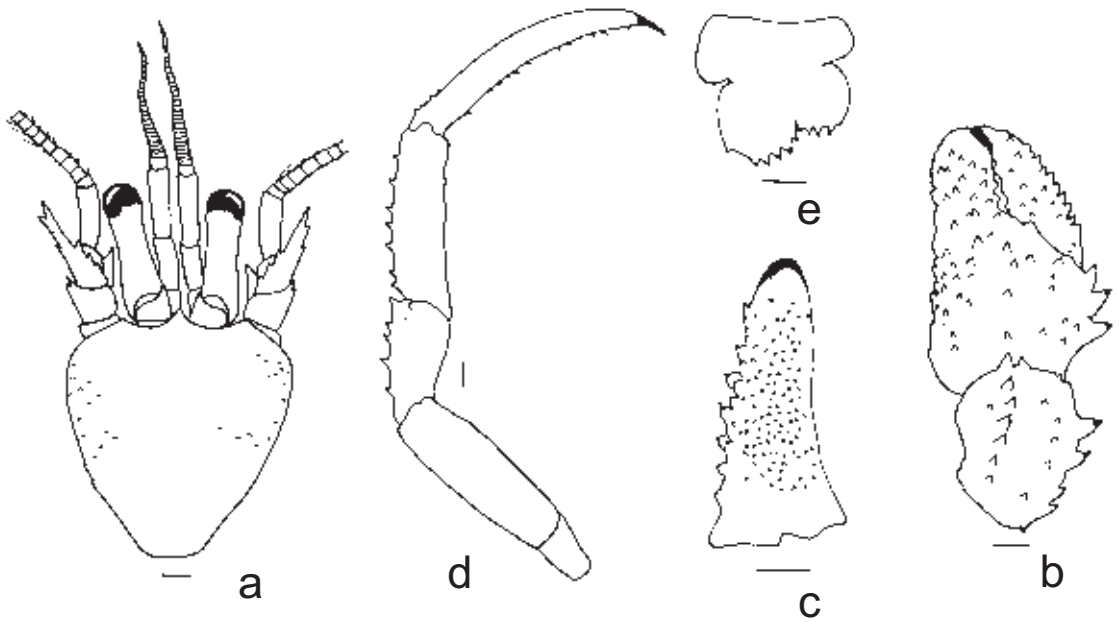
Distribution.– Pacific coast of Japan, from Boso Peninsula to Ohsumi Islands, Korea, Taiwan; 110-221, possibly to 254 m.

Remarks.– Yu & Foo's (1991) specimen of "*Paguristes kagoshimensis*" is actually not that species and their material was selected as a paratype of *P. versus* by Komai (2001).



Male (6.0 mm), Singda Harbor fishing port, Kaohsiung County: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Paguristes miyakei Forest & McLaughlin, 1998



Male (4.5 mm), CP91: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl of left cheliped (mesial view); **d,** right second pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Paguristes setosus– Miyake, 1978: 27 (in part), fig. 8 [not *Paguristes setosus* (H. Milne Edwards, 1848)].
Paguristes puniceus– Miyake, 1978: 37 (in part), ? fig. 13 [not *Paguristes puniceus* Henderson, 1896].
Paguristes miyakei Forest & McLaughlin, 1998: 191, figs. 2, 3.

Material examined.– Dasi fishing port, Yilan County, 17 Mar 2006: 1 female (4.4 mm), (NTOU); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 1 female (4.1 mm), (NTOU); CP85, 24°00.55'N, 122°00.54'E, 255-390 m, 9 May 2001: 2 males (3.8, 4.1 mm), 1 ovig. female (4.0 mm), (MNHN), 1 male (6.0 mm), (NTOU); CP91, 24°50.60'N, 122°01.39'E, 400 m, 10 May 2001: 1 male (4.5 mm), 1 female (4.5 mm), (MNHN Pg 7641); CP267, 24°30.29'N, 122°06.06'E, 422-519 m, 2 Sep 2004: 1 male (4.1 mm) (MNHN).

Diagnosis.– Gills biserial. Shield longer than broad; rostrum short, triangular. Branchiostegites each with very few tiny spinules on dorsal and anterior margins. Ocular peduncles moderately short and slender, corneas not dilated; ocular acicles each with simple or weakly bifid terminal spine. Antennular peduncles overreaching distal margins of corneas by half to nearly entire lengths of ultimate segments; antennal peduncles often overreaching distal corneal margins, fourth segment with small dorsodistal spine, second segment terminating in moderate to prominent bifid spine, 1-3 small spines on lateral margin; antennal acicle not overreaching distal margin of ultimate peduncular segment, with simple or bifid terminal spine; mesial margin with 4-6 small spines, lateral margin with 0-3 spines; antennal flagellum somewhat longer than carapace; thick; each article with several long randomly-set setae increasing in density distally. Chelipeds subequal; left slightly larger; armature generally similar; mesial faces of dactyls each with covering of small sometimes corneous-tipped spines or spinulose tubercles arranged in longitudinal or oblique rows; palm with 3-5 large spines on dorsomesial margin, dorsolateral margin not delimited; convex dorsolateral face and dorsal

surface with 4-6 rows of somewhat smaller spines; carpus with 4 or 5 large spines on dorsomesial margin, dorsal surface with 2 irregular rows of adjacent smaller spines separated by unarmed longitudinal area from dorsolateral row of acute or tuberculate spines. Second pereopods with dactyls longer than propodi; dorsal margins each with short proximal row of small corneous-tipped spines or simple protuberances, mesial faces unarmed, ventral margins each with row of 20-28 small corneous spines; propodi and carpi each with 1 or 2 rows of prominent spines on dorsal margins, ventral margins each with irregular row of small spines or spinulose protuberances. Third pereopods each with mesial face of dactyl unarmed, ventral row of spines present on dactyls and propodi; carpi each with dorsodistal spine and sometimes 1 or 2 proximal spinules. Male first pleopod with row of curved spines extending considerable distance along inner margin of inferior lamella. Female brood pouch elongate, moderately to quite slender. Telson with row of small spines on terminal margin of each posterior lobe.

Size.– Maximum recorded shield length 7.6 mm.

Coloration.– Anterior halves of carapace and basal segments of chelipeds and ambulatory legs reddish-brown; chelae and distal portions of carpi of chelipeds and distal two segments ambulatory legs whitish to light reddish-brown. Antennules and antennae light reddish-brown, dorsal surfaces of ocular peduncles whitish to light reddish-brown; ventral surfaces reddish-brown.

Habitat.– Gastropod shells on sandy-mud substrates.

Distribution.– Sagami Bay, Japan, Taiwan, northern Western Australia; 150-519 m.

Remarks.– Komai (2001) reexamined the majority of specimens assigned by Miyake (1978) to *Paguristes puniceus* and found one specimen that represented *P. miyakei*, while others represented *P. doederleini* Komai, 2001 and an undescribed species. Although Komai found Miyake's (1978) figure 13 to closely resemble the specimen of *P. miyakei*, because Miyake did not identify the specimen used in his illustration, his figure is questionably included in the present synonymy.

Paguristes doederleini Komai, 2001

CP212.

Paguristes setosus– Ortmann, 1892: 281, pl. 12, fig. 9; Yokoya, 1933: 76; Makarov, 1938: 167, fig. 67 [not *Paguristes setosus* (H. Milne Edwards, 1848)].

Paguristes kagoshimensis– Balss, 1913: 40 [not *Paguristes kagoshimensis* Ortmann, 1892].

Paguristes puniceus– Miyake, 1978: 37 (in part) [not *Paguristes puniceus* Henderson, 1896].

Paguristes incomitatus– Miyake, 1978: 41 (in part).

Paguristes doederleini Komai, 2001: 415, figs. 28-31.

Material examined.– CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 female (3.4 mm), (NTOU); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 20 males (3.8-6.1 mm), 23 females (4.0-5.4 mm), 18 ovig. females (4.3-5.4 mm), (NTOU); no specific locality, 29 Jul 2004: 1 male (5.5 mm), (NTOU).

Diagnosis.– Gills biserial. Shield longer than broad; rostrum short, triangular, terminating bluntly. Branchiostegites each with few small spines on anterior margin. Ocular peduncles moderately slender, shorter than shield, corneas not dilated; ocular acicles subtriangular, terminating in 1 or 2 small spines. Antennular peduncles overreaching distal margins of corneas by nearly half lengths of ultimate segments; antennal peduncles reaching nearly to bases of corneas; fourth segment occasionally with small spine, second segment with dorsolateral distal angle terminating in simple or bifid spine, lateral margin with few small spines; antennal acicle not quite reaching distal margin of fifth peduncular segment, terminating in simple or bifid spine, mesial margin with 2-4 spines proximally, lateral margin unarmed or with 1-3 spines distally; antennal

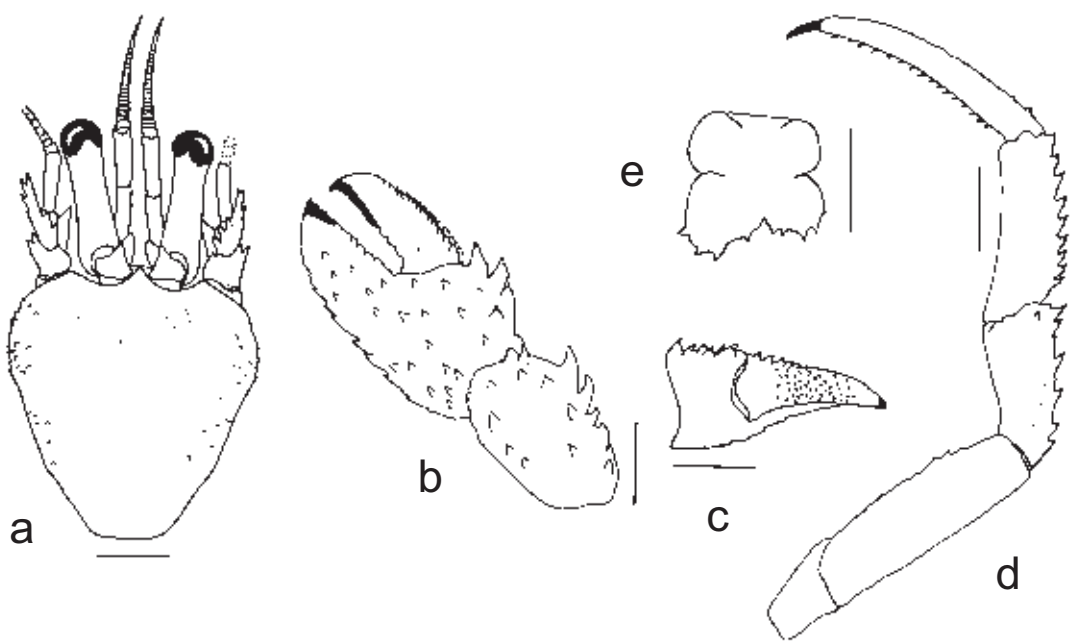
flagellum longer than shield, with long setae every 3 articles. Chelipeds equal or slightly subequal with left cheliped stouter; mesial face of dactyl with numerous scattered spinules; palm with 3 or 4 large, corneous-tipped spines on dorsomesial margin, sloping dorsal surface with several irregular rows of moderately large, corneous-tipped spines, dorsolateral margin not delimited; carpus with 4 or 5 large, corneous-tipped spines on dorsomesial margin, dorsal surface with single or double row of moderately large, spines in midline. Second pereopods with dactyls longer than propodi; dorsal surfaces each with row of small to moderately small corneous-tipped spines, ventral surfaces each with row of 20-25 small corneous spines; propodi each with row of large spines on dorsal surface; carpi each with double row of prominent spines on dorsal surface; third pereopods each with single or double row of small corneous spines on dorsal surface of dactyl, mesial surfaces each with single or double row of small corneous spines ventral to midline, propodi sometimes with few small corneous spinules dorsodistally, carpi each with dorsodistal spine and occasionally additional small spine on dorsal surface. Male first pleopod with single row of moderately strong, hooked corneous spines on distal margin of inferior lamella. Female brood pouch moderately large, subtriangular. Telson with 5 or 6 spines on terminal margin of each posterior lobe.

Size.– Maximum recorded shield length 7.3 mm.

Coloration.– Shield generally reddish-orange. Ocular peduncles uniformly reddish-orange. Chelipeds generally reddish-orange, spines and tubercles paler. Ambulatory legs generally reddish-orange; dactyls paler distally; propodi, and sometimes also meri, white distally.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kii Peninsula, Taiwan; 90-500 m.



Male (5.5 mm), no specific locality, 29 Jul 2004: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped; **c**, dactyl and palm of left cheliped (mesial view); **d**, left third pereopod (lateral view); **e**, telson. Setae omitted. Scales equal 1 mm.

Paguristes antennarius Rahayu, 2006

Nanfang-ao fishing port, Yilan County, 29 Jul 2004.

Paguristes antennarius Rahayu, 2006: 369, figs. 13-15.

Material examined.– Nanfang-ao fishing port, Yilan County, 29 Jul 2004: 1 male (6.0 mm), (NTOU); CP108, 24°48.23'N, 122°07.74'E, 295-337 m, 20 May 2001: 1 male (5.5 mm), (MNHN Pg 7646); CP109, 24°48.29'N, 122°83.98'E, 246-256 m, 20 May 2001: 1 female (5.7 mm), (MNHN Pg 7647); CP268, 24°30.46'N, 122°06.28'E, 421-531 m, 2 Sept 2004: 13 males (4.0-5.9 mm), 2 ovig. females (4.0, 5.2 mm), (MNHN Pg 7648).

Diagnosis.– Biserial gills. Shield as long as broad; rostrum broadly triangular. Branchiostegites each with 1-3 spinules on anterior margin. Ocular peduncles about 0.5 length of shield, corneas not dilated; ocular acicles small, triangular, each terminating acutely. Antennular peduncles exceeding corneal margins by entire lengths of ultimate segments; antennal peduncles overreaching corneal margins, fourth segment with dorsodistal spinule, second segment with dorsolateral distal angle produced, terminating in bifid spine, 1 spine on lateral margin; antennal acicle reaching beyond midlength of fifth peduncular segment, with prominent terminal bifid spine; mesial margin with 4 corneous spines, lateral margin with 1 spine; antennal flagella longer than shield, each article with tuft of setae, longer and denser distally. Chelipeds subequal, left slightly larger, armature similar; mesial face of dactyl with irregular oblique or longitudinal rows of small corneous spines, larger corneous spines near dorsal margin; palm with 4 prominent, corneous-tipped spines on dorsomesial margin, dorsolateral margin not delimited; weakly convex dorsal surface with irregular rows of prominent, corneous-tipped spines, each accompanied by tuft of long stiff setae; carpus with 4 prominent,

corneous-tipped spines on dorsomesial margin, and adjacent irregular double row of strong spines, dorsal surface with row of corneous-tipped spines medially. Second pereopods with dactyls longer than propodi, dorsal margins each with row of strong, corneous-tipped spines proximally, ventral margins each with 16-17 small corneous spines; dorsal surfaces of propodi each with row of 9 prominent corneous-tipped spines, lateral faces each with row of small corneous-tipped spines near dorsal margin and row of conical tubercles near ventral margin, mesial and ventral margins each with rows of small spines; carpi each with row of large spines on dorsal margin; third pereopods with small spines on dorsal and ventral margins of propodi, carpi each with 1 spine dorsodistally. Male first pleopod with row of curved spines on distal margin of inferior lamella. Female brood pouch triangular; tergal margins above pleopods 2-4 sometimes with fringe of long dense setae. Telson with terminal margins of posterior lobes armed with small corneous spines.

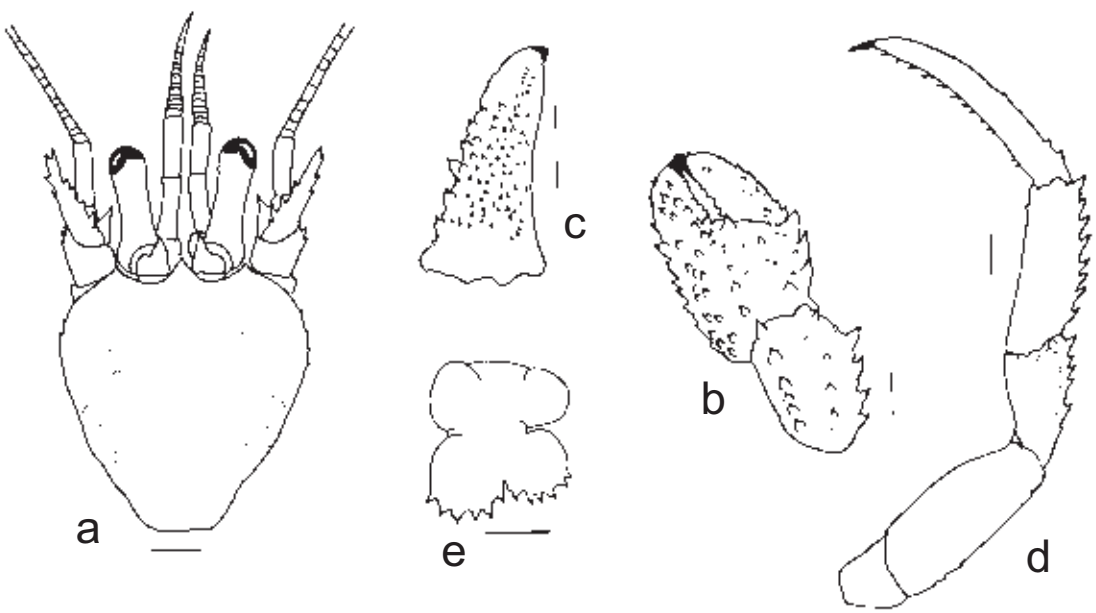
Size.– Maximum recorded shield length 7.2 mm.

Coloration.– Shield and cephalic appendages faintly to moderately dark orange or reddish-orange. Ocular peduncles entirely dull orange. Chelipeds generally orange, meri each with broad white band adjacent to distal margin. Dactyls of ambulatory legs white to orangish-pink, propodi each whitish with tinge of orange; carpi and meri each with irregular broad orange or reddish-orange stripe or elongate patch dorsally.

Habitat.– Gastropod shells.

Distribution.– Kai and Tanimbar Islands and south of Java Island, Indonesia, northeast Taiwan; 200-452, possibly 531 m.

Remarks.– The occurrence of *Paguristes antennarius* in Taiwan represents a major extension of this species, known heretofore only from Indonesian waters.



Male (6.0 mm), (NTOU), Nanfang-ao fishing port, Yilan County, 29 Jul 2004: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Paguristes puniceus Henderson, 1896

OCP293.

Paguristes puniceus Henderson, 1896: 527; Alcock & Anderson, 1897: pl. 32, fig. 1; Alcock, 1905: 38, pl. 3, fig. 6; Komai, 2001: 423; McLaughlin, 2004c, figs. 1, 2.

Paguristes puniceus var. *unispinosa* Balss, 1912: 92.

Not *Paguristes puniceus*– Miyake, 1978: 38, fig. 13.

Material examined.– Nanfang-ao fishing port, Yilan County: 1 male (5.5 mm), (MNHN); CP73, 24°52.86'N, 122°00.98'E, 220-330 m, 7 May 2001: 1 male (4.7 mm), (NTOU); CP269, 24°30.55'N, 122°05.78'E, 399-397 m, 2 Sep 2004: 12 males (4.6-7.8 mm), 3 females (3.2-5.6 mm), 1 ovig. female (4.0 mm), (MNHN Pg 7649); CP274, 24°47.76'N, 122°00.32'E, 338-277 m, 13 Jun 2005: 1 male (4.5 mm), (NTOU); CP292, 24°57.140'N, 122°04.737'E, 271-236 m, 8 Aug 2005: 2 males (4.3, 4.7 mm), (NTOU); OCP293, 24°57.719'N, 122°04.693'E, 262-232 m, 8 Aug 2005: 1 male (5.4 mm), 1 female (3.4 mm), (NTOU).

Diagnosis.– Gills biserial. Shield slightly longer than broad; rostrum narrowly to broadly triangular, rarely broadly rounded and nearly obsolete. Branchiostegites each often with few widely-spaced spinules or small spines on dorsal margin and usually with 1-3 small spines on anterior margin. Ocular peduncles moderately short to moderately long; corneas slightly if at all dilated; ocular acicles triangular, each terminating acutely to bluntly, often with terminal spine. Antennular peduncles slightly to considerably overreaching distal margins of corneas; antennal peduncles not reaching corneal bases to overreaching distal margins of corneas, fourth segment commonly with small dorsodistal spine, second segment with dorsolateral distal angle usually terminating in bifid spine, occasionally 1 or 2 smaller spines on lateral margin; antennal

acicle reaching, sometimes overreaching distal peduncular segment, with prominent terminal bifid spine, mesial margin with 0-6 spines, lateral margin with 0-3 spines; antennal flagellar length variable, each article naked to bearing numerous setae. Chelipeds approximately equal or occasionally subequal, left or right slightly larger; armature generally similar; mesial faces of dactyls each with irregular, vertical, oblique or longitudinal rows of very small spinules or spines; palms each with 3 or 4 moderate to prominent spines on dorsomesial margin, dorsolateral margin not delimited; weakly convex dorsal surface with 4-6 irregular rows of somewhat smaller spines; carpi each with 4-6 prominent spines on dorsomesial margin, irregular row, often double distally, of smaller tuberculate spines usually mesiad of midline. Second pereopods with dactyls longer than propodi; dorsal margins each with few to short row of small to moderate spines proximally; row of 14-34 small to tiny corneous spines on each ventral margin; propodi and carpi each with 1 or 2 rows of spines on dorsal surface; third pereopods also often with spines on dorsal surfaces of dactyls, propodi and carpi; mesial faces of propodi each with ventral row of very small corneous spines. Male first pleopod with 1 row of curved spines on distal margin of inferior lamella extending considerable distance along outer margin. Female brood pouch varying from subtriangular to subquadrate, sometimes almost fan-shaped; tergal thickenings above acetabula of pleopods 2-4 sometimes with fringe of long dense setae, setation sometimes restricted to tergal thickening above fourth pleopod, occasionally entirely absent. Telson with terminal margins of posterior lobes each armed with row of small to moderately small, sometimes widely-spaced spines.

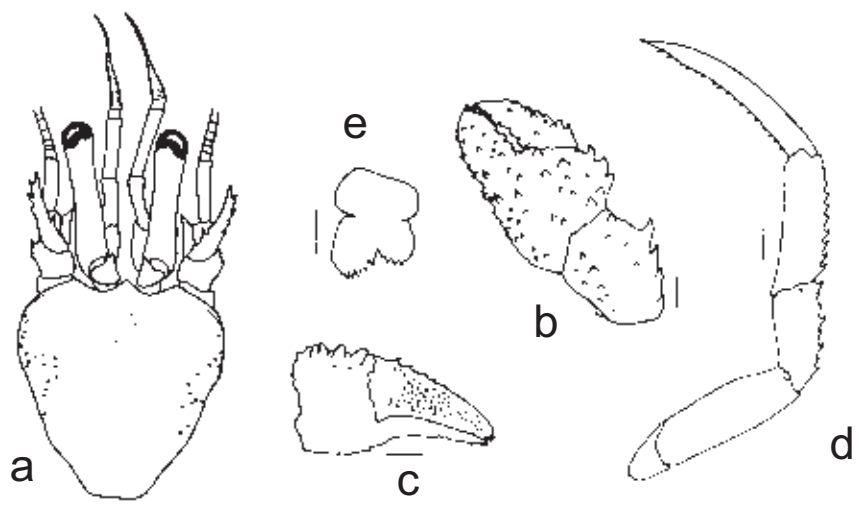
Size.– Maximum recorded shield length 10.1 mm.

Coloration.– Shield and ocular peduncles pale pink or lavender; antennular peduncles reddish-brown or reddish-orange. Chelipeds with chelae whitish; carpi and meri whitish with large areas of reddish-brown or reddish-orange dorsally. Dactyls of ambulatory legs white; propodi white tinged with reddish-brown; carpi primarily reddish-brown or reddish-orange; meri each reddish-brown or reddish-orange in distal half, whitish proximally.

Habitat.– Reported from substrates of mud and sandy mud; inhabiting gastropod shells, frequently with attached, unidentified *Epizoanthus*.

Distribution.– Bay of Bengal and Travancore coast, India, Andaman Sea, Indonesia, northern Queensland, Australia, Taiwan; 150-766 m.

Remarks.– This is a new record for this species in Taiwanese waters and represents a major range extension.



Male (5.5 mm), Nanfang-ao fishing port, Yilan County: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Strigopagurus Forest, 1995

In a recent revision, Forest (1995) divided the genus *Trizopagurus* Forest, 1952b, into three separate genera, *Trizopagurus* sensu stricto, *Ciliopagurus* Forest, 1995 and *Strigopagurus* Forest, 1995, representing what is believed to be an evolutionary cline. One of the diagnostic characters indicative of this trend is the progressively more elaborate development of the stridulatory structures on the mesial faces of the dactyls and chelae of the chelipeds. Of the five species assigned to *Strigopagurus*, one is found in Taiwan.

Strigopagurus boreonotus Forest, 1995

CP212.

Trizopagurus strigimanus– Miyake, 1978: 18 (in part); Miyake, 1982: 104, pl. 35, fig. 3; Baba, 1986: 195, 300, fig. 142; Yu & Foo, 1991: 56, unnumbered photo [not *Pagurus strigimanus* White, 1847].

Strigopagurus boreonotus Forest, 1995: 122, figs. 2c, f, i, 3c, f, i, 27a-d, 34d, 35d, 36d, i, 39c, 42c.

Material examined.– Dasi fishing port, Yilan County, 8 Mar 1986: 1 male (25.8 mm), (NTOU).– 29 Feb 1988: 1 specimen not sexed (21.0 mm), (NTOU).– May 1997: 1 male (14.4 mm), (NTOU).– May 1998: 1 male (16.7 mm), (NTOU).– 10 Apr 2000: 1 male (25.6 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 28 May 1997: 3 males (9.0-15.2 mm), 1 female (9.3 mm), (NTOU).– 23 Apr 1999: 1 male (8.4 mm), (NTOU).– 13 Mar 1999: 1 male (9.9 mm), 1 female (16.1 mm), (NTOU); CP109, 24°48.29'N, 122°83.98'E, 246-256 m, 20 May 2001: 1 male (13.0 mm), (MNHN Pg 7651); CP161, 22°09.63'N, 120°35.48'E, 302 m, 24 May 2002: 1 female (18.0 mm), (MNHN); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 2 females (12.0, 15.5 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 2 males (21.1, 22.0 mm), 1 female (8.0 mm), (NTOU); no specific locality: 1 male (17.0 mm), (NTOU).– 1 female (16.5 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum obtusely triangular. Ocular peduncles moderately short; corneas not dilated; ocular acicles acutely triangular. Antennular peduncles slightly overreaching distally corneal margins. Antennal peduncles reaching nearly to bases of corneas; second segment with dorsolateral distal angle produced, terminating in bifid spine; antennal acicle with bifid terminal spine, 4 or 5 spines on mesial surface, 1 or 2 on lateral face. Chelipeds subequal, left slightly larger, similar in shape and

armature; propodal-carpal articulation rotated counterclockwise approximately 45°; outer surfaces of palms each with covering of corneous-tipped spines, largest on upper margin; mesial faces each with stridulatory mechanism consisting of anterior primary vertical tier of 19-21 equidistant, parallel corneous ridges, shortest dorsally, and 3-5 rather broadly separated irregular rows of shorter parallel rows clustered in groups of threes; mesial faces of dactyls each with 4 or 5 short vertical rows of similar parallel ridges. Second and third pereopods stout; dactyls slightly longer than propodi, lateral faces of dactyls and propodi with numerous small, corneous-tipped spines. Males with paired second pleopods with exopods rudimentary, endopods modified as gonopods. Telson with posterior lobes somewhat asymmetrical, posterior margins unarmed.

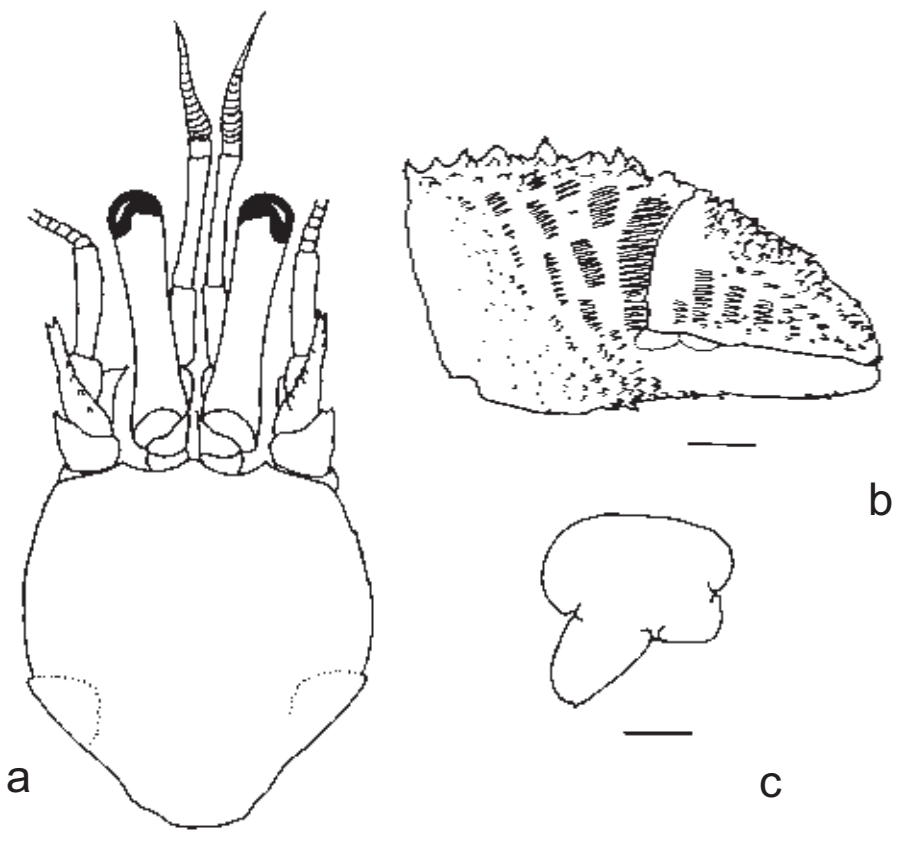
Size.– Maximum recorded shield length 25.8 mm.

Coloration.– Shield red with patches of white. Ocular peduncles red with broad white stripe dorsomedially; ocular acicles red proximally, white distally. Carpi and chelae of chelipeds yellowish-white tinted with red or yellowish-red; meri yellowish-red with numerous patches of white. Ambulatory legs reddish with patches of white (after Forest, 1995).

Habitat.– Gastropod shells, often with accompanying anemone.

Distribution.– Japan, Taiwan, Philippine Islands, South China Sea, Indonesia, New Caledonia; 135-460 m.

Remarks.– This species was previously known in Taiwanese waters as *Trizopagurus strigimanus*.



Male (17.0 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** dactyl and palm of left cheliped (mesial view); **c,** telson. Setae omitted. Scales equal 1 mm.

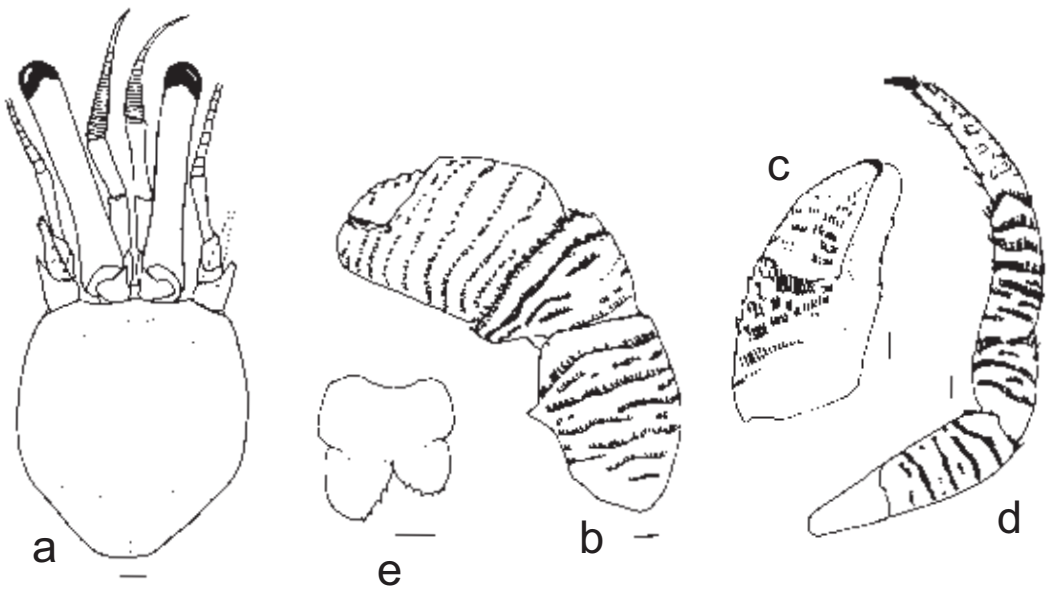
Ciliopagurus Forest, 1995

Although not considered a diagnostic character per se, species of *Ciliopagurus* are informally divided into two groups based on whether the margins of the ciliated striae on the dorsal surfaces of the chelae are denticulate or smooth. Among the Taiwanese species, *C. babai* Forest, 1995, belongs to the denticulate group, while the other two species belong to the smooth group.

Key to the Taiwanese species of *Ciliopagurus*

1. Merus of each cheliped with moderate to well developed blunt protuberance on ventral surface; telson with spinules on terminal margins of posterior lobes ……*C. babai*
- Merus of each cheliped without blunt protuberance on ventral surface; telson with unarmed terminal margins of posterior lobes ……2
2. Ocular acicles multifid; dorsal surfaces of palms of chelipeds each cut by 3 continuous transverse striae; dactyls of second and third pereopods each banded with orange and white ……*C. strigatus*
- Ocular acicles each with 1 or 2 spinules; dorsal surfaces of palms of chelipeds cut by 4 continuous transverse striae, dactyls of second and third pereopods entirely orange ……*C. krempfi*

Ciliopagurus babai Forest, 1995



Male (8.0 mm), Nanfang-ao fishing port, Yilan County, 14 May 1998: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer view); **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Trizopagurus strigatus– Matsuzawa, 1977: pl. 81, fig. 1 [not *Cancer strigatus* Herbst, 1804].

Trizopagurus tenebrarum– Miyake, 1978: 19 (in part, pl. 3, fig. 2); Miyake, 1982: 103, (in part, pl. 35, fig. 1 left); Baba, 1986: 195, 300 (in part, fig. 143).

Ciliopagurus babai Forest, 1995: 100, figs. 20c, 21h, 25, 31h, 38c, 42b.

Material examined.– Nanfang-ao fishing port, Yilan County, 14 May 1998: 1 male (8.0 mm), (NTOU).

Diagnosis.– Shield slightly to twice as long as broad; rostrum obtusely triangular. Ocular peduncles nearly as long as shield; corneas slightly dilated; ocular acicles triangular, simple or with 1 or 2 supplemental spinules. Antennular peduncles usually reaching to bases of corneas. Antennal peduncles not reaching beyond midlengths of ocular peduncles; antennal acicles each with terminal spine and 2 spines on lateral margin, surface with few spinules. Chelipeds equal or slightly subequal; meri each with prominent ventral blunt spine; carpi and chelae with principal striae continuous and deep, 2 on each carpus, 4 on each chela, carpus with some conical, acute or blunt corneous-capped tubercles on posterior crested margins of striae and on distal carpal margin. Stridulatory apparatus with main tier formed by 13-16 corneous ridges, 2 or 3 most ventral separated by from preceding; ridges subequal or decreasing in size; dactyl with series of transverse crests decreasing in size distally and becoming corneous tubercles near claw. Ambulatory legs with dactyls slightly longer than propodi; carpi of second pereopods each with dorsodistal corneous spine and 2 more posteriorly, third with only dorsodistal spine; carpi also each with 2 principal striae on mesial face; propodi with 5 striae ventromesially; striae of dactyls annular, but discontinuous; all striae with fringes of setae. Posterior lobes of telson each with few corneous spinules on terminal margin.

Size.– Maximum recorded shield length 9.3 mm.

Coloration.– Shield yellowish-white with irregular vermillion-red longitudinal bands. Ocular peduncles vermillion-red, each with triangular unpigmented area on dorsal surface at base of cornea; ocular acicles red. Antennal peduncles with smudges of red on proximal regions. Chelipeds with alternating transverse bands of vermillion-red, sometimes with lighter marbling, and narrower bands of yellowish-white bordering striae anteriorly. All segments of ambulatory legs with alternating rings of vermillion-red and narrower rings of yellowish-white under fringes of setae; red rings often marked with white patches irregularly disposed in transverse series (Forest, 1995).

Habitat.– Gastropod shells.

Distribution.– Japan, Taiwan, Vanuatu; 150-360 m, possibly to 419 m.

Remarks.– This is the first report of this species in Taiwanese waters.

Ciliopagurus strigatus (Herbst, 1804)

Gueishan Island, Yilan County, 13 Apr 2003.

Cancer strigatus Herbst, 1804: 25, pl. 61, fig. 3.

Pagurus strigatus– Olivier, 1811: 647.

Pagurus annulipes H. Milne Edwards, 1848: 63.

Pagurus (s.s.) *strigatus*– Hilgendorf, 1879: 820 (in part).

Aniculus strigatus– Henderson, 1893: 42; Alcock, 1905: 96 (in part: not pl. 7, fig. 4); Edmondson, 1946: 263, fig. 161c; Miyake, 1960: pl. 47, fig. 1; Minei, 1973: 46, fig. 1.

Trizopagurus strigatus– Forest, 1952b: 256; Forest, 1952c: 19, figs. 5, 14, 21 (in part); Forest, 1955: 86; Lewinsohn, 1969: 52, fig. 7; Miyake, 1975: 305, pl. 114, fig. 6; Miyake, 1978: 18 (in part, not pl. 3, fig. 5); Miyake, 1982: 103, 194, pl. 34, fig. 6; Field et al., 1987: 91, fig. 1C; Kamezaki et al., 1988: 123, unnumbered fig.; Wang, 1991: 225, fig. 183; Yu & Foo, 1991: 57, unnumbered figure; Asakura, 1995: 352: pl. 93, fig. 3.

Ciliopagurus strigatus– Forest, 1995: 49, figs. 8a, 9, 10a, 12a, 31a-b, 37c; Hoover, 1998: 252, unnumbered fig.

Not *Aniculus strigatus*– Barnard, 1950: 431, fig. 80a [= *Ciliopagurus tricolor* Forest, 1995].

Material examined.– Hepingdao, Keelung, Nov 1996: 1 female (5.9 mm), (NTOU); Aodi, Taipei County, 20 May 2006: 1 male (5.0 mm), (NTOU); Longdong, Taipei County, 6 Sep 1988: 2 females (3.9, 5.0 mm), (NTOU); Gueishan Island, Yilan County, 13 Apr 2003: 1 male (6.7 mm), (NTOU); Hungchikeng, Kending, Pingtung County, 9 Sep 2005: 2 males (2.9, 3.9 mm), 1 female (5.1 mm), (NTOU); Kending, Pingtung County, 29 Sep 2004: 1 female (3.6 mm), (NTOU); no specific locality: 1 male (6.9 mm), (NTOU).

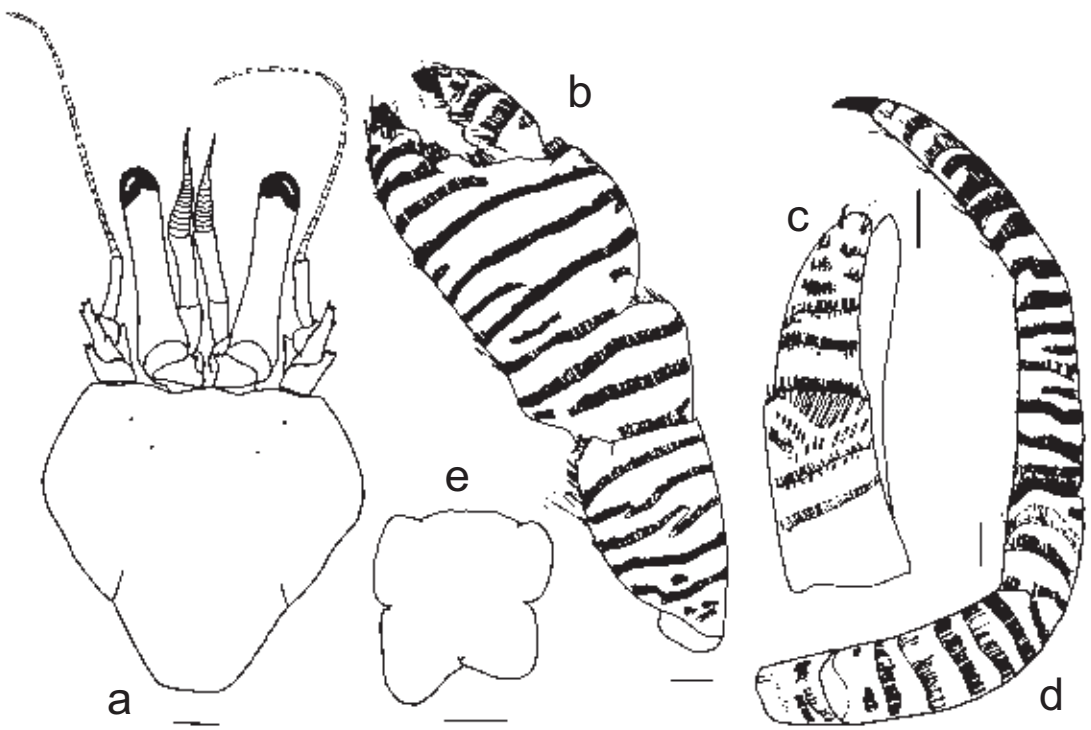
Diagnosis.– Shield nearly as long as broad; rostrum rounded. Ocular peduncles less than to slightly more than half length of shield; corneas dilated little if at all; ocular acicles quite large, multifid. Antennular peduncles not reaching bases of corneas. Antennal peduncles 0.5-0.8 lengths of ocular peduncles; antennal acicle reaching to or overreaching proximal margin of fifth segment, with 2 lateral spines distally, and 3-5 spines on dorsomesial margin. Chelipeds often slightly subequal; meri each with no prominent protuberance; carpi each with 3 complete striae; palms each with 3 striae extending entire length of segment and fourth less apparent. Stridulatory apparatus with main tier formed by 12-14 straight parallel corneous ridges, most dorsal sometimes reduced to denticles, following crescent-shaped; dactyl with corneous denticles in transverse lines. Ambulatory legs with dactyls equal to or slightly longer than propodi; carpi each with 4 striae on dorsal surface, 2 median forming complete rings; propodi each with 5 or 6 annular striae; striae of dactyls forming arcs converging dorsally with somewhat squamiform arrangement. Posterior lobes of telson terminally rounded and sometimes with tiny marginal spinules.

Size.– Maximum recorded shield length 7.6 mm.

Coloration.– Shield white. Ocular peduncles intense red-orange; ocular acicles, antennular and antennal peduncles orange or red-orange. Chelipeds and surfaces of all segments of ambulatory legs vermillion-red with bands of piliferus striae, each band white or orange under each fringe of bristles; red bands broader than white or orange bands.

Habitat.– Apparently always found in shells of the gastropod genus *Conus*.

Distribution.– Indo-West Pacific including Red Sea, northern Indian Ocean, Indonesia, northern and eastern Australia, Vietnam, Philippine Islands, Taiwan, Japan, French Polynesia to Hawaii; 0-15 m, possibly to 25 m.



Male (6.7 mm), Gueishan Island, Yilan County, 13 Apr 2003: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer view); **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Ciliopagurus krempfi Forest, 1995

Dasi fishing port, Yilan County, 2 Oct 1996.

Aniculus strigatus– Alcock, 1905: 97, pl. 7, fig. 4; Laurie, 1926: 159; Thompson, 1943: 417 [not *Aniculus strigatus* (Herbst, 1804)].

Trizopagurus strigatus– Miyake, 1978: 18, pl. 3, fig. 5 [not *Trizopagurus strigatus* (Herbst, 1804)].

Trizopagurus krempfi Forest 1952b: 256; Forest, 1952c: 24, figs. 6, 15, 22; Miyake, 1982: 104 (in part, pl. 35, fig. 2, right).

Ciliopagurus krempfi– Forest, 1995: 59, figs. 10c, 12c, 31d, 37g, h.

Material examined.– Dasi fishing port, Yilan County, 2 Oct 1996: 1 female (7.4 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum rounded. Ocular peduncles shorter to nearly as long as shield; corneas slightly dilated, ocular acicles triangular, each with 1 or 2 terminal spinules. Antennular peduncles reaching slightly beyond bases of corneas. Antennal peduncles extending to or beyond midlength; antennal acicle overreaching proximal margin of fifth segment, with 2 spines laterally and smaller spinules on dorsal surface. Chelipeds subequal; meri each without ventral blunt spine; carpi each with 3 regular striae, palms each with 4 clearly visible and fifth obscured by distal margins of carpi. Stridulatory apparatus with main tier consisting of about 15 corneous, equidistant parallel rods, other series of parallel ridges extend on mesial face; dactyl with series of ridges separated into 2 groups by large space and bordered by transverse proximal furrow. Ambulatory legs with dactyls equal to or slightly longer than propodi; carpi each with 4 striae, 1 forming complete ring; propodi each with 6 generally angular striae; striae of dactyls converging dorsally. Posterior lobes of telson short, approximately equal, unarmed and with rounded tips.

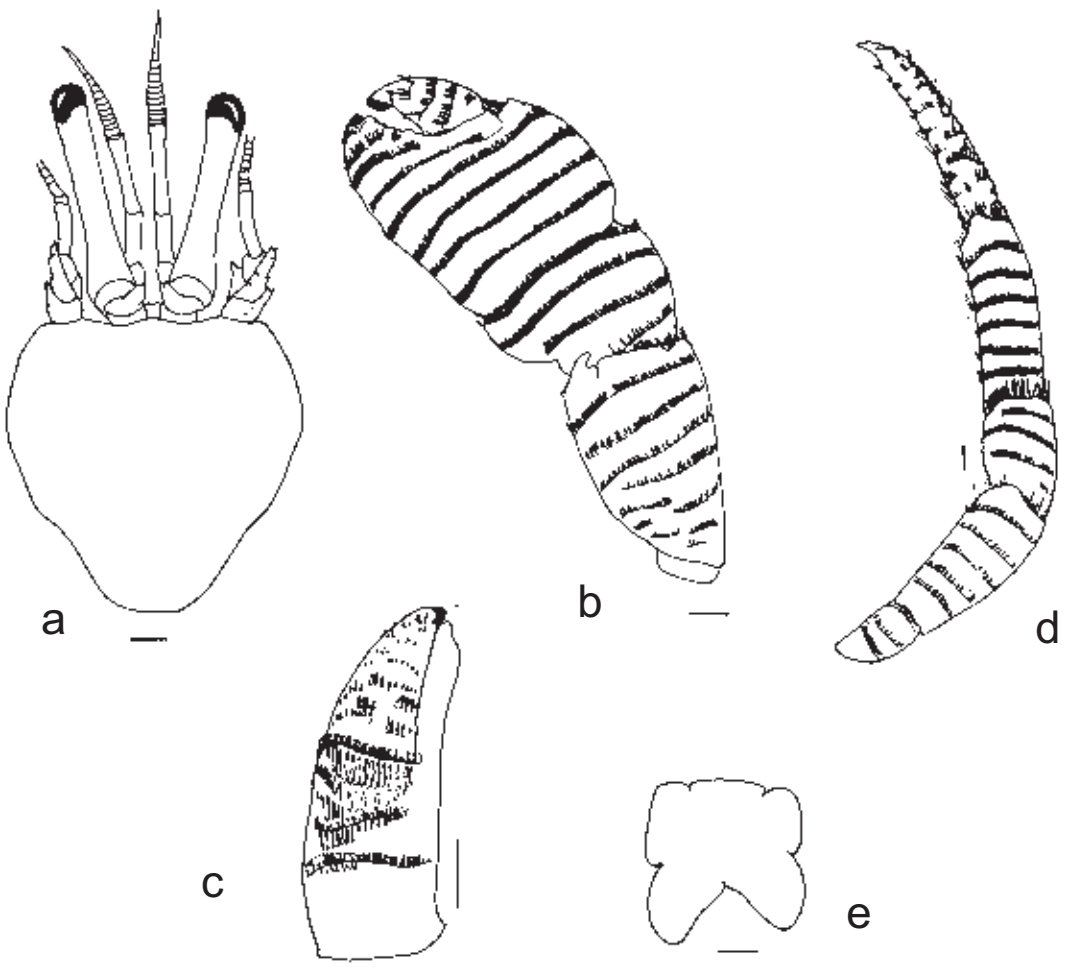
Size.– Maximum recorded shield length 7.4 mm.

Coloration.– Shield whitish to faint orange-rose. Ocular peduncles and acicles, antennular and antennal peduncles orange. Chelipeds with alternating bands of white under fringes of setae, and broader bands of vermillion-red; fixed fingers, and dactyls orange distally. Dactyls of ambulatory legs entirely orange; propodi, carpi and meri banded vermillion-red and white as chelipeds.

Habitats.– Shells frequently utilized include *Conus, Ancillaria, Mitra* and *Cassis*.

Distribution.– East Indian Ocean from Kenya to Arabian Sea, Indonesia, Australia, Vietnam, Reunion, South China Sea, Philippine Islands, Taiwan, Japan, New Caledonia, French Polynesia; 10-300 m.

Remarks.– The occurrence of *Ciliopagurus krempfi* in Taiwanese waters is a new distributional record for this species. It is very closely allied to the common Taiwanese species, *C. strigatus*, but is easily distinguished from that species by the entirely orange coloration of its ambulatory dactyls.



Female (7.4 mm), Dasi fishing port, Yilan County, 2 Oct 1996: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer view); **c,** dactyl and palm of left cheliped (mesial view); **d,** left third pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Dardanus Paul'son, 1875

Species of *Dardanus* are among the largest and most widely distributed of the marine hermit crabs, occurring in tropical waters around the world. Despite this commonality, the genus was at the center of systematic controversy for many years. As may be seen in the synonymies accompanying all of the taxa, the species were known to many early carcinologists by the generic name *Pagurus*. But the name *Pagurus* was also applied by other carcinologists to a genus of the family Paguridae. It required a ruling by the International Commission on Zoological Nomenclature to resolve the disputed application of the name (Forest & Holthuis, 1955; Opinion 472, cf. Hemming, 1958). With that ruling, *Pagurus* was defined as belonging to the family Paguridae, with its type species, *Pagurus bernhardus* (Linnaeus, 1758). The diogenid genus was defined as *Dardanus* Paul'son, 1875 with its type species *Dardanus lagopodes* (Forskål, 1775). Of the 42 recent species described in the genus, 12 are found in Taiwanese waters.

Key to the Taiwanese species of *Dardanus*

1. Left chela and ambulatory legs covered with scutes or scute-like granular or tuberculate ridges [cephalothorax and appendages reddish-brown; ocular peduncles each with 2 dark red bands] ···*D. arrosor*
- Left chela and ambulatory legs not covered with scutes ···2
2. Outer face of palm of left cheliped with granules, tubercles or very blunt spines ···3
- Outer face of palm of left cheliped with sharp, often corneous-tipped spines ···6
3. Propodus of left third pereopod with lateral face concave dorsally and ventrally, convex medianly [carapace mottled green and white, appendages faint orange and white with orange spots; ocular peduncles white with proximal and distal brown bands] ···*D. deformis*
- Propodus of left third pereopod with lateral face evenly convex ···4
4. Dorsolateral margin of propodus of left third pereopod angular [cephalothorax and appendages generally orange with some violet, particularly on carpi of chelipeds; ocular peduncles red with median white band] ···*D. gemmatus*
- Dorsolateral margin of propodus of left third pereopod rounded ···5
5. Outer upper surface of left chela with 2 or 3 longitudinal rows of granules or tubercles, lower half generally smooth; outer surface of fixed finger without deep, wedge-shaped concavity [shield reddish-brown or light purple; appendages reddish-brown to purple, carpi deep purple; ocular peduncles dark brown, each with 2 white bands] ···*D. pedunculatus*
- Entire outer surface of left chela with several rows of spinulose or blunt tubercles; outer surface of fixed finger with deep wedge-shaped concavity [Shield brownish-purple to yellowish-red; chelae and dactyls and propodi of ambulatory legs reddish to yellowish-red, carpi and meri dark violet, meri each with 2 reddish bands; ocular peduncles light brown, each with 2 red bands] ···*D. impressus*
6. Chelipeds subequal, left not appreciably larger than right ···7
- Chelipeds markedly unequal, left appreciably larger than right ···9
7. Ocular peduncles (including corneas) shorter than antennular peduncles [shield greenish-gray; chelipeds and ambulatory legs gray-violet and yellow; ocular peduncles each with dorsal greenish-gray stripe, violet stripe laterally and mesially] ···*D. hessii*
- Ocular peduncles (including corneas) longer than antennular peduncles ···8
8. Lateral face of propodus of left third pereopod with deep longitudinal furrow or sulcus, dorsal margin cut into series of scute-like projections [shield purplish-red with numerous white spots and large blue-green

markings; chelipeds and ambulatory legs reddish-brown, carpi each with large blue-green patch dorsally; ocular peduncles pinkish-purple, each with white ring at base of cornea] ……*D. guttatus*

- Lateral face of propodus of left third pereopod without deep longitudinal furrow or sulcus, dorsal surface not cut into series of scute-like projections [shield mottled red and white; chelipeds and ambulatory legs mottled red, brown, white and violet, carpi each with large red or blue patch dorsally; ocular peduncles pinkish-gray with yellow band at base of cornea ……*D. lagopodes*

9. Dactyl and propodus of left third pereopod with convex lateral faces, dactyl without longitudinal sulcus or groove [shield, chelipeds and ambulatory legs bright orange with numerous white spots ringed in black; ocular peduncles bright red-orange with few darker spots] ……*D. megistos*

- Dactyl and propodus of left third pereopod with flattened or concave lateral faces, dactyl with longitudinal sulcus or groove ……10

10. Lateral faces of dactyl and propodus of left third pereopod flattened, each with shallow longitudinal sulcus [Shield and appendages brown with numerous dark red or white spots, ambulatory legs with more red; ocular peduncles brown proximally and distally, purple medianly] ……*D. aspersus*

- Lateral faces of dactyl and propodus of left third pereopod deeply concave, at least in upper half, dactyl with deep longitudinal groove ……11

11. Propodus of left third pereopod with broad, elevated ridge separated from tessellated dorsal margin by wide, deep sulcus and from similarly cut ventral margin by narrower sulcus [shield reddish-brown with scattered purple spots; chelipeds and ambulatory legs reddish-brown, carpi each with purple patch dorsally; ocular peduncles light purple with white band distoventrally] ……*D. crassimanus*

- Propodus of left third pereopod with distinct median row of small, tuberculate, corneous-tipped spines on slightly elevated ridge; dorsal and ventral marginal tessellations each with 1 or 2 small, corneous-tipped spines [shield, chelipeds and ambulatory legs all mottled red and white, carpi and propodi of walking legs banded darker red; ocular peduncles uniform pinkish-orange] ……*D. setifer*

Dardanus arrosor (Herbst, 1796)

No specific locality (photographed by P.H. Ho).

CP216, juvenile.

Cancer arrosor Herbst, 1796: 170, pl. 43, fig. 1.

Pagurus strigosus Bosc, 1802: 77, pl. 11, fig. 3.

Pagurus striatus Latreille, 1802: 163; Roux 1828-30: pl. 10; De Haan 1849: 204, pl. 49, fig. 1; Brocchi 1875: 34, pl. 19, figs. 35-39; Whitelegge 1900: 166.

Pagurus incisus Olivier, 1811: 641; pl. 9, fig. 1; Latreille, 1818: pl. 310.

Pagurus Striatus– Risso, 1816: 54.

Pagurus Strigosus– Hope, 1851: 12.

Eupagurus striatus Cuenot, 1892.

Petrochirus arrosor– Rathbun, 1900: 302.

Pagurus arrosor– Pallary, 1900: 221; Nobre, 1931: 230, figs. 128-130; Terao, 1932: pl. 57, fig. 1; Bouvier, 1940: 124, fig. 82; Zariquiey Alvarez, 1946: 114, fig. 14; Barnard, 1950: 423, fig. 79a.

Dardanus arrosor– Gee, 1925: 159; Schmitt, 1926: 40, fig. 69; Hale, 1927: 93, fig. 89; Makarov, 1938: 168, pl. 1, fig. 1; Forest, 1955: 90, fig. 19; Holthuis & Gottlieb, 1958: 69, pl. 1, fig. 4; Miyake, 1965: 643, fig. 1077; Forest & de Saint Laurent, 1968: 91, pl. 1, figs. 1, 3; Zariquiey Alvarez, 1968: 241, fig. 90 m; Holthuis & Sakai, 1970: 96, pl. 7, fig. 1; Suzuki, 1971: 96, pl. 33, fig. 2; Kim, 1973: 200, 595, pl. 4, fig. 18; Miyake, 1975: 327, pl. 114, figs. 1, 7; Miyake, 1978: 58, fig. 20, pl. 1, fig. 5; Ross, 1979: 1182, fig. 1A-F; Miyake, 1982: 102, pl. 36, fig. 5; Baba, 1986: 185, 295, fig. 133; Foo & Yu, 1988: 117, pl. 1C; Wang, 1991: 238, fig. 198; Yu & Foo, 1991: 25, unnumbered fig.; Wang, 1992: 61 (list); Asakura, 1995: 357, pl. 95, fig. 1; Wang, 1995: 569 (list); Sakai, 1999: 11, pl. 4D.

Aniculus typicus– Heller, 1865: 90; Miers, 1876: 64; Filhol, 1885: 424; Thomson, 1899: 184 [not *Aniculus typicus* Dana, 1852a].

Aniculus aniculus– Chilton, 1911: 300 [not *Aniculus aniculus* (Fabricius, 1787)].

Aniculus chiltoni Thompson, 1930: 265, pl. 41, fig. a-e.

Material examined.– Hepingdao, Keelung, 27 Apr 1993: 1 male (32.0 mm), (NTOU); Keelung fishing port, 2 Mar 1992: 1 male (23.0 mm), (NTOU); Keelung, 10 May 1974: 3 males (13.4-21.9 mm), 1 female (12.3 mm), (NTOU); Dasi fishing port, Yilan County, 22 Sep 1984: 1 male (23.1 mm), (NTOU).– 20 Apr 1986: 1 male (22.0 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 5 Mar 1991: 1 male (20.2 mm) (NTOU); Toucheng, Yilan County, 19 Mar 1973: 1 male (33.5 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2004: 1 male (3.7 mm), (NTOU); CH 257, 24°30.09'N, 121°54.91'E, 200-157 m, 27 Aug 2004: 1 male (13.4 mm), 2 females (18.0, 21.0 mm), (NTOU); CH258, 24°30.47'N, 121°54.33'E, 173-225 m, 28 Aug 2004: 1 male (10.5 mm), 6 females (10.0-22.0 mm), (NTOU); CH259, 24°29.53'N, 121°55.13'E, 231-193 m, 28 Aug 2004:1 female (20.5 mm), (NTOU); CH260, 24°30.69'N, 121°54.43'E, 207-175 m, 29 Aug 2004: 2 males (15.5, 22.0 mm), 2 females (15.0, 19.0 mm), (NTOU); no specific locality: 1 female (11.2 mm), (NTOU).– 1 male (2-.4 mm), (NTOU).– 1 male (13.1 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum obsolete. Ratio of ocular peduncular length to shield length decreasing with animal size; corneal diameter approximately 0.3 of peduncular length; ocular acicles with anterior margins obliquely truncate, multispinose. Lengths of antennular and antennal peduncles varying greatly in relation to ocular peduncles in accordance with animal size, shorter in smaller individuals; antennal acicles elongate, denticulate. Chelipeds asymmetrical, left clearly larger; carpi and chelae ornamented with sinuous, quite short, arched, and somewhat contiguous transverse striations, fringed anteriorly with short setae, generally giving somewhat squamiform appearance, striations also armed with corneous spinules, corneous-tipped spines along upper margins of segments. Second and third pereopods with dactyls usually somewhat longer than propodi; carpi, dactyls and propodi all with transverse, setose striations,

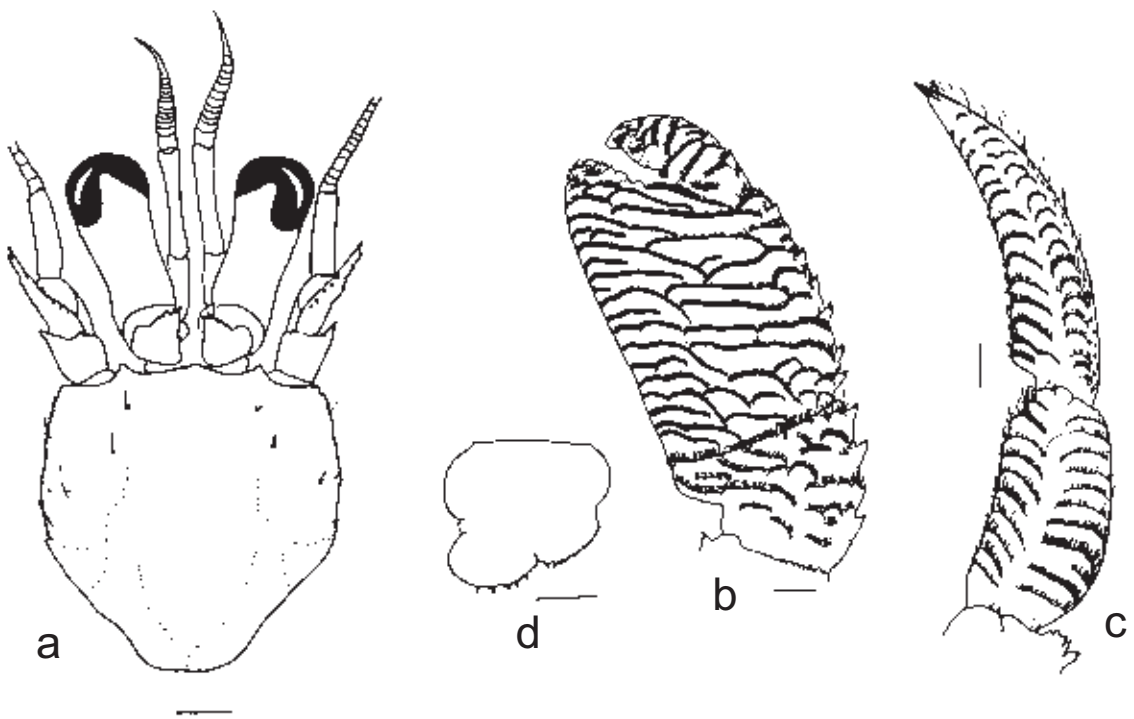
largely interrupted on inner faces; enlarged, regularly convex outer face of propodus of left third pereopod with 2 series of striations disposed 1 on each side of narrow, longitudinal, naked band; dactyl similar, with striations forming 2 series, separated by longitudinal groove; carpi each with row of corneous-tipped spines on dorsal margin. Telson with posterior lobes separated by median cleft, left slightly larger; terminal margins each with 5 or 6 strong spines and long setae.

Size.– Maximum reported shield length 75.0 mm.

Coloration.– Overall reddish-brown. Ocular peduncles each with 2 dark red bands. Anterior margins of meri of chelipeds and ambulatory legs each with red bands.

Habitats.– Variety of gastropods frequently encrusted with one or more anemones; often found on sandy-mud substrates.

Distribution.– Mediterranean and Red Seas, West and South Africa, Philippine Islands, Taiwan, Japan, East China Sea and Korea Strait, Australia, New Zealand; 30-290 m.



Female (11.2 mm), no specific locality: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped (outer face); **c**, dactyl and propodus of left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 2 mm.

Dardanus deformis (H. Milne Edwards, 1836)

Lanyu, Taitung County, 30 Mar 1998.

Pagurus deformis H. Milne Edwards, 1836: 272, pl. 13, fig. 4; Miers, 1874: 3, pl. 2, fig. 3; Hilgendorf, 1879: 818, pl. 3, figs. 6, 7; Zehntner, 1894: 191, pl. 8, fig. 20; Alcock, 1905: 88, pl. 9, fig. 4; Maki & Tsuchiya, 1923: 100, pl. 9, fig. 2; Boone, 1935: 28, pl. 5; Yap-Chiongco, 1938: 195, pl. 1, fig. 10; Fize & Serène, 1955: 199, figs. 31, 33E, F, pl. 4, fig. 6.

Pagurus cultratus White, 1847a: 60, nomen nudum.

Pagurus cavipes White, 1847b: 122.

Pagurus difformis– Dana, 1852b: 449; Stimpson, 1907: 204 (misspelling).

Pagurus biformis– Yap-Chiongco in Estampador, 1937: 502 (misspelling).

Pagurus bifermis– Yap-Chiongco in Estampador, 1937: 502 (misspelling).

Pagurus cultrerus– Yap-Chiongco in Estampador, 1937: 502 (misspelling).

Dardanus deformis– Edmondson, 1925: 24; Lee, 1969: 47; Sakai, 1973: 49; Miyake, 1982: 108, pl. 36, fig. 4; Wang, 1992: 61 (list); Asakura, 1995: 357, pl. 95, fig. 3; Tudge, 1995: 23, fig. 9, pl. 3, fig. D; Wang, 1995: 569 (list); McLaughlin & Hogarth, 1998: 11, pl. 1, fig. E, F.

Material examined.– SiaoLiouciou, Pingtung County, 8 Jan 1993: 1 ovig. female (10.2 mm), (NTOU); South Bay, Pingtung County, 25 Mar 1995: 1 female (10.9 mm), (NTOU); Wukan, Penghu County, 20 Apr 2002: 1 female (10.5 mm), (NTOU).– 21 May 2002: 1 female (12.0 mm), NTOU); no specific locality: 1 female (7.1 mm), (NTOU).

Diagnosis.– Ocular peduncles short, broadened distally, corneas approximately half peduncular length;

ocular acicles multispinose. Antennular peduncles overreaching distal corneal margins by 0.2-0.5 lengths of ultimate segments. Left cheliped massive; upper margin of palm with row of spines, outer face with 2 or 3 parallel rows of tubercles or granules in upper third. Upper margins and outer faces of dactyl and palm of right chela each with 2 or 3 rows of small spines and tufts of long setae. Dactyl and propodus of left third pereopod considerably broader than right; dactyl slightly longer than propodus, lateral surface concave, unarmed, but ventrolateral margin somewhat elevated, dorsolateral and ventrolateral margins each with crenulate crest; propodus with unarmed lateral face concave dorsally and ventrally and convex medianly, dorsolateral and ventrolateral margins crenulate, each often forming crest. Telson with markedly asymmetrical posterior lobes, left largest; terminal margins of each armed with several spines or spinules.

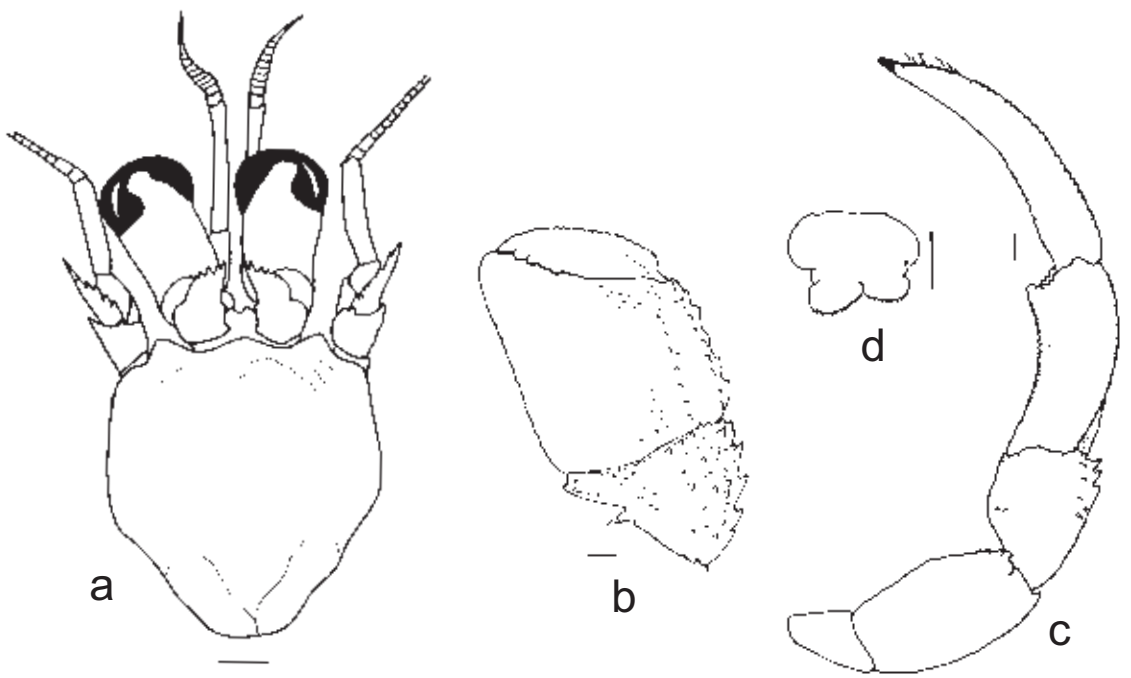
Size.– Maximum recorded shield length 12.0 mm.

Coloration.– Carapace mottled brownish-green and white. Ocular peduncles white or cream with two brown, olive or blackish transverse bands. Chelipeds often grayish-olive on upper and inner faces, remainder creamy white to pinkish-white, frequently also with small irregular orange spots. Ambulatory legs creamy white to grayish-olive, often with faint orange spots; carpi and meri each usually with proximal brown transverse band; third often with two faint darker stripes on lateral faces.

Habitat.– Sandy substrates of lower shores and shallow sublittoral; shells commonly with anemones attached.

Distribution.– East Africa, Seychelles, Madagascar, Reunion, Mauritius, Red Sea to Hawaii, Taiwan, Philippine Islands, Australia; intertidal and shallow subtidal.

Remarks.– This is the first report of *Dardanus deformis* in Taiwanese waters.



Female (12.0 mm), Wukan, Penghu County: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Scales equal 2 mm.

Dardanus gemmatus (H. Milne Edwards, 1848)

Hongchaikeng, Kending, Pingtung County, 9 Sep 2005.

Pagurus gemmatus H. Milne Edwards, 1848: 60; Forest, 1953b: 557, figs. 10, 11.

Neopagurus sp.– Kamalaveni, 1950: 85.

Dardanus gemmatus– Holthuis, 1953: 48; Tinker, 1965: 50, unnumbered fig.; Ross & Sutton, 1968: 380, fig. 1; Ross, 1970: 351, pl. 1, figs. 1-6, pl. 2, figs. 7-12; Ross, 1975: 160, fig. 1a-d; Johnson, 1981: 355, unnumbered figure; Miyake, 1982: 108, pl. 36, fig. 5; Foo & Yu, 1988: 116, pl. 1, fig. A; Yu & Foo, 1991: 30, unnumbered fig.; Poupin, 1994: 32, fig. 18, pl. 2, fig. e.

Dardanus tinctor– Sakai, 1973: 49, unnumbered fig.; Miyake, 1978: 55 (key) [not *Dardanus tinctor* (Forskål, 1775)].

Material examined.– Hualien County: 1 male (22.7 mm), (NTOU); Tongsiao, Miaoli County: 1 male (13.2 mm), (NTOU); Singda Harbor, Kaohsiung County, 23 Mar 1985: 1 male (19.2 mm), (NTOU); Hungchikan, Kending, Pingtung County, 9 Sep 2005: 1 ovig. female (14.2 mm), (NTOU); Guoye, Penghu County, 22 May 1992: 1 female (9.0 mm), (NTOU).– no specific date: 1 male (10.5 mm), (NTOU); Wukan, Penghu County, 15 May 2002: 1 male (14.6 mm), (NTOU); no specific locality: 1 male (13.0 mm), (NTOU).– 1 female (9.7 mm), (NTOU).

Diagnosis.– Ocular peduncles very stout, shorter than antennular and antennal peduncles; corneas dilated, occupying more than 0.3 of peduncular length; ocular acicles each with few spinules. Left cheliped massive; upper margin of dactyl without distinct sharp crest, but with longitudinal rows of tubercles; outer surface of palm entirely covered with blunt tubercles, upper margin with slightly larger tubercles or blunt

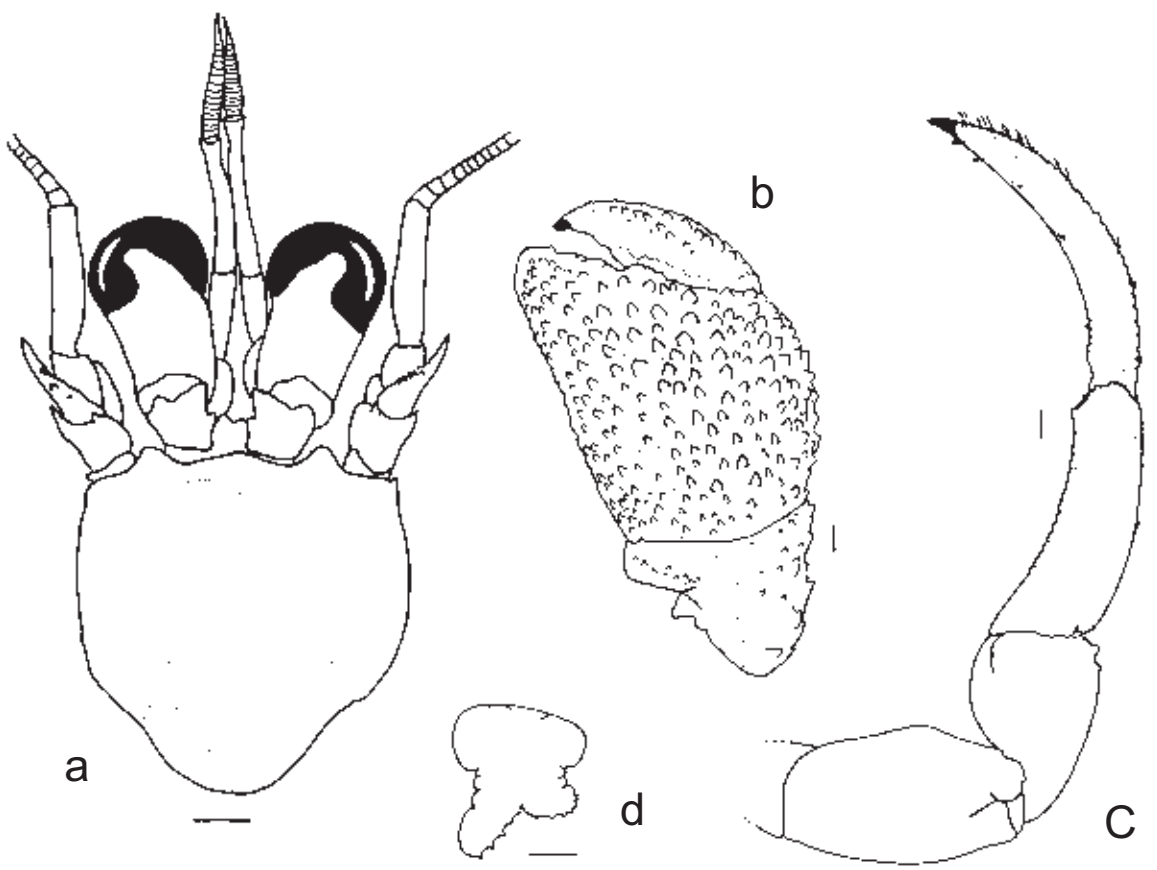
spines; upper margin of carpus with 4 or 5 strong, blunt spines. Left third pereopod with dorsal margin of dactyl serrate; short broad propodus with dorsolateral margin well defined, angular. Telson with markedly asymmetrical posterior lobes, left largest; terminal margins of each armed with several spines or spinules.

Size.– Maximum recorded shield length 26.0 mm.

Coloration.– Generally orange, reddish-orange, or maroon with some regions of violet on appendages, particularly on upper margins of carpi of chelipeds. Ocular peduncles red or maroon, each with median thin band of white.

Habitat.– Found on the outer edges of reefs occupying a variety of gastropod shells, but particularly shells of *Tonna* and *Charonia*, and usually in association with anemones.

Distribution.– Indian Ocean to French Polynesia including Japan and Taiwan, Hawaii; 10-50 m, possibly to 100 m.



Male (13.2 mm), Tongsiao Miaoli County: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Dardanus pedunculatus (Herbst, 1804)

Shen-ao, Taipei County, 3 Aug 1997.

Cancer pedunculatus Herbst, 1804: 25, pl. 61, fig. 3.

Pagurus pedunculatus– Olivier, 1811: 647.

Pagurus pedunculatus var. *varipes*– Hilgendorf, 1879: 815.

Pagurus asper De Haan, 1849: 208, pl. 49, fig. 4; Alcock, 1905: 90, pl. 9, fig. 5; Yap-Chiongco, 1938: 197, pl. 1, fig. 14.

Pagurus sigmoidalis Zehntner, 1894: 192, pl. 8, fig. 191, 191b.

Dardanus haani Rathbun, 1903: 34; Maki & Tsuchiya, 1923: 101, pl. 10, fig. 3; Miyake, 1965: 644, fig. 1083.

Neopagurus horai Kamalaveni, 1950: 83, figs. 2a-c, 3.

Pagurus haani– Laurie, 1926: 158; Fize & Serène, 1955: 207, figs. 32, 33, pl. 4.

Pagurus varipes– De Man, 1888b: 436; Henderson, 1893: 420; Alcock, 1905: 90, pl. 9, fig. 7 [not *Pagurus varipes* Heller, 1861].

Dardanus pedunculatus: Lewinsohn, 1969: 29, pl. 1, fig. 3; Miyake, 1978: 60, fig. 21; Miyake, 1982: 108, pl. 36, fig. 6; Foo & Yu, 1988: 120, pl. 2, fig. E; Yu & Foo, 1991: 33, unnumbered fig.; Wang, 1992: 61 (list); Asakura, 1995: 358, pl. 95, fig. 8; Wang, 1995: 569 (list); McLaughlin & Hogarth, 1998: 11, pl. 1, fig. C, D.

Not *Pagurus pedunculatus*– Ortmann, 1894: 31; Barnard, 1950: 429, fig. 79a [= *Dardanus tinctor* (Forskål, 1775)].

Material examined.– Shen-ao, Taipei County, 3 Aug 1997: 1 male (11.8 mm), (NTOU); Yeliou, Taipei

County: 1 female (damaged), (NTOU); Beiguan fishing port, Yilan County, 20 Jun 1991: 1 ovig. female (12.9 mm), (NTOU); Dasi fishing port, Yilan County, 15 Apr 1993: 1 female (18.5 mm), (NTOU).– 29 Jan 1988: 1 male (23.0 mm), (NTOU); Lanyu, Taitung County, 30 Mar 1996: 1 female (7.3 mm), (NTOU); Nanliao fishing port, Hsinchu, 3 Apr 1988: 1 male (19.9 mm), (NTOU); Cijin fishing port, Kaohsiung, 6 Jan 1993: 1 male (13.5 mm), (NTOU); Singda Harbor fishing port, Kaohsing County, 2 males (damaged), (NTOU); Kending, Pingtung County, 28 Aug 1999: 1 male (3.9 mm), (NTOU); no specific locality: 1 male (6.0 mm), (NTOU).– 1 male (18.4 mm), (NTOU).

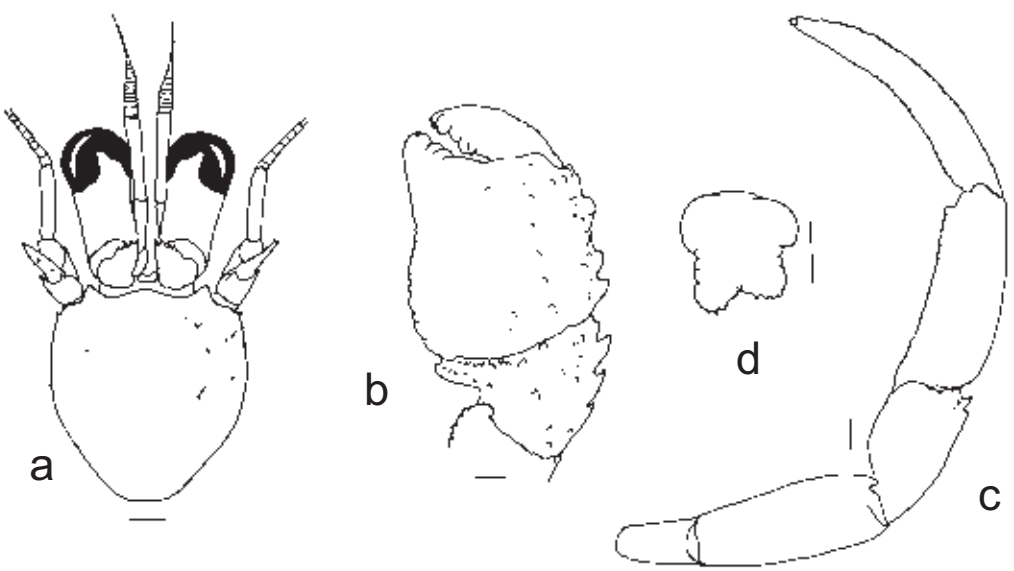
Diagnosis.– Ocular peduncles short, stout; corneas not or only slightly dilated, diameter approximately 0.3 of peduncular length; ocular acicles subtriangular to subquadrate, each with several marginal spines. Antennular and antennal peduncles both overreaching distal margins of corneas. Chelipeds very unequal; palm of left chela with ventral margin sinuous and tuberculate, outer surface with lower half nearly smooth, upper half with longitudinal rows of tubercles separated by shallow furrows, upper margin with strong spinulose tubercles or blunt spines; carpus with few spines or spinulose tubercles on upper margin and outer face. Ambulatory legs with dactyls longer than propodi; left third pereopod with dorsal and ventral margins of dactyl armed with very small spinules, lateral face with strong longitudinal carina in proximal half; propodus with dorsolateral margin rounded or acute, lateral face convex, ventral margin with row of small, closely-spaced tubercles. Pleon in adult with spur developed between third and fourth pleopods, and often also between second and third. Posterior lobes of telson separated by narrow median cleft, left elongate; distal margins each with long setae.

Size.– Maximum recorded shield length approximately 25.0 mm.

Coloration.– Carapace reddish-brown or light purple in anterior half. Ocular peduncles dark brown to reddish-brown, each with white band at midlength and at base of peduncle. Chelipeds with chelae reddish-purple, sometimes very faintly purple to tan; carpi deep purple to bluish-green. Ambulatory legs reddish-brown to brownish-tan; carpi and propodi reddish-brown to purple.

Habitat.– Sandy substrates, commonly inhabiting turban shells usually encrusted with anemones.

Distribution.– Southern Japan to Ryukyu Islands, Japan, Taiwan, Philippine Islands, Seychelles, Indonesia, Hawaii, Australia; 10-100 m.



Male (6.0 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Dardanus impressus (De Haan, 1849)

Dasi fishing port, Yilan County, 14 Dec 2006.

Pagurus impressus De Haan, 1849: 204, 207, pl. 3; Balss, 1913: 46, figs. 30, 31.

Dardanus impressus– Rathbun, 1903: 34; Maki & Tsuchiya, 1923: 102, pl. 9, fig. 5; Miyake, 1965: 645, fig. 1084; Lee, 1969: 47; Kim, 1973: 202, pl. 4, fig. 19, fig. 36; Miyake, 1978: 65, fig. 24; Miyake, 1982: 109, pl. 37, fig. 1; Baba, 1986: 189, 297, fig. 136; Foo & Yu, 1988: 119, pl. 2D; Wang, 1991: 239, fig. 200; Yu & Foo, 1991: 29, unnumbered fig.; Wang, 1992: 61 (list); Wang, 1995: 569 (list).

Material examined.– Dasi fishing port, Yilan County, 29 Jul 1984: 2 males (11.0, 13.0 mm), (NTOU).– 4 Oct 1984: 2 males (11.0, 13.8 mm), (NTOU).– 8 Mar 1986: 1 male (14.0 mm), 2 females (6.3, 8.3 mm), (NTOU).– 12 Jan 1988: 6 males (9.4-14.0 mm), 2 females (9.9, 9.9 mm), (NTOU).– 8 Oct 1990: 1 male (6.0 mm), (NTOU).– 13 Mar, 1992: 7 males (7.7-14.3 mm), 2 females (7.9, 8.0 mm), (NTOU).– 22 Feb 1994: 1 female (8.1 mm), (NTOU).– 25 Nov 1994: 1 male (18.3 mm), (NTOU).– 20 Jul 1995: 1 male (8.1 mm), (NTOU).– 1996: 1 male (15.0 mm), (NTOU).– 28 Jan 1997: 1 male (8.0 mm), (NTOU).– 11 Mar 1997: 1 female (8.3 mm), (NTOU).– 27 May 1997: 4 males (5.7-16.6 mm), 1 female (3.8 mm), 2 ovig. females (8.0, 8.4 mm), (NTOU).– 17 Dec 2004: 1 female (6.2 mm), (NTOU).– 5 Mar 2005: 2 males (11.7, 12.5 mm), (NTOU).– 14 Feb 2006: 4 males (5.3-15.6 mm), (NTOU).– no specific date: 1 male (7.8 mm), (NTOU).– no specific date: 1 ovig. female (5.1 mm), (NTOU).– no specific date: 1 ovig. female (6.8 mm), (NTOU); Nanfang-ao fishing port, Yilan County, Dec 1987: 3 males (10.2-15.7 mm), 3 females (7.7-8.0 mm), (NTOU).– 28 May 1997: 1 ovig. female (7.9 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County: 2 males (7.1, 8.1 mm), (NTOU); CP79, 24°50.36'N, 121°59.93'E, 145-200 m, 8 May 2001: 1 male (8.2 mm),

(NTOU); no specific locality: 1 male (12.8 mm), (NTOU).– 1 male (18.4 mm), (NTOU).– 5 males (5.5-8.7 mm), 1 female (6.3 mm), (NTOU).– 13 Mar 1992: 1 male (12.7 mm), (NTOU).

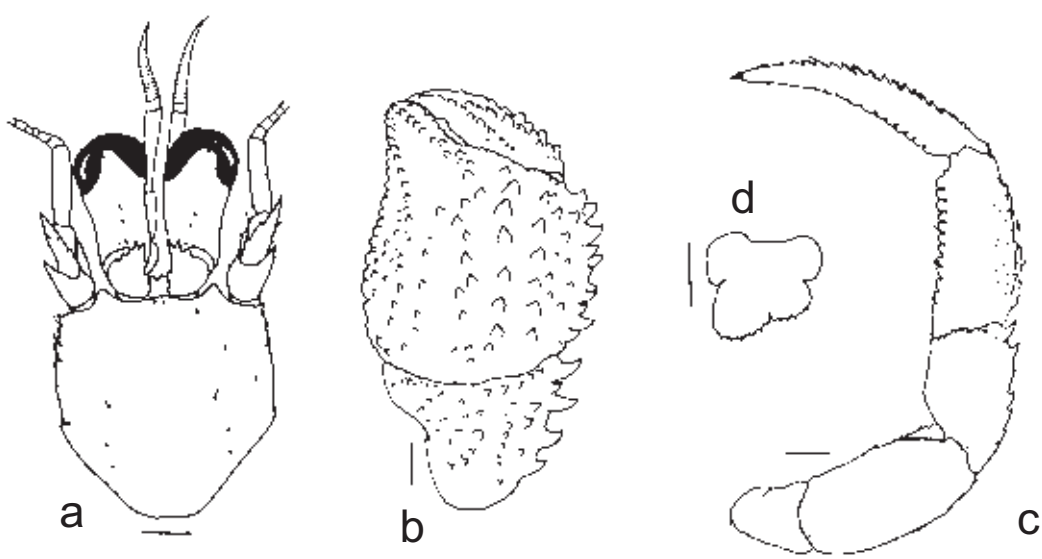
Diagnosis.– Ocular peduncles stout, shorter than antennal peduncles; corneas occupying approximately 0.3-0.5 peduncular length; ocular acicles moderately broad, multispinose. Antennal acicle moderately slender, usually with 3 spines on mesial margin, lateral margin with 1 spine subdistally. Chelipeds unequal, left much larger, not hirsute; palm with several longitudinal rows of blunt or spinose tubercles or spines on outer and upper surfaces, dactyl with 2 rows of spines or tubercles, fixed finger with deep wedge or horseshoe-shaped concavity between tubercular or spinose ridges. Ambulatory legs with dactyls longer than propodi; left third pereopod differing distinctly from right and second pereopods; propodus broad, lateral face with median rounded longitudinal carina, 1 or 2 rows of spines or tubercles on or near dorsal margin, row of blunt spines or large tubercles ventrally or ventromesially; dactyl with longitudinal sulcus on lateral face, dorsal and ventral margins with acute or subacute spines or tubercles. Posterior lobes of telson with 3 or 4 small spinules on each terminal margin.

Size.– Maximum recorded shield length approximately 19 mm.

Coloration.– Shield brownish-purple or light yellowish-red. Ocular acicles, antennules and antennae light brownish-purple. Ocular peduncles pinkish-orange, each with two red bands. Chelae varying from whitish-pink with reddish-orange dactyls and fixed fingers to reddish-vermillion or yellowish-red, tubercles and spines purple to dark violet. Carpi and meri of chelipeds dark to light violet or purplish-red. Ambulatory legs with dactyls uniformly reddish-orange; propodi and carpi pinkish-white with large median area of reddish-orange on each lateral face; meri pinkish-white, each with two reddish-vermillion, red or reddish-orange bands on lateral face.

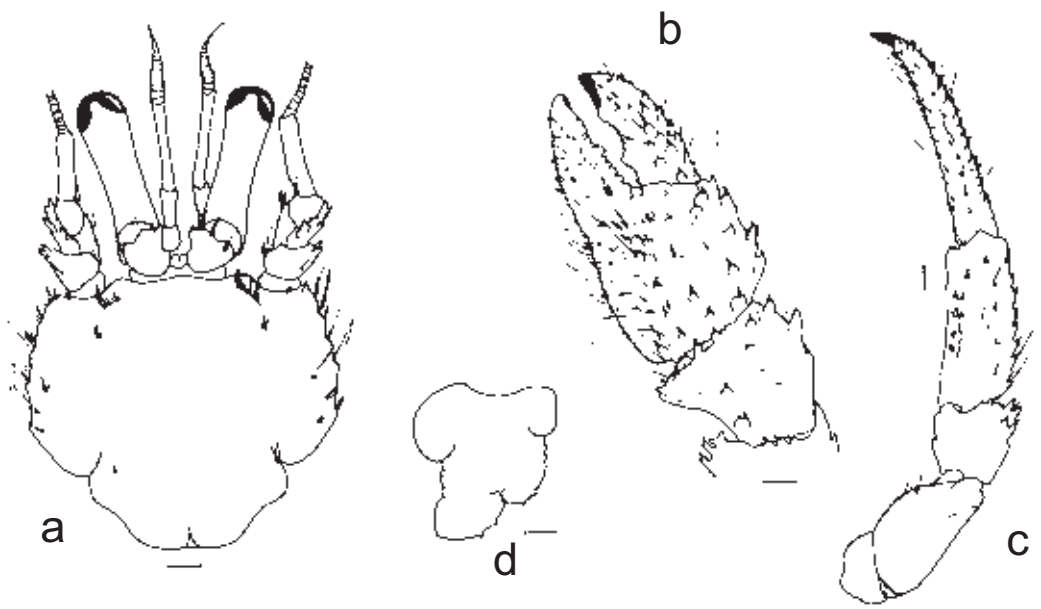
Habitat.– Found on sandy, muddy and rocky bottoms.

Distribution.– Japan from Sagami Bay southwards to Kyushu, Ogasawara Islands, Taiwan; 22-145 m, possibly to 200 m.



Male (8.2 mm), CP79: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped (outer face); **c**, left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 2 mm.

Dardanus hessii (Miers, 1884)



Ovig. female (14.0 mm), no specific locality: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped (outer face); **c**, left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 2 mm.

Pagurus hessii Miers, 1884: 264, pl. 28, fig. 4; Alcock, 1905: 93, pl. 8, fig. 4.

Pagurus similimanus Henderson, 1888: 59, pl. 6, fig. 6.

Clibanarius striolatus– Chilton, 1911: 552 [not *Clibanarius striolatus* Dana, 1852b].

Pagurus hessi– Fize & Serène, 1955: 158, fig. 34, pl. 4.

Dardanus hessii– Lee, 1969: 46; Wang, 1991: 249, fig. 201; Wang, 1992: 61 (list); Wang, 1995: 569 (list); Forest & McLaughlin, 2000: 85, fig. 27.

Pagurus semilimanus– Yap-Chiongco in Estampador, 1937: 503; Estampador, 1959: 51 (misspelling of *Pagurus similimanus* Henderson, 1888).

Material examined.– No specific locality: 1 ovig. female (14.0 mm), (NTOU).

Diagnosis.– Ocular peduncles often broadened distally, usually shorter than extended antennular peduncles and nearly as long as antennal peduncles; antennal acicles sometimes extending beyond bases of fifth peduncular segments. Chelipeds subequal and similar; outer surface of carpus of left cheliped with 3 longitudinal rows of spines; outer surfaces of palm and fingers spinose, 3 to 4 very conspicuous longitudinal rows of spines on palm, long bristles present on chelipeds and ambulatory legs not obscuring sculpture. Ambulatory legs similar; carpi, propodi and dactyls prominently spinose dorsally; dactyls considerably longer than propodi; propodus of the third left leg approximately 0.3 as broad as long. Telson with asymmetrical posterior lobes separated by shallow median cleft; terminal margins each with row of corneous spines extending onto lateral margins.

Size.– Maximum recorded shield length 17.6 mm.

Coloration.– Shield with general tint of deep gray-green mixed with violet and yellow-ocher.

Antennular and antennal peduncles pale grayish-green; setae on acicle and first antennal segments bright carmine. Ocular peduncles with broad longitudinal stripe of green-gray dorsally outlined in white, with white continuing to outline base of cornea, laterally and mesially an additional stripe of violet-carmine. Chelipeds with meri pale gray-violet mixed with patches of yellow-ocher, one more or less transverse band of bright yellow-ocher distally, spines carmine distally, setae carmine and yellow, points black. Ambulatory legs with meri marked proximally by transverse band of yellow much less developed medianly and distally and separated by two transverse bands of violet-gray; carpi violet-gray mixed with yellow; propodi with yellow tint proximally and dorsally, violet distomesially; dactyls gray. Setae of all segments carmine except bright yellow band of dense setae on dorsodistal 0.7 of dactyl of left third pereopod (after Fize & Serène, 1955).

Habitat.– Gastropod shells on muddy substrates.

Distribution.– Gulf of Oman, Indian Ocean, Maldives and Andaman Sea, Indonesia, Arafura Sea, Vietnam, Taiwan; 15-55 m, possibly to 80 m.

Remarks.– Although not included by either Foo & Yu (1988) or Yu & Foo (1991), Wang (1992, 1995) included *Dardanus hessii* in his lists of *Dardanus* species occurring in Taiwan. This species is now formally reported from Taiwan.

Dardanus guttatus (Olivier, 1811)

Hongchaikeng, Kending, Pingtung County, 9 Sep 2005.

Pagurus guttatus Olivier, 1811: 640; Quoy & Gaimard, 1824: 533, pl. 79, fig. 3; Guérin Méneville, 1829, pl. 16, fig. 2; Dana, 1852b: 451; Dana, 1855, pl. 28, fig. 3a, b; Alcock, 1905: 87, pl. 9, fig. 1; Yap-Chiongco, 1938: 200, pl. 1, fig. 13; Fize & Serène, 1955: 173, figs. 26A-C, 27C, D, pl. 5, figs. 1-3.

Pagurus setifer– Hess, 1865: 35; Hilgendorf, 1879: 815, pl. 3, fig. 8; Haswell, 1882: 154; De Man, 1887: 433; Ortmann, 1892: 287; Ortmann, 1894: 30; Borradaile, 1898: 460; Borradaile, 1900: 396, 425 [not *Pagurus setifer* H. Milne Edwards, 1836].

Dardanus guttatus– Holthuis, 1953: 48; Lee, 1969: 49, fig. 8; Miyake, 1982: 109, pl. 37, fig. 3; Foo & Yu, 1988: 118, pl. 2A; Yu & Foo, 1991: 28, unnumbered fig.; Tudge, 1995: 24, pl. 3, fig. E; McLaughlin & Hogarth, 1998: 14, pl. 1, fig. E, F; Wang, 1995: 259 (list).

Dardanus quthatus– Wang, 1992: 61 (list) (misspelling).

Not *Pagurus guttatus*– Miers, 1884: 555.

Material examined.– Keelung, 10 Aug 1983: 1 male (23.3 mm), (NTOU); Lanyu, Taitung County, 27 Mar 1998: 1 male (9.9 mm), 1 female (5.7 mm), (NTOU).– no specific date: 1 male (10.4 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 9 Sep 2005: 2 males (5.5, 12.2 mm), (NTOU); Hou Bay, Kending, Pingtung County, 3 Nov 1996: 1 female (9.4 mm), (NTOU); Jioupeng, Pingtung County: 1 male (5.7 mm), (NTOU), 6 May 1992; Wukan, Penghu County, 20 Apr 2002: 1 male (7.1 mm), (NTOU).– 28 May 2002: 1 ovig. female (17.7 mm), (NTOU).

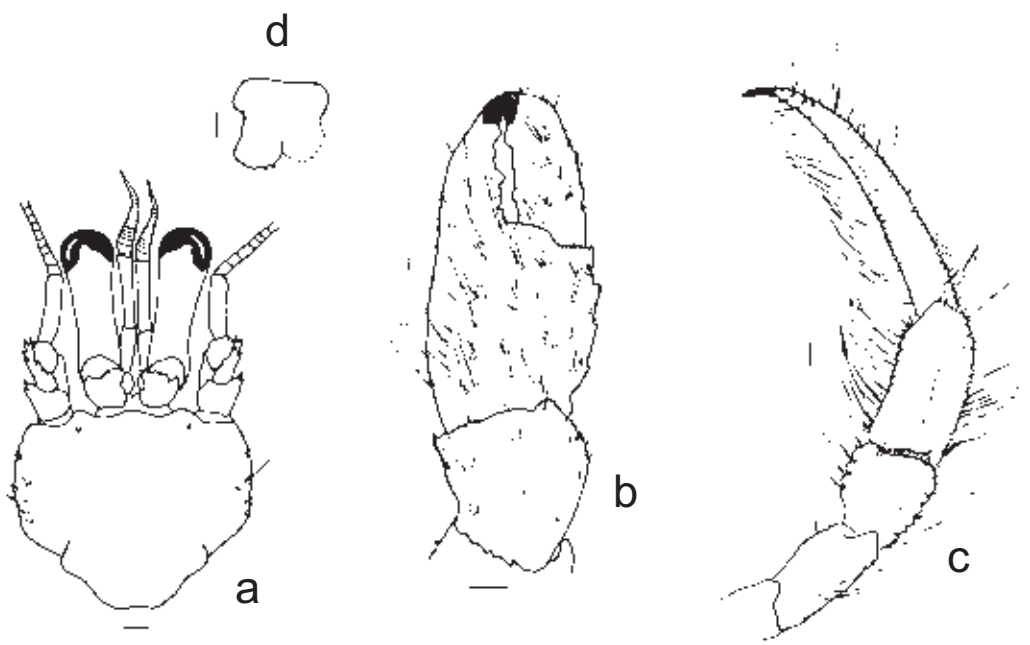
Diagnosis.– Carapace and pleon markedly flattened. Ocular peduncles broadened distally, overreaching antennular and antennal peduncles; corneas occupying less than 0.2 of peduncular length. Left cheliped larger but not massive and not much longer than right; outer faces of dactyl, fixed finger and palm each with rows of acute, usually dark-tipped spines, often obscured by tufts of very long, pinnate setae. Lateral face of propodus of left third pereopod with broad longitudinal groove in dorsal 0.3, dorsal margin with row of closely-spaced, rectangular scutes and tufts of very long, dense, pinnate setae, ventral 0.6-0.7 rounded and marked by transverse incisions and row of scutes ventrally often obscured by tufts of long, dense, pinnate setae; dactyl slender and approximately twice as long as propodus; lateral face with deep longitudinal groove, dorsal margin with row of subquadrate scutes and tufts of dense, pinnate setae, ventrolateral surface with row of semicircular, usually slightly overlapping scutes in proximal 0.8; ventral margin with row of scutes often obscured by tufts of long, dense, pinnate setae; setae of other pereopods much less dense. Telson asymmetrical, left posterior lobe considerably larger; terminal margins each armed with 5 or 6 sharp, ventrally directed, and often dark-tipped, spines.

Size.– Maximum recorded shield length approximately 23.3 mm.

Coloration.– Shield primarily blue to greenish-blue; posterior carapace mottled reddish-purple to pale tan or pink. Ocular peduncles brownish-green to pinkish, reddish-purple or deep brownish-red, each with narrow white ring adjacent to cornea. Chelipeds deep reddish-purple with white spots; dorsal surface of each carpus with large blue to dark greenish-blue spot covering most of segment; setae reddish-purple with white tips. Ambulatory legs reddish-purple with white spots; carpi each with large dark greenish-blue spot like those of chelipeds.

Habitat.– Deep tide pools with hard substrates; reef-crests. Appears to prefer shells of the family Conidae.

Distribution.– East coast of Africa, Madagascar, Indian Ocean, Indonesia, South China Sea, Taiwan, New Guinea, Australia, Samoa, Loyalty Islands; intertidal to shallow subtidal.



Male (7.1 mm), Wukan, Penghu County, 20 Apr 2002: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Dardanus lagopodes (Forskål, 1775)

Haikou, Kending, Pingtung County, 8 Sep 2005, “red-knee” form.

Hongchaikeng, Kending, Pingtung County, 9 Sep 2005, “blue-knee” form.

Cancer lagopodes Forskål, 1775: 93.

Pagurus sanguinolentus Quoy & Gaimard, 1824: 532, pl. 79, fig. 2; Forest, 1953b: 559, figs. 12-14; Fize & Serène, 1955: 166, fig. 25A, B, C, pl. 4a, figs. 4, 5.

Pagurus affinis H. Milne Edwards, 1836: 274; H. Milne Edwards, 1837: 224.

Pagurus euopsis Dana, 1852b: 452; Dana, 1855: 10, pl. 28, fig. 6; Alcock, 1905: 86, pl. 9, fig. 2; Yap-Chiongco, 1938: 200, pl. 1, fig. 7.

Pagurus depressus Heller, 1861: 248.

Dardanus Hellerii Paul'son, 1875: 90, pl. 12, fig. 4, 4a-c.

Dardanus euopsis– Maki & Tsuchiya, 1923: 98, pl. 8, fig. 4.

Dardanus sanguinolentus– Forest, 1956: 49; Utinomi, 1956: 64, pl. 32, fig. 7; Miyake, 1965: 644, fig. 1081; Minei, 1973: 49, fig. 8.

Dardanus lagopodes– Lewinsohn, 1969: 32, pl. 2, figs. 1, 2; Lee, 1969: 50; Miyake, 1978: 55, fig. 19; Miyake, 1982: 110, pl. 37, fig. 4; Foo & Yu, 1988: 119, pl. 2C; Yu & Foo, 1991: 31, unnumbered fig.; Wang, 1992: 60 (list); Asakura, 1995: 357, pl. 95, fig. 6; Tudge, 1995: 25, fig. 10, pl. 3, fig. F; Wang, 1995: 569 (list).

Material examined.– Badouzih Keelung, 3.6 m, 14 Jul 2005: 1 female (3.4 mm), (NTOU); Hepingdao, Keelung, 27 Apr 1993: 1 male (14.5 mm), (NTOU); Mao-ao, Taipei County, 17 Aug 2006: 1 female (4.2 mm), (NTOU); Dayuan, Yilan County, 15 Mar 1989: 1 specimen not sexed (5.7 mm), (NTOU); Siaogang, Taitung County: 1 female (5.7 mm), 2 juveniles (about 2.5 mm), (NTOU); Haikou, Kending, Pingtung County, 8 Sep 2005: 1 female (7.2 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 23 Mar 2005: 1 female (8.7 mm), (NTOU).– 9 Sep 2005: 1 female (5.8 mm), (NTOU); Guoye, Penghu County, 24 Apr 1992: 1 male (9.2 mm), (NTOU).– 22 May 1992: 1 males (8.6 mm), (NTOU); Wukan, Penghu County, 15 May 2002: 1 ovig. female (15.2 mm), (NTOU); no specific locality: 3 males (9.0-13.0 mm), 1 ovig. female (10.0 mm), (NTOU).– 19 July 2003: 1 male (7.2 mm), (NTOU).

Diagnosis.– Carapace depressed. Ocular peduncles longer than antennular peduncles; decidedly broadened distally; corneas occupying no more than 0.2 of peduncular length. Left cheliped broad, but not massive, and not much longer than right; upper margin and outer surface of palm with rows of acute spines, not obscured by long setae. Dactyl of left third pereopod nearly equaling length of propodus, not laterally compressed, lateral face with median longitudinal groove flanked dorsally and ventrally by row(s) of strongly corneous-tipped spines or tubercles; propodus armed dorsally and ventrally with strongly corneous-tipped spines or tubercles, lateral face weakly concave and with median longitudinal row of long, stiff, simple setae. Telson asymmetrical; posterior lobes each with terminal row of corneous-tipped, ventrally directed spines, weaker on right, but extending further on lateral margin.

Size.– Maximum recorded shield length approximately 17.0 mm.

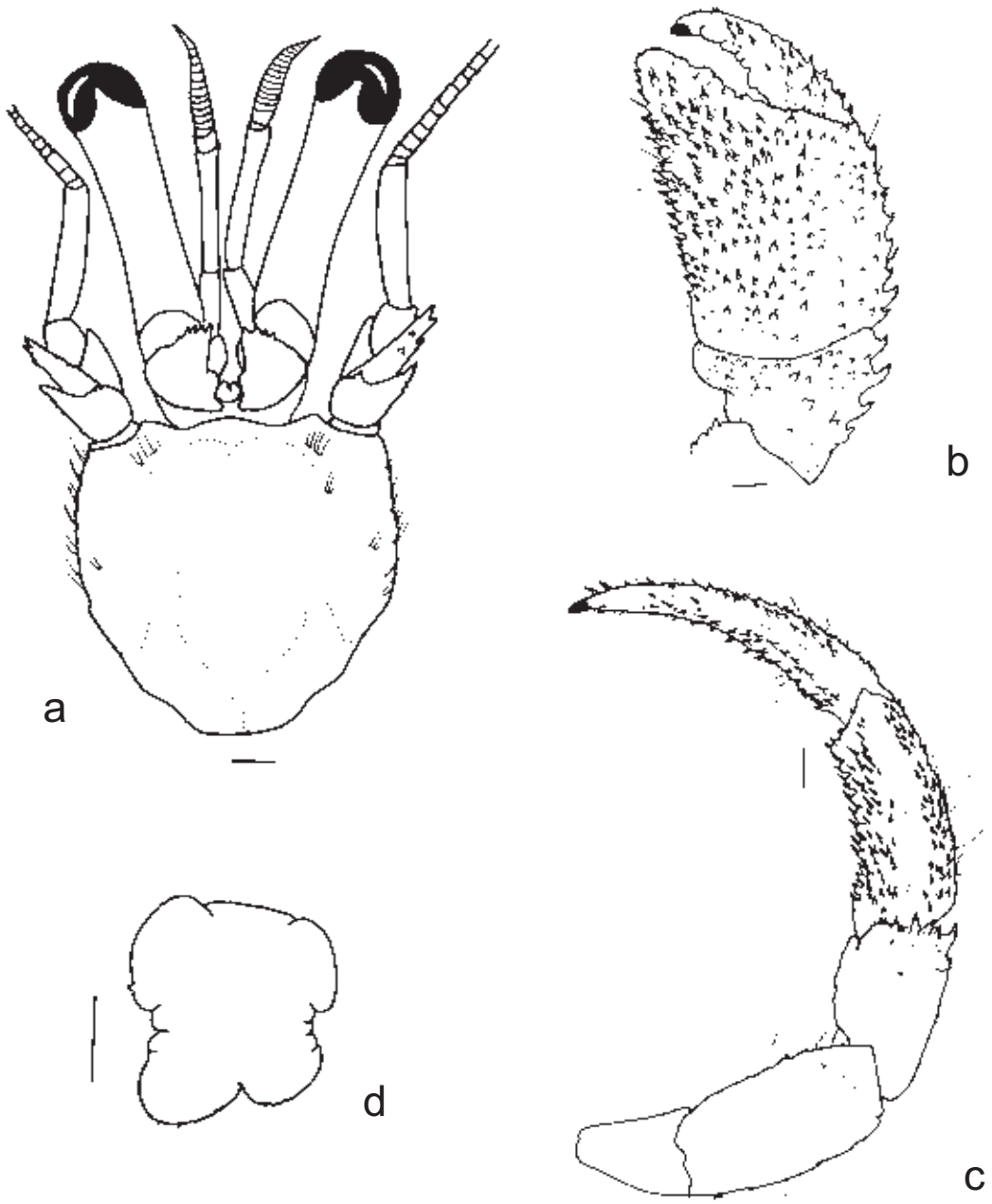
Coloration.– Carapace mottled red and white with purplish-red patch anteriorly. Ocular peduncles pinkish-gray to yellowish-brown with yellow band distally near cornea. Chelipeds generally mottled red, maroon, brown, orange and/or white; chelae reddish-orange to maroon on fingers and most of palms, carpi reddish-brown, each with large purplish-red or blue patch dorsally, meri reddish-brown to maroon and white. Ambulatory legs reddish-brown to maroon mottled with flecks of pale violet to grayish-purple; carpi each mostly reddish-brown dorsally with similar purplish-red or blue patch on segment. Setae red with cream tips.

Habitats.– Rocky shores and hard substrates of the shallow sublittoral, including coral heads in lagoons.

Distribution.– Red Sea, East Africa, Madagascar, Seychelles, Mauritius, southern India, Malaysia, Philippine Islands, Taiwan, Japan, New Guinea, Australia, Samoa, French Polynesia; intertidal to shallow

subtidal.

Remarks.– The two color forms of *D. lagopodes*, often referred to by field biologists as "*Dardanus* red-knee" and "*Dardanus* blue-knee", are thought by some carcinologists to represent two distinct species.



Male (7.2 mm), no specific locality, 19 Jul 2003: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of left cheliped (outer face); **c**, left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 1 mm.

Dardanus megistos (Herbst, 1804)

Donggang fishing port, Pingtung County, 27 Mar 1985.

Cancer megistos Herbst, 1804: 23, pl. 61, fig. 1.

Pagurus megistos– Olivier, 1811: 639; Barnard, 1950: 425, fig. 79c; Fize & Serène, 1955: 158, fig. 24, pl. 4, fig. A.

Pagurus punctulatus Olivier, 1811: 641; Quoy & Gaimard, 1824: 528, pl. 78, fig. 2; Dana, 1852b: 451; Dana, 1855, pl. 28, fig. 4a, b; Alcock, 1905: 81, pl. 8, fig. 1; Maki & Tsuchiya, 1923: 95, pl. 118, fig. 3; Yap-Chiongco, 1938: 197, pl. 1, fig. 3.

Pagurus spinimanus H. Milne Edwards, 1848: 61; Dana, 1852b: 452; Dana, 1855: pl. 28, fig. 5a-c.

Dardanus megistos– Rathbun, 1907: 205; Utinomi, 1961: 61, pl. 32, fig. 10; Tinker, 1965: 52, unnumbered fig.; Miyake, 1982: 110, pl. 37, fig. 6; Foo & Yu, 1988: 118, pl. 1, fig. D; Thomas, 1989: 68, pl. 2, fig. E; Yu & Foo, 1991: 32, unnumbered fig.; Poupin, 1994: 23, fig. 19, pl. 2 fig. g.; Asakura, 1995: 358, pl. 95, fig. 7.

Cancer magistes– Yap-Chiongco in Estampador, 1937: 503 (misspelling).

Dardanus megsitos– Ward, 1942: 64 (misspelling).

Dardanus spinimanus– Holthuis, 1953: 49.

Material examined.– Magang, Taipei County, 14 Jul 1984: 1 male (7.6 mm), (NTOU).– Jul 1984: 1 male (10.3 mm), (NTOU); Cijin fishing port, Kaohsiung: 1 male (24.4 mm), (NTOU), commercial trawler, 24 Jan 1992; Singda Harbor fishing port, Kaohsiung County, 23 Mar 1985: 1 male (8.2 mm), (NTOU); Wukan, Penghu County, 21 May 2002: 1 female (13.1 mm), (NTOU).

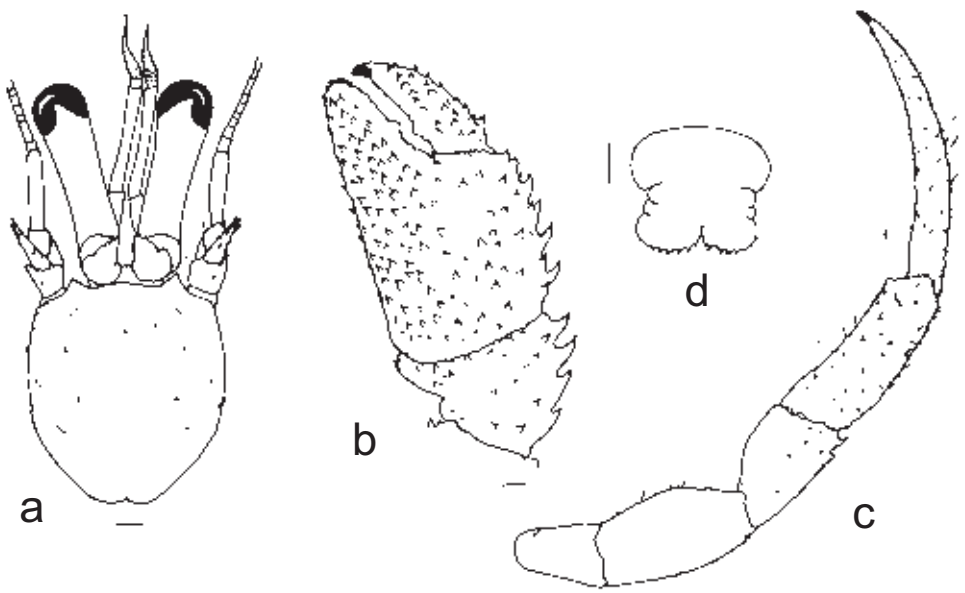
Diagnosis.– Ocular peduncles moderately long and slender; corneas only very slightly dilated, occupying less than 0.3 of peduncular length; ocular acicles subtriangular, setose and weakly spinose. Antennular peduncles reaching beyond distal margins of corneas. Antennal peduncles reaching approximately to bases of corneas; antennal acicle setose and slightly spinulose. Chelipeds and ambulatory legs, especially three distal segments each thickly covered with tufts of long bristles and corneous-tipped spines. Chelipeds grossly unequal, left larger. Left chela with row of large spines and adjacent slightly smaller row on upper margin; carpus with irregular row of 3 or 4 large spines on upper surface. Right cheliped with double row of prominent spines on upper margin of palm; outer surface with 2 rows of much smaller spines in dorsal half and rows of spinules in lower half. Ambulatory legs with dactyls longer than propodi; third left pereopod with maximum width of subcylindrical propodus between 0.2 and 0.4 maximum length, surfaces covered with moderately densely-packed, acute, often corneous-tipped spines. Telson with asymmetrical posterior lobes separated by moderately shallow median cleft; terminal margins each with row of corneous spines, not extending onto lateral margins.

Size.– Maximum recorded shield length approximately 40.0 mm.

Coloration.– Carapace bright reddish to brownish-orange, with numerous white spots ringed with black. Ocular peduncles bright reddish to grayish-blue, usually with few tiny darker spots. Chelipeds and ambulatory legs bright reddish to brownish-orange with numerous white spots ringed with black. Setae generally dark red, some with white tips.

Habitat.– Often inhabiting waters on outer sides of reefs and on sandy and muddy substrates.

Distribution.– Red Sea and east coast of Africa eastwards through Indo-Pacific to Liu-Kiu Islands, Australia, South China Sea, Taiwan, French Polynesia, Hawaii; intertidal to 50 m, possibly 100 m.



Male (7.6 mm), Magang, Taipei County, 14 Jul 1984: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Dardanus aspersus (Berthold, 1846)

Donggang fishing port, Pingtung County, 22 Feb 1997.

Pagurus aspersus Berthold, 1846: 21, pl. 2, fig. 1; Alcock, 1905: 168.

Pagurus diogenes– De Haan, 1849: 208; Ortmann, 1892: 285; Terao, 1913: 377; Terao, 1932, pl. 57, fig. 2 [not *Cancer diogenes* Linnaeus, 1758].

Dardanus diogenes– Gee, 1925: 159; Utinomi, 1956: 65, pl. 33, fig.1; Miyake, 1965: 644, fig. 1080; Lee, 1969: 48, fig. 6; Suzuki, 1971: 96, pl. 33, fig. 4.

Dardanus aspersus: Holthuis & Sakai, 1970: 96; Miyake, 1975: 191, pl. 114, fig. 4; Miyake, 1978: 64, fig. 23, pl. 1, fig. 2; Miyake, 1982: 109, pl. 37, fig. 2; Baba, 1986: 187, 296, fig. 134; Foo & Yu, 1988: 117, pl. 1B; Wang, 1991: 238, fig. 199; Yu & Foo, 1991: 26, unnumbered fig.; Wang, 1992: 61 (list); Wang, 1995: 569 (list).

Material examined.– Hepingdao, Keelung, 30 Jan 1992: 1 male (23.0 mm), (NTOU).– 4 Jun 1997: 1 female (11.4 mm), (NTOU); Magang, Taipei County, 14 Jul 1984: 1 male (7.7 mm), (NTOU); Gushan fishing port, Kaohsiung County, 14 Jan 1985: 1 male (10.8 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: 1 female (15.7 mm), (NTOU).–7 May 1988: 1 male (8.4 mm), (NTOU); Linbian, Pingtung County, 19 May 1991: 1 male (22.4 mm), (NTOU); Magong fishing port, Penghu County, 31 Mar 1988: 1 male (20.4 mm), (NTOU); Penghu County, 2 Apr 1988: 1 female (11.1 mm), (NTOU); no specific locality, 4 Jun 1997: 1 female (12.8 mm), (NTOU).

Diagnosis.– Ocular peduncles depressed, stout; corneas somewhat dilated, 0.2-0.3 of peduncular length; ocular acicles broadly triangular, anterior margins each usually with 3 small spines. Antennular peduncles

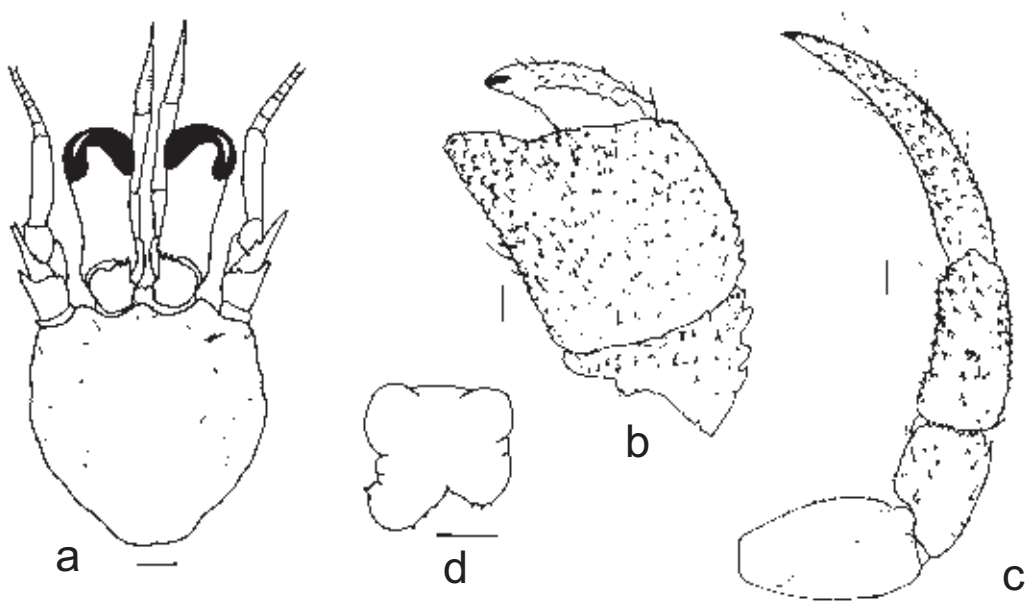
overreaching distal corneal margins. Antennal peduncles reaching to distal margins of corneas; antennal acicle with few spinules obscured by setae. Left cheliped massive; chela with convex outer face thickly covered with short sharp corneous-tipped spines and tufts of setae, lower surface nearly glabrous. Ambulatory legs with dactyls longer than propodi; both dorsal and ventral margins of dactyls and propodi with spines and setae; left third distinctly broader, covered with short, corneous-tipped spines and setae. Posterior lobes of telson separated by median cleft; terminal margins each with minute spinules; left lobe with about 10, right with 3.

Size.– Maximum recorded shield length 23.0 mm.

Coloration.– Shield reddish-brown with numerous dark brown spots. Ocular peduncles dark reddish-brown proximally with broad dark purple band medially, reddish-orange distally; ocular acicles lighter reddish-orange. Chelae of both chelipeds light reddish-brown with tint of yellow; carpi and meri reddish-brown with numerous darker spots. Dactyls of ambulatory legs dark reddish-brown, propodi, carpi and meri lighter reddish-brown with numerous darker spots, propodi each with median darker reddish-brown band; carpi and meri each with similar, but less distinct median band.

Habitat.– Gastropod shells, often with anemone, on sandy-mud substrates.

Distribution.– Boso Peninsula and Tottori southward on both coasts of Japan, Taiwan, East and South China Seas; 20-60 m.



Female (11.4 mm), Hepingdao, Keelung, 4 Jun 1997: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Dardanus crassimanus (H. Milne Edwards, 1836)

No specific locality, Mar 2002.

Pagurus crassimanus H. Milne Edwards, 1836: 277.

Pagurus setifer– De Haan, 1849: 209; Terao, 1913: 379; Terao, 1932: pl. 57, fig. 3 [not *Dardanus setifer* (H. Milne Edwards, 1836)].

Pagurus sculptipes Stimpson, 1858: 287; Ortmann, 1892: 287; Doflein, 1902: 646; Alcock, 1905: 83, pl. 8, fig. 3; Balss, 1913: 48.

Pagurus pavimentatus Hilgendorf, 1879: 816, pl. 3, figs. 1-5.

Clibanarius crassimanus– Alcock, 1905: 162.

Dardanus sculptipes– Rathbun, 1903: 34.

Dardanus crassimanus– Buitendijk, 1937a: 55; Utinomi, 1956: 64, pl. 32, fig. 6; Miyake, 1965: 643, fig. 1079; Lee, 1969: 49, fig. 7; Suzuki, 1971: 96, pl. 33, fig. 3; Kim, 1973: 204, 396, fig. 37, pl. 4, fig. 20; Miyake, 1975: 197, pl. 114, fig. 5; Miyake, 1978: 61, fig. 22, pl. 1, fig. 1; Miyake, 1982: 110, pl. 37, fig. 5; Baba, 1986: 187, 296, fig. 135; Foo & Yu, 1988: 119, pl. 2B; Morgan, 1989: 405, fig. 3a, b; Yu & Foo, 1991: 27, unnumbered fig.; Wang, 1992: 60 (list); Asakura, 1995: 357, pl. 95, fig. 2; Tudge, 1995: 18, pl. 3, fig. C; Wang, 1995: 569 (list).

Material examined.– Hepingdao, Keelung, 27 Apr 1993: 1 male (17.6 mm), (NTOU); Beiguan, Yilan County, 20 Jun 1991: 1 male(12.8 mm), (NTOU); Dasi fishing port, Yilan County, 25 Apr 1989: 1 damaged specimen not sexed (18.6 mm), (NTOU); Taitung County, Oct 1991: 1 female (16.7 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 23 Mar 1985: 1 male (8.8 mm), (NTOU); Kending, Pingtung County,

28 Aug 1999: 1 female (4.1 mm), (NTOU); no specific locality: 2 males (10.9, 14.0 mm), 1 ovig. female (10.1 mm), (NTOU).– 1 male (12.9 mm), (NTOU).– 1 male (10.8 mm), (NTOU).– Mar 2002: 1 male (17.7 mm), (NTOU).

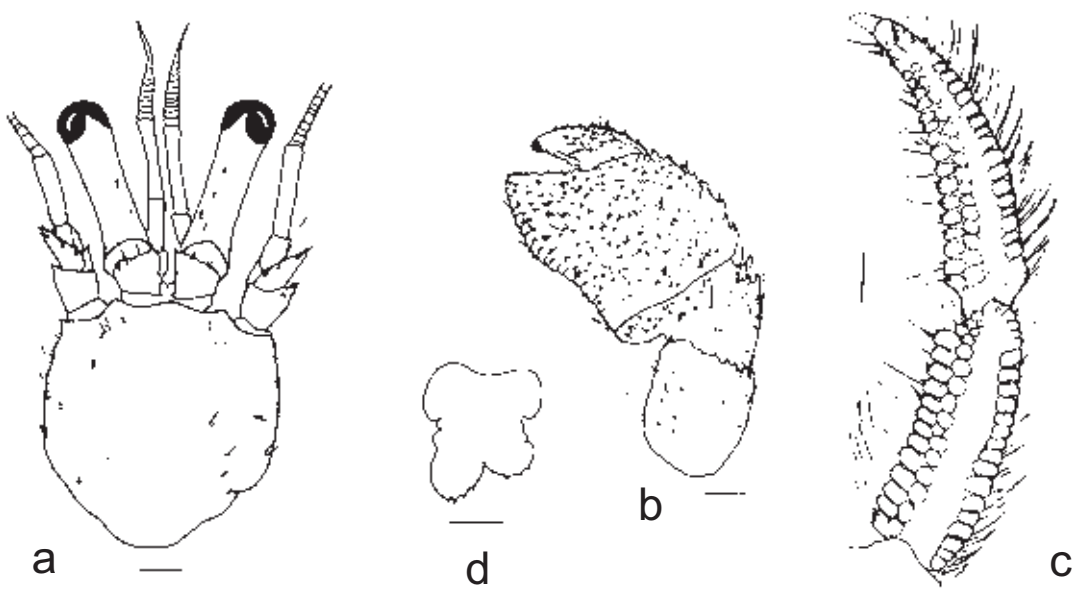
Diagnosis.– Ocular peduncles slightly shorter than or equal to extended antennular peduncles, corneas 0.2-0.3 of peduncular length; ocular acicles large, each with 3 or 4 terminal spines. Antennal peduncles slightly shorter than ocular peduncles; antennal acicle slender, reaching middle of penultimate peduncular segment, with 3 mesial and 1 distolateral spine. Left cheliped larger and longer than right; distal 3 segments of chelipeds and ambulatory legs thickly covered with tufts of long bristles on upper and outer margins; outer surfaces of chelae with numerous corneous-tipped spines or acute tubercles; spines near lower margin of fixed finger and palm of left cheliped grouped in palisade-form. Left third pereopod with dorsal and ventral margins of dactyl and propodus crenulate, lateral surface of propodus with moderately broad, elevated tuberculate and often spinulose ridge separated from tessellated dorsal margin by wide, deep sulcus and from similarly cut ventral margin by much narrower sulcus; lateral face of dactyl with broad and deep sulcus in dorsal half, tuberculate ridge in ventral half contiguous with or only weakly separated from tessellated ventral margin. Telson with deep median cleft; terminal margins each with few small spines.

Size.– Maximum recorded shield length 18.6 mm.

Coloration.– Carapace red to reddish-brown. Ocular peduncles light to moderately dark purple or reddish-purple, each often with ventral white band adjacent to cornea. Chelipeds red to reddish-brown or orange; carpi each with dorsal reddish-purple to purple patch proximally. Ambulatory legs colored as chelipeds including reddish-purple to purple carpal patch; meri and carpi each with transverse darker red band at midlength.

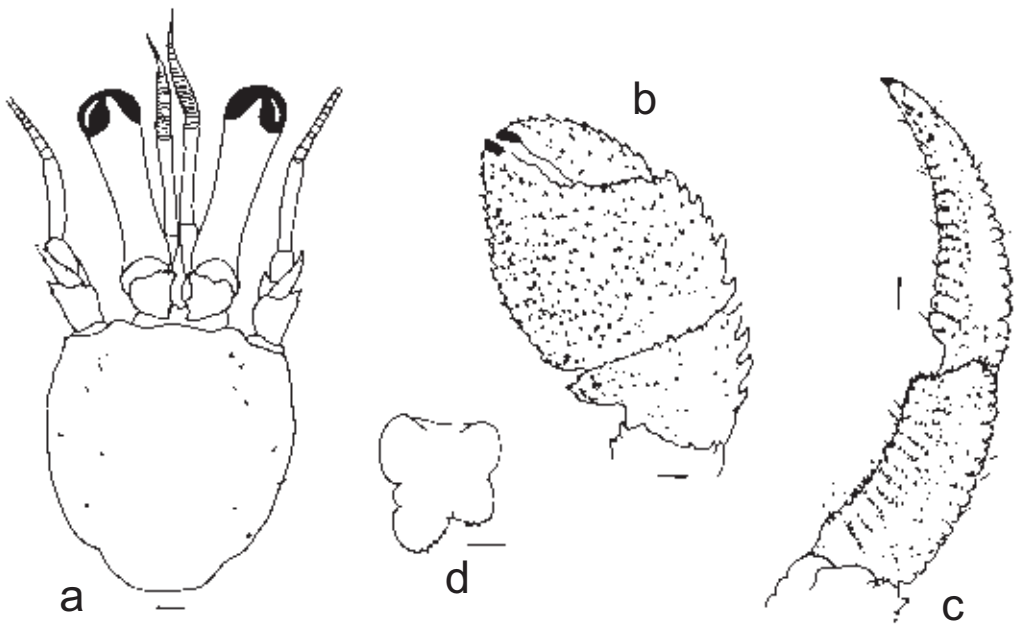
Habitat.– Gastropod shells on sandy and muddy substrates.

Distribution.– East Africa, Mauritius, Australia, Hong Kong, Philippine Islands, Japan, Taiwan; 10-50, possibly to 100 m.



Male (10.8 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** chela, carpus and merus of left cheliped (outer view); **c,** dactyl and propodus of left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Dardanus setifer (H. Milne Edwards, 1836)



Female (8.5 mm), Hepingdao, Keelung, 28 Oct 1993: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer view); **c,** dactyl and propodus of left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Cancer hungarus Herbst, 1791: 26 (in part), pl. 23, fig. 7, [not fig. 6 = *Calcinus tibicen* (Herbst, 1791)].

Pagurus setifer H. Milne Edwards, 1836: 274; Alcock, 1905: 83, pl. 8, fig. 3; Fize & Serène, 1955: 182, figs. 27A, B, 28, pl. 5, figs. 4-8.

Dardanus setifer– Forest, 1956c: 49; Tirmizi & Siddiqui, 1982: 80, figs. 41, 42; Ajmal Khan & Natarajan, 1984: 10, fig. 7; Haig & Ball, 1988: 167.

Not *Pagurus setifer*– Hess, 1865: 35; Hilgendorf, 1879: 815, pl. 3, fig. 8; De Man, 1887: 433; Ortmann, 1892: 287; Borradaile, 1898: 460; Borradaile, 1900: 396 [= *Dardanus guttatus* (Olivier, 1811)].

Not *Pagurus setifer*– De Haan, 1849: 209; Terao, 1913: 379; Terao, 1932: pl. 57, fig. 3; Barnard, 1950: 426, fig. 79d; Morgan, 1987: 180 [= *Dardanus crassimanus* (H. Milne Edwards, 1836)].

Material examined.– Hepingdao, Keelung, 28 Oct 1993: 1 female (8.5 mm), (NTOU).

Diagnosis.– Ocular peduncles long and moderately slender, slightly overreaching antennular peduncles; corneas slightly dilated, occupying slightly less than 0.2 of peduncular length; ocular acicles subtriangular to subquadrate, each with 3 or 4 terminal spines. Antennal peduncles not reaching bases of corneas. Chelipeds grossly unequal; palm of left cheliped covered with corneous-tipped, thorn-like spines, each accompanied by wreath of very short bristles, lower margin with spines grouped in palisade. Left third pereopod distinct in form and sculpture; maximum width of propodus approximately 0.6 length, lateral faces of propodus and dactyl somewhat concave, each with broad longitudinal spinose median carina, surfaces above and below concavities, but particularly dorsally, tessellated by series of deep cut and extremely regular transverse grooves, dorsal and ventral margins each with row of very long setae.

Size.– Maximum recorded shield length 13.9 mm.

Coloration.– Carapace mottled red and white. Ocular peduncles uniform pinkish-orange; antennular and antennal peduncles uniformly pinkish-orange. Chelae mottled red and white. Ambulatory legs mottled red and white, with distinct bands of darker red on carpi and propodi (after Haig & Ball, 1988).

Habitat.– Collected on sandy substrates.

Distribution.– South Africa, Madagascar, Mauritius, Pakistan, India, Sri Lanka, Thailand, Australia, Vietnam, Hong Kong, Taiwan; 4-80 m.

Remarks.– *Dardanus setifer* is reported from Taiwanese waters for the first time.

Aniculus Dana, 1852

Prior to Forest's (1984) monographic revision, the genus consisted of four species thought to be quite distinct in their dispersals. Although Forest recorded broad, albeit, discontinuous distributions for most of the known and newly described species, none were reported as occurring in Taiwan. Thus it was interesting to find this colorful and distinctive genus represented in Taiwanese waters by four of the nine described species.

Key to the Taiwanese species of *Aniculus*

1. Mesogastric region of shield not delimited laterally; striae on lateral faces of propodi of ambulatory legs interrupted by smooth broad longitudinal stripe ……*A. retipes*
- Mesogastric region of shield delimited laterally by furrows; striae on lateral faces of propodi of ambulatory legs not interrupted by smooth broad longitudinal stripe ……2
2. Ocular acicles terminating acutely or with single spine; coxae of chelipeds each with 1 short, deep, transverse groove mesially on ventral surface; ocular peduncles each with 3 red stripes; second and third pereopods intense orange or yellowish-orange with transverse striae bordered with red ……*A. maximus*
- Ocular acicles with 2 or more terminal spines; coxae of chelipeds each with 1 or 2 moderate to long transverse grooves on ventral surface; ocular peduncles without stripes; coloration of second and third pereopods variable, striae bordered with red ……3
3. Chelipeds each with 1 shallow stria on ventral surface of coxa; propodus of left third pereopod brown distally, greenish-brown or blue proximally (sub-adult coloration) or entirely brown to greenish-blue (adult) ……*A. miyakei*
- Chelipeds each with 2 parallel deep striae on ventral surface of coxa; propodus of left third pereopod entirely greenish-brown, olive, or bluish-green ……*A. ursus*

Aniculus retipes Lewinsohn, 1982

Lanyu, Taitung County, 10 Jul 1997.

Aniculus retipes Lewinsohn, 1982a: 76, figs. 1, 2; Forest, 1984: 51, figs. 13, 20, 51-58; Nomura et al., 1997: 4, figs. 7, 8, 13.

Material examined.– Lanyu, Taitung County, 10 Jul 1997: 1 male (7.2 mm), (NTOU).

Diagnosis.– Shield longer than broad; mesogastric region delimited only anteriorly, posterior V-shaped grove faint; rostrum broadly triangular. Ocular peduncles approximately as long as shield, slender, subequal in length with left slightly longer; ocular acicles triangular. Antennular and antennal peduncles not overreaching distal corneal margins; antennal acicle slender, reaching beyond proximal margin of ultimate peduncular segment. Chelipeds generally equal, armament and ornamentation similar; dactyl and fixed finger short, with prominent hiatus; outer face of palm with transverse striae, each with marginal row of fine short setae, replaced near upper margin with corneous-tipped spinules and longer setae; carpus with prominent corneous-tipped spine at upper distal margin, outer face with several short striae; ventral surface of coxa with short, moderately deep, transverse groove mesially. Second and third pereopods with dactyls shorter than propodi, ventral margins each with row of 6-8 corneous spines; propodi each with series of transverse striae on lateral face interrupted medially by broad, smooth strip; striae on carpi and meri shorter and less regular. Telson with posterior lobes markedly asymmetrical, terminal margins unarmed.

Size.– Maximum recorded shield length 15 mm.

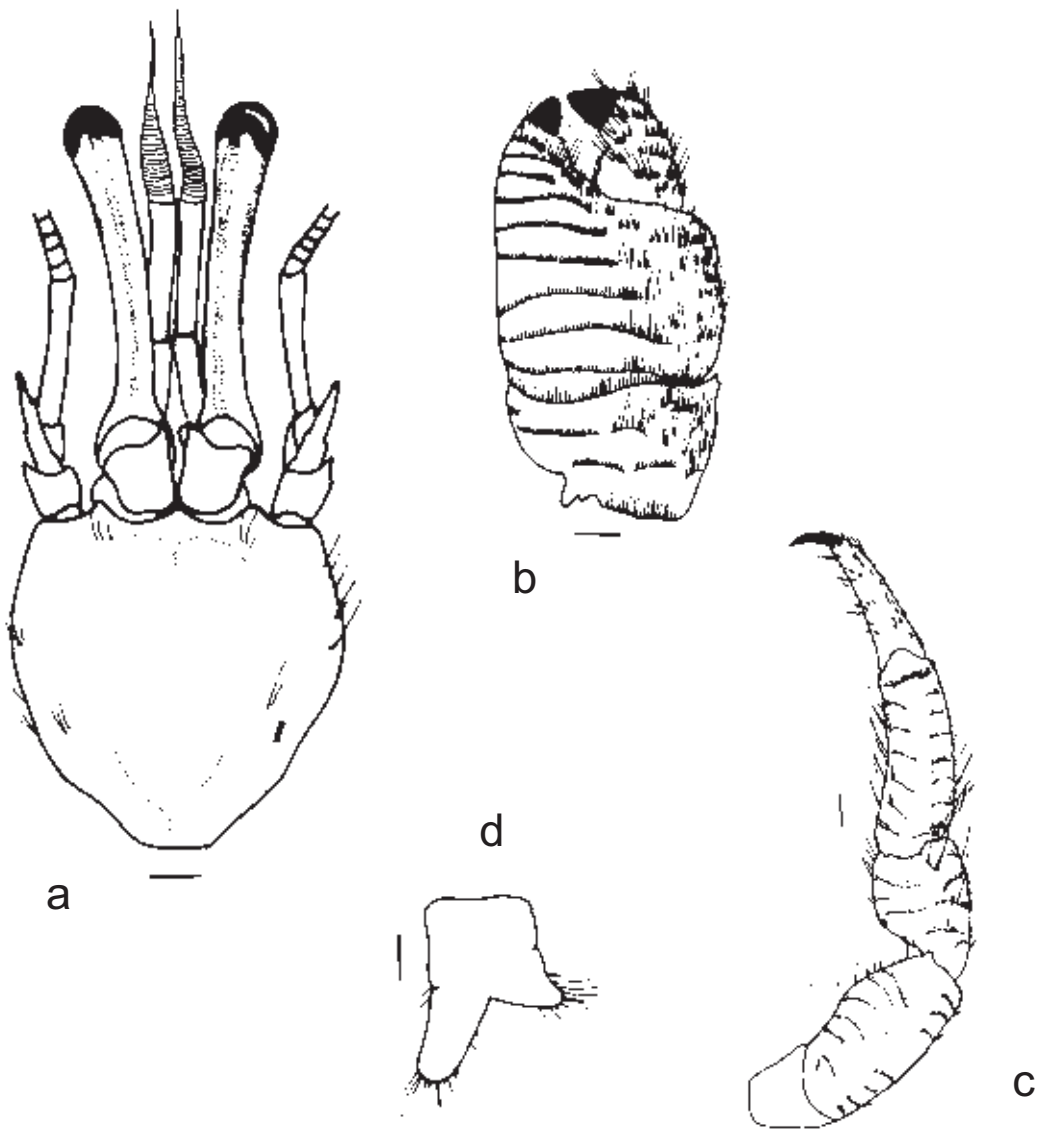
Coloration.– Shield red to reddish-orange. Ocular peduncles greenish-gray with four dark stripes. Chelipeds with chelae deep brownish-red; carpi and meri also primarily deep brownish-red, each with bluish-

green or greenish-black band distally. Ambulatory legs with dactyls mottled greenish and red; propodi deep brownish-red, each with broad blackish or bluish-green band distally, lateral faces each with broad median smooth, similarly colored stripe. Carpi and meri each with similar coloration and striping.

Habitat.– Shallow reefs.

Distribution.– Red Sea, Tanzania, Banda Sea, Vietnam, Taiwan, Ryukyu, Ogasawara, Hachijo-jima Islands, Japan, Samoa; 0-15 m.

Remarks.– This is the first record of *Aniculus retipes* in Taiwanese waters.



Male (7.2 mm), Lanyu, Taitung County, 10 Jul 1997: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face, some setae omitted); **c,** left second pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Aniculus maximus Edmondson, 1952

Hualien County, 30 Jun 1985 (photographed by P.H. Ho).

Aniculus maximus Edmondson, 1952: 79, figs. 7a-f, 8; Tinker, 1965, 56, pl. 16; Forest, 1984: 61, figs. 14, 22, 59-61; Yu & Foo, 1991: 55, unnumbered fig.; Nomura et al., 1997: 3, figs. 3, 4, 13; Hoover, 1998: 252, unnumbered fig.

Material examined.– Hualien County, 30 Jun 1985: 1 female (15.8 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad, divided into lobes by setiferous depressions and fine grooves; mesogastric region as irregular diamond, approximately twice as long as broad; rostrum triangular. Ocular peduncles slender, approximately 0.9 length of shield; ocular acicles terminally acute or with small spine. Antennular peduncles reaching beyond bases but not to corneal margins; antennal peduncles reaching distal 0.6 or 0.7 of ocular peduncles; antennal acicle simple, reaching well beyond proximal margin of fifth segment. Chelipeds equal, similarly armed; chela relatively smooth, with outer face marked by series of transverse scutes, each lined anteriorly with fringe of short setae, dactyl, fixed finger and upper surface of palm with numerous minute or tiny spinules, segmental margins all with long setae; ventral surface of coxa with 1 short, deep, transverse groove mesially. Ambulatory legs with dactyls somewhat longer than propodi, each with short, transverse series of sharp spinules almost completely concealed by long setae; propodi unarmed, but each with series of uninterrupted transverse scutes; carpi each with small dorsodistal spine and 2 or 3 uninterrupted scutes on lateral face; scutes on meri more irregular. Telson with markedly asymmetrical posterior lobes, terminal margins unarmed.

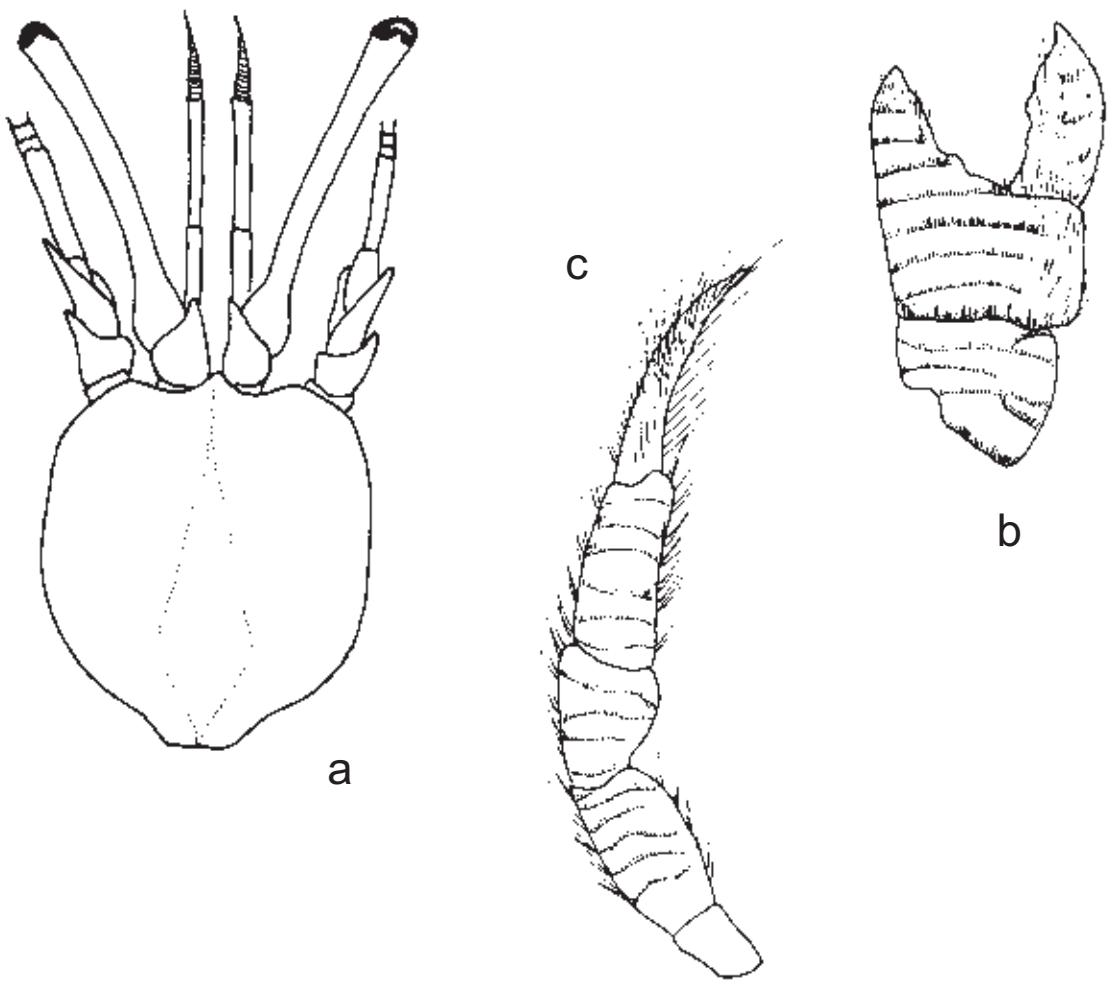
Size.– Maximum recorded shield length 32 mm.

Coloration.– Shield yellowish-orange with rostral region mottled gray and red. Ocular peduncles each with three narrow red stripes, one dorsal, one lateral and one ventral; ocular acicles with median large red patch. Chelipeds and ambulatory legs intense golden or orange-yellow, trimmed in crimson, with scutes edged in white; dactyls and fixed fingers of chelipeds and ambulatory dactyls red distally; setae yellowish to off-white.

Habitat.– Found typically under ledges and in caves, occupying large shells such as tritons.

Distribution.– Hawaii, Marquesas, Seychelles, Taiwan, Ryukyu and Ogasawara Islands, Honshu, Japan; 15-50 m.

Remarks.– The specimen of this species, first reported from Taiwan by Yu & Foo (1991), now is in quite poor condition; however, it still retains its characteristic coloration.



Female (15.8 mm), Hualien County, 30 Jun 1985: **a,** shield and cephalic appendages (aesthetascs and setae omitted); **b**, carpus and chela of left cheliped (outer face, some setae omitted); **c**, second right pereopod (lateral view). Not to scale.

Aniculus miyakei Forest, 1984

Badouzih, Keelung, 25 Aug 1988 (photographed by P.H. Ho).

Pagurus aniculus– De Haan, 1849: 209; Herklots, 1861: 37 [not *Pagurus aniculus* Fabricius, 1787].

Aniculus typicus– Stimpson, 1858: 247.

Aniculus aniculus– Balss, 1913: 49; Terao, 1913: 548, unnumbered fig.; Maki & Tsuchiya, 1923: 165, pl. 10; Utinomi, 1956: 63, pl. 32, fig. 6; Okada et al., 1958, fig. 249; Miyake, 1965: 640, fig. 1067; Lee, 1969: 51; Imajima et al., 1970: 21, unnumbered fig.; Suzuki, 1971: 93, pl. 32, fig. 4; Miyake, 1978: 16, fig. 6; Miyake, 1982: 98, pl. 33, fig. 5 [not *Aniculus aniculus* (Fabricius, 1787)].

Aniculus miyakei Forest, 1984: 36, figs. 10, 18, 37-40; Yu & Foo, 1991: 54, unnumbered fig.; Asakura, 1995: 351, pl. 93, fig. 2; Nomura et al., 1997: 3, figs. 5, 6, 13.

Material examined.– Badouzih, Keelung, 25 Aug 1988: 1 ovig. female (12.5 mm), (NTOU).

Diagnosis.– Shield longer than broad, divided into lobes by piliferous depressions and fine grooves; mesogastric region in form of irregular diamond, twice as long as wide; rostrum triangular. Ocular peduncles moderately short, approximately 0.7 length of shield; ocular acicles terminally bifid. Antennular peduncles reaching or slightly overreaching distal margins of corneas; antennal peduncles 0.7-0.8 length of ocular peduncles; antennal acicle moderately broad, reaching beyond proximal margin of fifth peduncular segment. Chelipeds equal and similar in armament and ornamentation; chela circumscribed by transverse striae, interrupted only on inner surface near upper margin, each with marginal with row of short setae, replaced on outer upper surface with small corneous spinules and accompanied by longer setae; carpi each with dorsodistal spine, outer face also with marginally piliferous, generally entire, transverse striae; coxae each with 2

moderately long, deep, transverse grooves. Ambulatory legs with dactyls shorter than propodi; dactyls lacking striae, but each with transverse series of small spinules on lateral face accompanied by long setae; propodi each with several marginal piliferous, transverse striae, entire proximally, but interrupted distally; dorsal and ventral surfaces of both propodi and carpi each with numerous corneous spinules. Telson with somewhat asymmetrical posterior lobes, terminal margins unarmed.

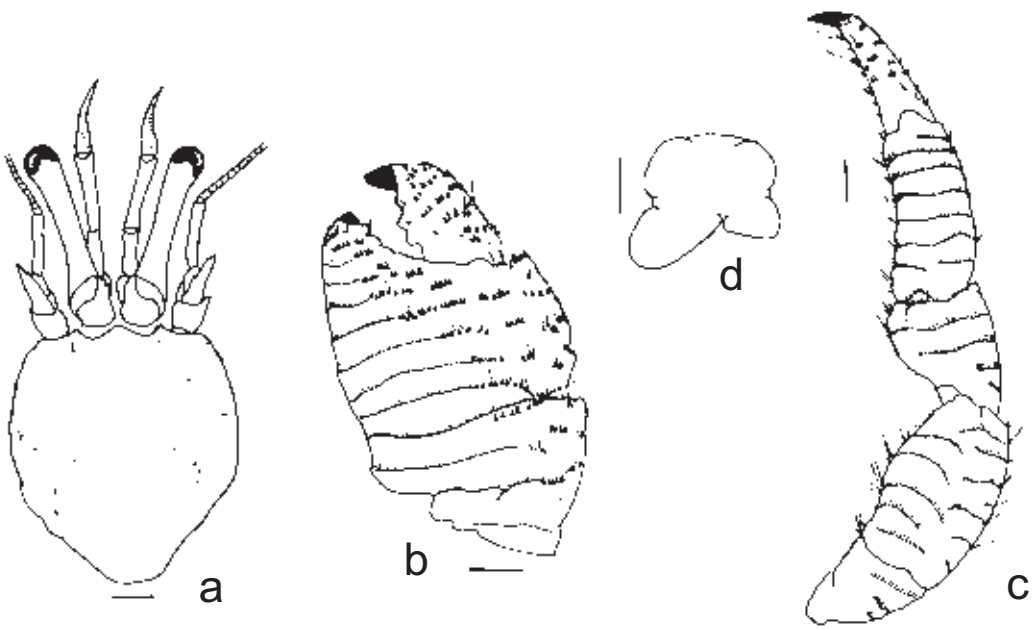
Size.– Maximum recorded shield length 29.0 mm.

Coloration.– Shield reddish; ocular peduncles olive. Chelipeds and ambulatory legs generally reddish-purple, carpi and meri each with bluish-green band.

Habitat.– Reef flats, sometimes in tide pools.

Distribution.– Mainland Japan from Niigata and Tokyo Bay to Kagoshima Bay, Taiwan; intertidal to 90 m.

Remarks.– In their key to the Japanese species of *Aniculus* based on color, Nomura et al. (1997) separated *A. miyakei* from the superficially similar *A. ursus* by the entirely greenish-brown or olive coloration of the propodus of the left third pereopod in the latter species. This segment in *A. miyakei* was reported to be dark brown distally and greenish-brown proximally in sub-adults and entirely brown in adults; however, regional variations undoubtedly occur as suggested by the present photo.



Ovig. female (12.5 mm), Badouzih, Keelung, 25 Aug 1988: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Aniculus ursus (Olivier, 1811)

Haikon, Kending, Pingtung County, 8 Sep 2005.

Pagurus ursus Olivier, 1811: 640; Latreille, 1818: 5, pl. 312, fig. 2.

Pagurus aniculus– H. Milne Edwards, 1836: 279 [not *Pagurus aniculus* Fabricius, 1787].

Aniculus ursus– Stimpson, 1858: 234; Forest, 1984: 26, figs. 1-7, 9, 17, 31, 36, 67, 69-73; Nomura et al., 1997: 5, figs. 11, 12, 13.

Aniculus typicus– Neumann, 1878: 31.

Aniculus aniculus– Alcock, 1905: 94, pl. 7, fig. 6 (in part); Yap-Chiongco, 1938: 201, pl. 2, fig. 2; Lewinsohn, 1982a: 74, fig. 2a-c; Tudge, 1995: 9, pl. 1 fig. D [not *Aniculus aniculus* (Fabricius, 1787)].

? *Aniculus aniculus*– Wang, 1991: 224, fig. 182; Wang, 1992: 60 (list); Wang, 1994: 568 (list) [not *Aniculus aniculus* (Fabricius, 1787)] (see remarks).

Material examined.– Haikou, Kending, Pingtung County, 8 Sep 2005: 1 male (20.9 mm), (NTOU); Hungchikan, Kending, Pingtung County, 8 Sep 2005: 1 male (19.3 mm), (NTOU); Kending, Pingtung County: 1 female (21.2 mm), (NMNS); Wanlitong, Pingtung County, 15 Oct 1997: 1 male (22.1 mm), (NMNS).

Diagnosis.– Shield longer than broad; divided into lobes by piliferus depressions and fine grooves; mesogastric region in form of irregular diamond, twice as long as wide; rostrum triangular. Ocular peduncles moderately short, approximately 0.7 length of shield; ocular acicles with 2-5 terminal spinules. Antennular peduncles reaching or slightly overreaching distal margins of corneas; antennal peduncles not quite or just reaching corneal bases; antennal acicle reaching to or slightly beyond proximal margin of fifth peduncular segment. Chelipeds equal and similar in armament and ornamentation; chela circumscribed by transverse

striae, interrupted only on inner surface near upper margin, each with marginal with row of short setae, replaced on outer upper surface with small corneous spinules and accompanied by longer setae; carpi each with dorsodistal spine, outer face also with marginally piliferus, generally entire, transverse striae; coxae each with 2 moderately long, deep, transverse grooves. Ambulatory legs with dactyls shorter than propodi; dactyls lacking striae, but each with transverse series of small spinules on lateral face accompanied by long setae; propodi each with several marginal piliferous, transverse striae, entire proximally, but interrupted distally; dorsal and ventral surfaces of both propodi and carpi each with numerous corneous spinules. Telson with somewhat asymmetrical posterior lobes, terminal margins unarmed.

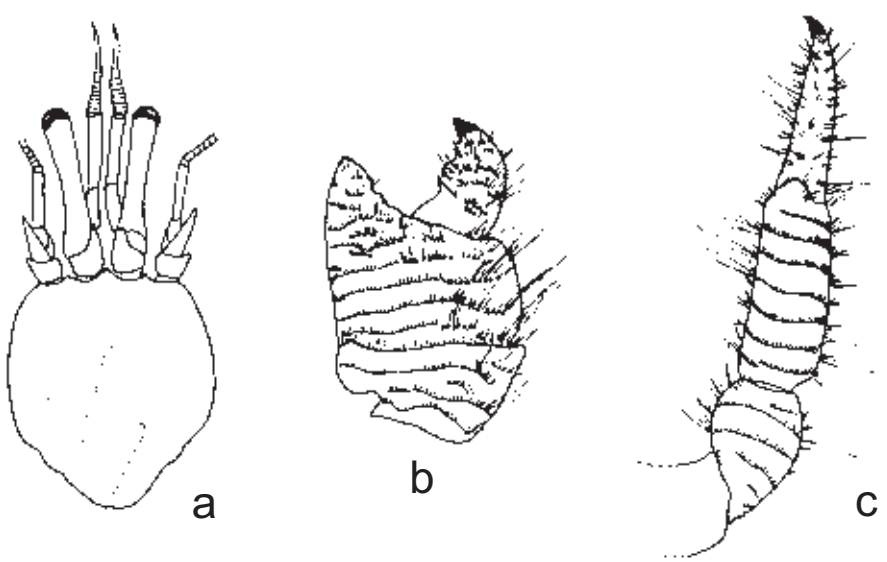
Size.– Maximum recorded shield length 27.0 mm.

Coloration.– Base color of shield gray-green to blue-green, rostral and gastric regions with broad bands of dark red-brown, grooves and lines bright red. Dorsal surfaces of ocular peduncles, antennular and antennal peduncles deep green-bronze; ocular acicles red-brown proximally and green distally. Chelipeds olive-green to bronze-green, each with large patch of deep brown-red on distal region of merus; carpus primarily with same deep color. Ambulatory legs with dactyls light green; propodi entirely deep olive-green; carpi very deep brown-red except green-blue proximally; meri of second pereopods each reddish on lateral face with striae greenish-white, dorsal surface blue-green with patch of red-brown distally; meri of third pereopods blue-green and bronze on lateral faces.

Habitat.– Reef platforms.

Distribution.– East coast of Africa and Madagascar to southern India, Cocos (Keeling) Islands, Australia, western Pacific, including Okinawa and Taiwan to Fiji; intertidal to 30 m.

Remarks.– Wang (1991) described and illustrated, a species he identified as *Aniculus aniculus* from Zhejiang, China, and subsequently (Wang, 1992, 1994) listed *A. aniculus* from Taiwan, as well as from the East and South China Seas. As pointed out by Forest (1984), *A. aniculus* sensu stricto has been confused with several other species of the genus. Although both *A. miyakei* and *A. ursus* occur in Taiwan, because of its generally broader distribution, it is most probable that the species occurring in the East and South China Seas is *A. ursus* rather than *A. miyakei*. For this reason, we have included Wang's (1991, 1992, 1994) records questionably in the synonymy of *A. ursus*.



Male (20.9 mm), Haikou, Kending, Pingtung County, 8 Sep 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view). Setae partially omitted. Not to scale.

Clibanarius Dana, 1852

The 59 species currently recognized in the genus are cosmopolitan in their distribution in shallow, tropical and subtropical zones, with only a few temperate species. Because of their osmoregulatory mechanisms, species of *Clibanarius*, more than any other paguroid genus, are able to live and reproduce in waters of low salinities such as are found in estuaries and around the mouths of rivers. Thus it is not surprising that the only truly freshwater species of hermit crab, *Clibanarius fonticola* McLaughlin & Murray, 1990, is a member of this genus. Approximately 20 percent of the described species of *Clibanarius* are found in Taiwan.

Maki & Tsuchiya (1923, pl. 1, fig. 3) provided a photo of the species identified for them as *Clibanarius pacificus* Stimpson, 1858, but it is of such poor quality that it is impossible to determine what taxon really is represented. Maki & Tsuchiya (1923) indicated that the species was the most common hermit crab in Keelung. Stimpson's type material is no longer extant and the specimen Maki & Tsuchiya (1923) reported, a female specimen 13 mm in length, has not been available for reexamination. The male specimen in the USNM collections labeled *C. pacificus* (USNM 55415) that is part of the Maki & Tsuchiya collection has been reexamined and identified as *C. virescens* (Krauss, 1843).

Clibanarius pacificus is an enigmatic species that has not been reported from anywhere but the type localities, Tanegashima (Tanega-shima) and Anami-Oshima (Oshima), Japan, other than a brief mention by Terao (1913) and the report of its occurrence in Taiwan by Maki & Tsuchiya (1923). All recent investigations at the type localities by one of the authors (TK) failed to locate any specimens fitting Stimpson's (1858) description. Consequently, we do not believe that Maki & Tsuchiya's (1923) illustrated specimen is a specimen of *C. pacificus* either.

Wang (1992, 1995) listed *Clibanarius formosus* Ives, 1892 as occurring in Taiwan, but indicated that his records were taken from the literature. *Clibanarius formosus* is a synonym of *Clibanarius sclopetarius* (Herbst, 1796), as pointed out by Forest & de Saint Laurent (1968), and a taxon known only from the western Atlantic. It is possible that Wang (1992, 1995) took his descriptive information from Yap-Chiongco (1938), but because of the locality, chose to use Ives' (1892) specific name, *formosus*. Yap-Chiongco (1938) provisionally, but obviously incorrectly, identified 36 Philippine specimens as *C. sclopetarius*. Similarly, Taiwan was included in Wang's (1991, 1992, 1995) distributions of *Clibanarius inaequalis* (De Haan, 1849). Only Wang's (1991) account was accompanied by a brief diagnosis and generalized illustration, but neither is sufficiently diagnostic to permit verification of his identification. Both latter records were merely species listings that also cannot be verified. De Haan's (1849) taxon has not been found in Taiwanese collections at either NTOU or NMNS, thus it is unlikely that Wang's (1991) identification is accurate for Taiwan.

Key to the Taiwanese species of *Clibanarius*

1. Meri of chelipeds each with prominent spine or tubercle on ventral surface proximally [ambulatory legs each with 2 longitudinal blue stripes bordered in red on lateral faces of distal 3 segments ···*C. infraspinatus*
- Meri of chelipeds each without prominent spine or tubercle on ventral surface proximally ……2
2. Cephalothorax, basal segments of chelipeds and ambulatory legs distinctly compressed dorsoventrally [cephalothorax, chelipeds and ambulatory legs all yellow or white with stripes of dark brown or black; ocular, antennular and antennal peduncles also yellow or white with stripes of black or dark brown] ……*C. eurysternus*
- Cephalothorax, basal segments of chelipeds and ambulatory legs not distinctly compressed dorsoventrally

…3

3. Chelipeds and ambulatory legs densely setose [cephalothorax reddish-brown, posterior carapace with 3 yellow stripes; chelipeds and ambulatory legs reddish-brown; ocular peduncles reddish-brown dorsally, orange laterally and ventrally] …*C. corallinus*
- Chelipeds and ambulatory legs not densely setose …4
4. Dactyls of ambulatory legs distinctly longer than propodi [ocular peduncles solid olive-green dorsally; chelipeds olive or brown with blue-green tubercles and spines; dactyls, propodi, and carpi of ambulatory legs blue-green, each with 2 olive or brown stripes on lateral face] …*C. longitarsus*
- Dactyls of ambulatory legs shorter to slightly longer than propodi …5
5. Ambulatory legs each with 4 continuous longitudinal stripes of color [ocular peduncles olive-green; chelipeds dark green, fingers yellow; ambulatory legs with brown stripes] …*C. striolatus*
- Ambulatory legs without or with fewer than 4 longitudinal stripes of color …6
6. Ocular peduncles each with ring of color at base of cornea …7
- Ocular peduncles without ring of color at base of cornea …10
7. Ocular peduncles each with broad stripe on dorsal surface [ocular peduncles orange, with blue ring at base of cornea and brown stripe on dorsal surface; chelipeds brown with white spines; dactyls of ambulatory legs white, propodi brown, each with white patch distally] …*C. englaucus*
- Ocular peduncles each without stripe on dorsal surface …8
8. Shield, chelipeds, and ambulatory legs all with patches of white on dark base color [ocular peduncles brown, each with white ring at base of cornea; shield, chelipeds and ambulatory legs red-violet with patches of white; dactyls of second and third pereopods each with broad white stripe on lateral face] …*C. snelliusi*
- Shield and chelipeds at least without patches of white on dark base color …9
9. Ocular peduncles solidly colored except for ring at bases of corneas [ocular peduncles olive-drab, dark brown or greenish-black, with white ring at bases of corneas; chelipeds olive-drab, dark brown or bluish-black, tips orange; dactyls of ambulatory legs white, with or without submedian dark band, propodi and carpi greenish] …*C. virescens*
- Ocular peduncles each with ring at base of cornea and patch of color on dorsal surface [ocular peduncles white, each with broad orange band at base of cornea and orange patch on dorsal surface proximally; chelipeds dark green; dactyls of second and third pereopods orange-yellow, propodi with orange stripe proximally] …*C. humilis*
10. Carpi of chelipeds each with 3 spines on dorsal margin [in preservative, ocular peduncles orange with blue dorsal stripe; chelipeds reddish-brown with white spines; ambulatory dactyls each with yellowish-white stripe on lateral face extending from base of claw to proximal margin of merus] …*C. ransoni*
- Carpi of chelipeds each with single dorsodistal spine …11
11. Ocular acicles each with 5 or 6 terminal spinules; dorsal surfaces of chelae each with covering of tubercles or spines [ocular peduncles orange with blue band on dorsal surface; chelipeds black with light colored tubercles; ambulatory legs black with light colored stripe on dactyls and often some parts of propodi] …*C. merguiensis*
- Ocular acicles each with 2 or 3 terminal spinules; dorsal surfaces of chelae each with only few scattered spinules [in preservative, ocular peduncles uniformly reddish-orange; chelipeds and ambulatory legs deep reddish-orange] …*C. arethusa*

Clibanarius infraspinatus (Hilgendorf, 1869)

Budai, Chiayi County, 2 Jul 2002.

Guanyin, Taoyuan County, 14 Sep 2006, juvenile.

Pagurus (Clibanarius) infraspinatus Hilgendorf, 1869: 97.

Clibanarius infraspinatus– Yap-Chiongco, 1938: 194, pl. 2, fig. 4; Fize & Serène, 1955: 77, fig. 10; Lee, 1969: 41, fig. 3; Tirmizi & Siddiqui, 1982: 26, fig. 20; Wang, 1991: 234, fig. 194; Yu & Foo, 1991: 46, unnumbered fig.; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 749; Wang, 1995: 569 (list).

Material examined.– Guanyin, Taoyuan County, 14 Sep 2006: 2 males (2.4, 2.6 mm), 5 females (2.0-2.5 mm), (NTOU); Budai, Chiayi County, 2 Jul 2002: 2 males (15.7, 18.6 mm), (NTOU).

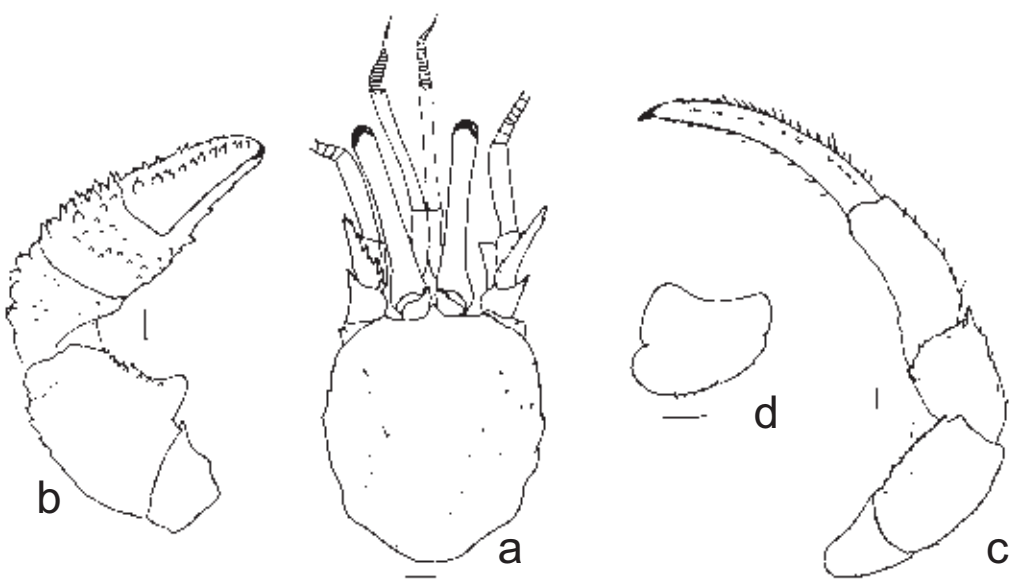
Diagnosis.– Shield longer than broad. Ocular peduncles long, slender, ocular acicles multidenticulate. Antennular peduncles equal to or slightly longer than ocular peduncles; antennal peduncles shorter, not reaching to base of corneas; antennal acicle reaching beyond base of ultimate segment. Chelipeds generally equal, or right slightly smaller, similar in armament; palms each with numerous spiniform tubercles on dorsal surface; carpi each with 3 strong spines on dorsomesial margin and scattered smaller spines on dorsal surface; meri each with prominent blunt spine on ventromesial margin proximally. Ambulatory legs with dactyls longer than propodi; dorsal surfaces each with slightly raised but smooth longitudinal margin; ventral margins each with 7 or 8 corneous spines in distal half; carpi each with row of spines on dorsal surface (second) or single dorsodistal spine (third). Telson with median cleft barely detectable; posterior lobes asymmetrical; terminal margins each with 5 or 6 prominent, corneous-tipped spines.

Size.– Maximum recorded shield length 18.6 mm.

Coloration.– In adults, shield tan to grayish-orange. Ocular peduncles brown to dark blackish-brown, with longitudinal reddish-white stripes. Chelipeds reddish-orange to bluish-brown with lighter colored tubercles. Ambulatory legs tan to bluish-brown; dactyls, propodi, and carpi each with two bluish-orange to whitish-tan stripes bordered in red and one median longitudinal whitish-blue or brownish-orange stripe on lateral surface; meri each with two brownish-orange to whitish-blue stripes. Juveniles without light colored stripes on ocular peduncles and ambulatory legs.

Habitat.– Oyster beds and fine sand substrates near river outlets.

Distribution.– Red Sea, Indian Ocean, Thailand, northern Australia, Indonesia, Singapore, Vietnam, Philippine Islands, Taiwan, Japan; shallow subtidal.



Male (15.7 mm), Budai, Chiayi County, 2 Jul 2002: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (mesial view); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Clibanarius erysternus (Hilgendof, 1879)

Mao-ao, Taipei County, Oct 2006.

Pagurus (Clibanarius) erysternus Hilgendorf, 1879: 822.

Clibanarius erysternus– Yap-Chiongco, 1938: 189, pl. 1; Fize & Serène, 1955: 118, fig. 17; Lee, 1969: 42; Haig & Ball, 1988: 163; Yu & Foo, 1991: 41, unnumbered fig.; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 750; Wang, 1995: 569 (list).

Material examined.– Aodi, Taipei County: 1 female (4.3 mm), (NTOU); Mao-ao, Taipei County, 2 Oct 2006: 3 males (2.1-8.5 mm), 1 female (2.4 mm), 6 ovig. females (3.9-5.0 mm), 1 juvenile (1.3 mm), (NTOU).– 16 Oct 2006: 15 males (2.0-4.7 mm), 4 females (2.4-3.8 mm), (NTOU); Shihyusan, Taitung County, 19 Sep 2006: 1 male (1.5 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 5 males (2.1-4.9 mm), 3 females (2.0-3.2 mm), 4 ovig. females (3.6-4.8 mm), (NTOU); Hengchun, Pingtung County, 27 Mar 1986: 2 males (4.6, 5.7 mm), 1 ovig. female (4.2 mm), (NTOU); no specific locality: 1 male (2.8 mm), (NTOU).– 1 male (3.1 mm), 2 females (2.6, 3.9 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad; cephalothorax, basal segments of chelipeds and pereopods all dorsoventrally compressed and very smooth. Ocular peduncles long, overreaching both antennular and antennal peduncles; ocular acicles each with 3-6 small spines on anterior margin; antennal acicle overreaching proximal margin of fifth peduncular segment. Chelipeds nearly equal, right slightly larger; with prominent hiatus between dactyls and fixed fingers; chelae with dorsal and lateral surfaces armed with spines, often corneous-tipped; carpi each with prominent spine at dorsodistal margin. Ambulatory legs with propodi and dactyls of third pereopods nearly of equal length, each flattened ventrally, with some spines on dorsolateral

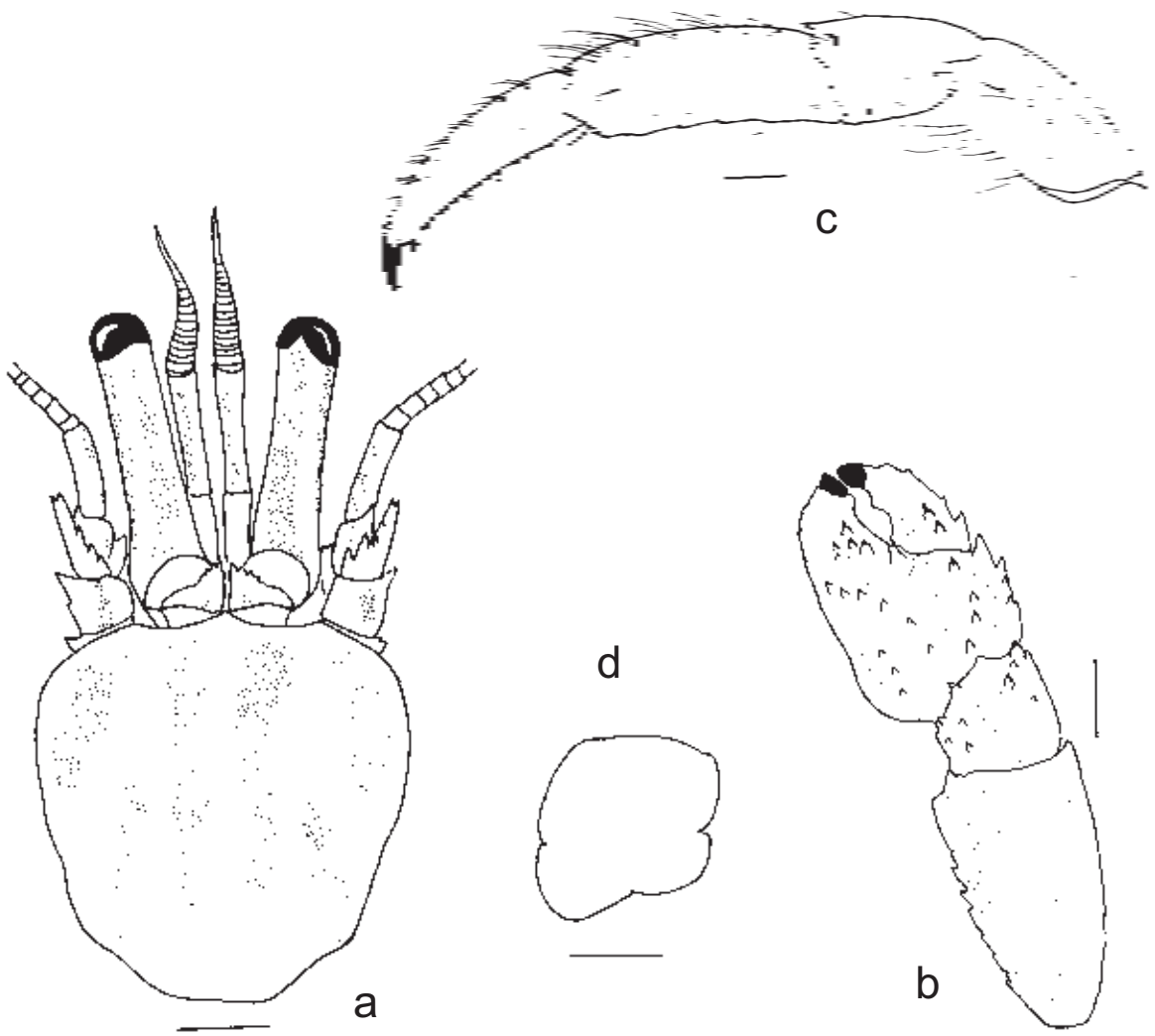
margin forming crest only on left side, lateral face of propodus with low, transverse striae giving weakly ribbed appearance. Telson with asymmetrical posterior lobes separated by shallow median cleft; terminal margins each with long setae.

Size.– Maximum recorded shield length approximately 10 mm.

Coloration.– Cephalothorax, chelipeds and ambulatory legs yellow or white with stripes of dark brown, dark blue or black. Ocular, antennular and antennal peduncles also yellow or white with stripes of dark brown, dark blue or black; ocular acicles yellow or white distally.

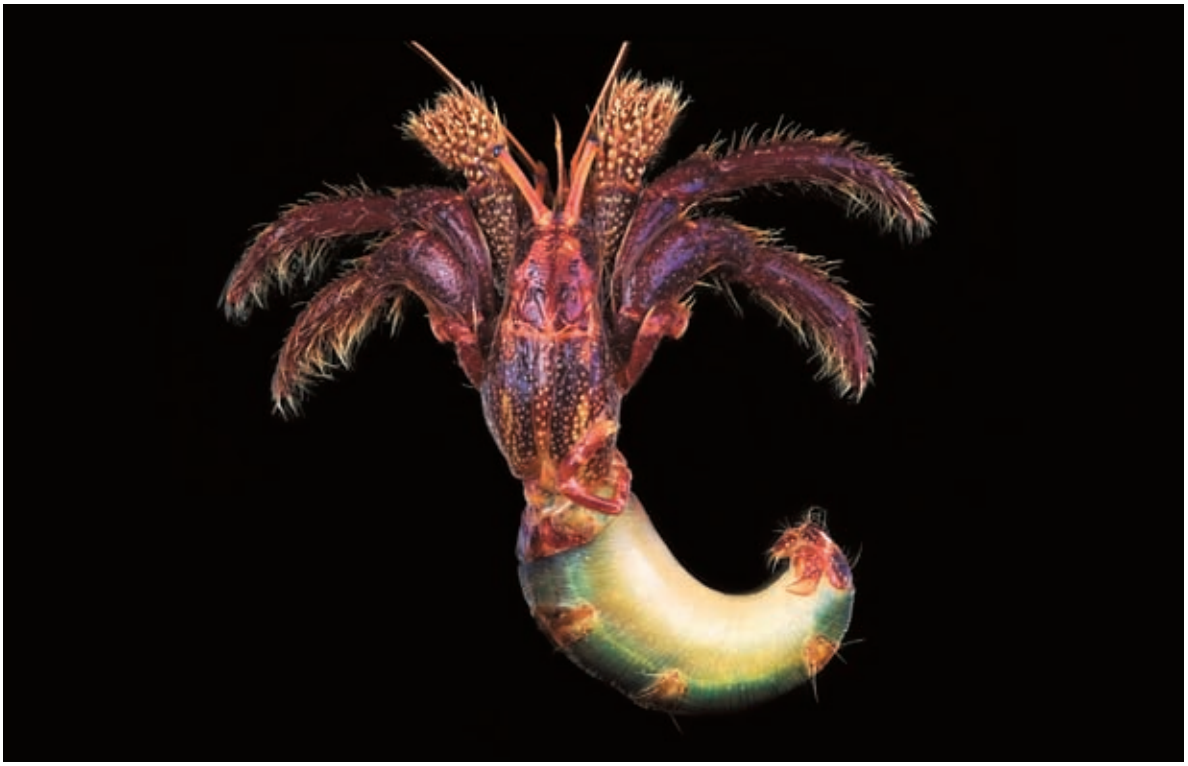
Habitat.– Reef or rocky shores and shallow areas of coral sand, typically occupying gastropod shells of the family Conidae.

Distribution.– Southern Africa, Mozambique, eastern Indian Ocean, Singapore, Vietnam, Philippine Islands, Taiwan, Japan, Polynesia; intertidal to 5 m.



Female (4.3 mm), Aodi, Taipei County: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius corallinus (H. Milne Edwards, 1848)



Mao-ao, Taipei County, 8 Feb 2007.

Pagurus corallinus H. Milne Edwards, 1848: 63.

Pagurus globoso-manus Dana, 1851: 271.

Clibanarius globosi-manus– Dana, 1852a: 7.

Clibanarius corallinus– Alcock, 1905: 48, pl. 5, fig. 1; Yap-Chiongco, 1938: 187, pl. 1, fig. 11; Fize & Serène, 1955: 132, fig. 20; Miyake, 1956: 313, figs. 6, 7; Lee, 1969: 43; Yu & Foo, 1991: 40, unnumbered fig.; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 770; Poupin, 1994: 20, fig. 16; Tudge, 1995: 15, pl. 2, fig. E; Wang, 1995: 569 (list).

Material examined.– Magang, Taipei County, 7 Oct 1996: 1 male (4.3 mm), (NTOU).– 21 Oct 2006: 5 females (4.2-7.7 mm), (NTOU); Mao-ao, Taipei County, 11 Aug 2006: 3 males (3.6-5.6 mm), 1 female (4.4 mm), (NTOU).–8 Feb 2007: 1 male (10.5 mm), (NTOU); Dasi, Yilan County, 7 Jul 1988: 1 male (4.0 mm), 2 females (3.6, 4.3 mm), (NTOU); Dayuan, Yilan County, 5 Apr 1987: 1 male (4.3 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 3 males (2.7-7.5 mm), 4 females (3.6-6.2 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 1 male (5.9 mm), (NTOU).– 4 Jun 2005: 2 males (3.0, 6.2 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 3 Jun 2005: 1 male (3.5 mm), 2 juveniles (1.6, 2.6 mm), (NTOU).– 9 Sep 2005: 2 juveniles (2.2, 2.3 mm), (NTOU); Wanlitong, Pingtung County, 18 Mar 1981: 3 females (3.4-4.8 mm), (NTOU).– 18 Mar 1992: 1 female (3.3 mm), (NTOU); Penghu County, 11 Oct 1984: 1 male (4.3 mm), 1 female (4.5 mm), (NTOU).– 1 May 2000: 1 male (5.6 mm), (NTOU); no specific locality: 2 males (2.9, 4.5 mm), (NTOU).– 2 females (4.5, 4.7 mm), (NTOU).– 1 male (7.8 mm), 1 juvenile (2.6 mm), (NTOU).

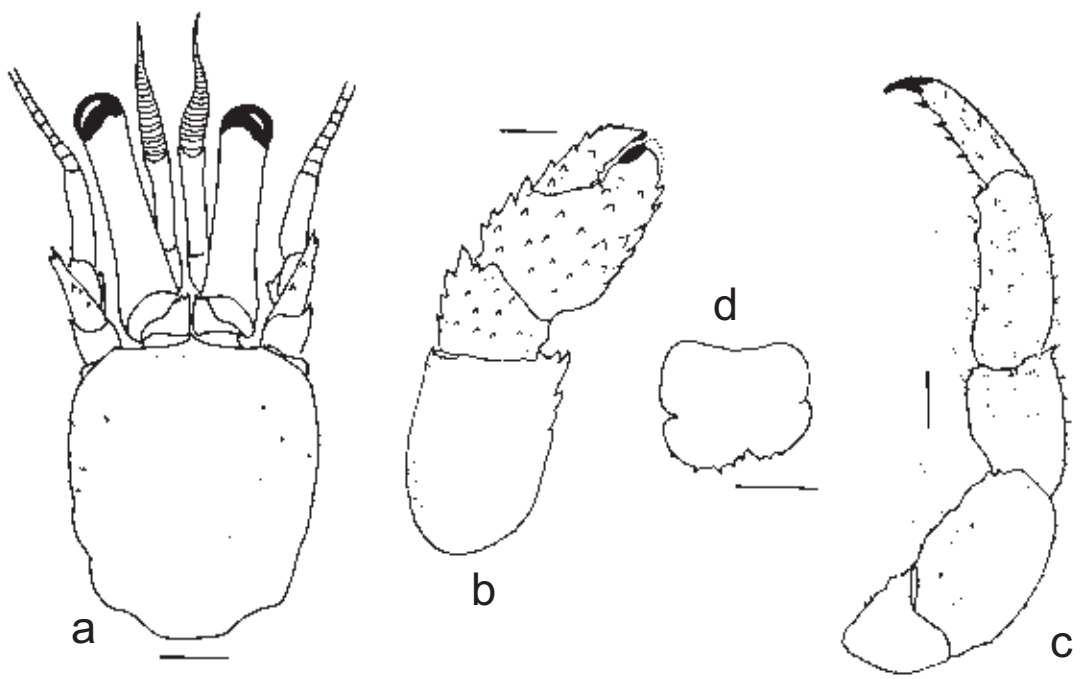
Diagnosis.– Shield longer than broad. Ocular peduncles slender, longer than antennular and antennal peduncles, corneas 0.2 of peduncular length; ocular acicles each usually with 1 or 2 spines, occasionally multifid. Antennal acicle slightly exceeding distal margin of fourth peduncular segment. Chelipeds subequal, like ambulatory legs, remarkably setose; carpi, palms and fingers all with conical tubercles or prominent spines accompanied by tufts of yellow or brown setae. Ambulatory legs covered with numerous tufts of yellow or brown setae. Third pereopods with propodi only slightly longer than dactyls; left with lateral face flattened and covered with dense setae. Telson with slightly asymmetrical posterior lobes separated by moderately large median cleft; terminal margins each with row of spines but not extending to lateral margins.

Size.– Maximum recorded shield length approximately 10.5 mm.

Coloration.– Shield reddish-brown to blackish-blue. Ocular peduncles reddish-brown to orange. Chelipeds reddish-brown to blackish-blue with white to yellowish tubercles and thickly covered with yellow to brown setae. Ambulatory legs uniformly reddish-brown to blackish-blue.

Habitat.– Common on beach rock on coral cays or rocky coastal shores, utilizing a variety of gastropod shells.

Distribution.– Eastern Indian Ocean to Taiwan and Ryukyu Islands of Japan, French Polynesia; intertidal.



Male (4.3 mm), Magang, Taipei County, 7 Oct 1996: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius longitarsus (De Haan, 1849)

Penghu County, 8 Jul 1997.

? *Pagurus asper* H. Milne Edwards, 1848: 62.

Pagurus longitarsus De Haan, 1849: 211, pl. 50, fig. 3.

Clibanarius longitarsis– Dana, 1852b: 464.

Pagurus (Clibanarius) longitarsus– Hilgendorf, 1869: 96.

Clibanarius longitarsus– De Man, 1902: 741; Fize and Serène, 1955: 83, fig. 11, pl. 3, figs. 1, 7, 10, 13; Lee, 1969: 44; Ajmal Khan & Natarajan, 1984: 8, fig. 6; Yu & Foo, 1991: 43, unnumbered fig.; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 762, figs. 4b, 5b, 6b; Wang, 1995: 569 (list).

Material examined.– Danshuei, Taipei County, 25 Jan 1999: 1 female (8.1 mm), (NTOU); Gongliao, Taipei County, 20 May 2005: 1 female (4.0 mm), (NTOU); Longdong, Taipei County, 1 Dec 1984: 1 male (3.4 mm), (NTOU); Yaliao, Taipei County, 22 Jun 1986: 1 male (5.8 mm), (NTOU); Dasi, Yilan County, 23 Jan 1988: 1 female (3.1 mm), (NTOU); Singda Harbor, Kaohsiung County, 31 Dec 1984: 1 male (8.3 mm), (NTOU); Baisha, Penghu County, 20 Sep 1999: 1 male (2.9 mm), 1 ovig. female (3.9 mm), (NTOU); Cingluo, Penghu County, 24 Apr 1992: 1 male (8.8 mm), (NTOU); Guoye, Penghu County, 23 Apr 1992: 1 female (9.8 mm), (NTOU); Penghu County, 8 Jul 1997: 1 male (5.1 mm), (NTOU); Wuciou, Kinmen County, 25 Apr 1988: 1 female (5.6 mm), (NTOU); no specific locality: 4 males (5.6-8.7 mm), (NTOU).– 2 males (5.6, 6.9 mm), (NTOU).– 2 females (7.0, 8.5 mm), (NTOU).– 1 male (9.5 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles approximately 0.8 length of shield; ocular acicles each terminating in simple or bifid spine. Antennular peduncles not quite reaching or slightly

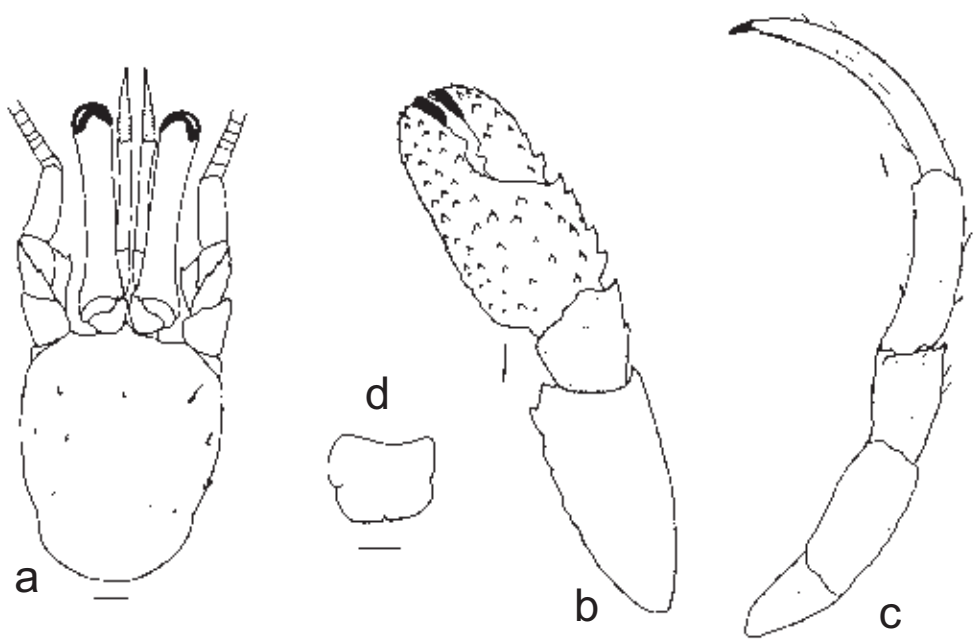
overreaching distal margins of corneas; antennal peduncles usually reaching bases of corneas or just slightly beyond, occasionally much shorter; antennal acicle short, not reaching distal margin of fourth peduncular segment. Chelipeds subequal, right slightly longer and more robust, similar in armature; dorsomesial margins of palms each with row of 4-6 spines, dorsal surfaces with 1 or 2 irregular rows of sometimes corneous-tipped spines; dorsomesial margins of carpi each with 1 prominent corneous-tipped spine distally. Ventral margins of dactyls of ambulatory legs each with short row of very small, closely-spaced corneous spinules (10-12) in distal half; dactyl of left third pereopod approximately 1.5 length of propodus. Telson with very slender median cleft separating asymmetrical posterior lobes, terminal margins each with few very small spinules and 1-3 larger, corneous tipped spines laterally, but not extending onto lateral margins.

Size.– Maximum recorded shield length 12.0 mm.

Coloration.– Cephalothorax tan to greenish-brown with darker brown mottling and patches. Ocular peduncles dorsally olive-green to brown, no distinct stripes. Chelipeds olive or brown with irregular rows of paler blue or bluish-green tubercles and spines on chelae. Second and third pereopods each with dactyl and propodus bluish-green to olive-tan with two longitudinal olive or brown stripes on lateral and mesial surfaces, areas between stripes whitish-tan; carpi similarly colored; meri each with broad dorsal, lateral and ventrolateral olive-brown to brown stripes.

Habitat.– Mud or sand substrate around rivers and mangroves.

Distribution.– Red Sea, Indian Ocean, northern Australia, Thailand, Indonesia, Taiwan, Japan; 0-2 m.



Male (7.2 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius striolatus, Dana, 1852

Magang, Taipei County, 23 Aug 2006.

Clibanarius striolatus Dana 1852a: 7, Dana, 1852b: 463; Dana, 1855: pl. 29, fig. 3a-c; Alcock, 1905: 46, pl. 4, fig. 7; Yap-Chiongco, 1938: 193, pl. 1. fig. 1; Dechancé, 1964: 32, fig. 6; Lee, 1969: 44, fig. 4; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 758; Wang, 1995: 569 (list).

Clibanarius A– Fize & Serène, 1955: 109, fig. 15, pl. 3, fig. 6.

? *Clibanarius striolatus*– Miyake, 1978: 51, fig. 18 (see remarks).

Clibanarius merguiensis– Kamezaki et al., 1988, unnumbered fig. [not *Clibanarius merguiensis* De Man, 1888a].

Not *Clibanarius striolatus*– Fize & Serène, 1955: 97, fig. 13 [= *Clibanarius demani* Buitendijk, 1937b].

Material examined.– Aodi, Taipei County, 20 May 2005: 2 males (4.4, 5.1 mm), (NTOU).– 6 Oct 2005: 2 males (3.0, 3.7 mm), 2 females (3.2, 4.0 mm), (NTOU).–2005: 1 male (6.6 mm), (NTOU).– no date: 1 male (4.1 mm), (NTOU); Fulong, Taipei County, 3 Oct 2006: 2 males (2.3, 2.6 mm), 1 female (3.0 mm), 1 ovig. female (3.6 mm), (NTOU); Gongliao, Taipei County, 6 Oct 2005: 6 males (3.0-4.7 mm), 1 female (3.3 mm), 1 ovig. female (4.3 mm); Magang, Taipei County, 23 Aug 2006: 2 males (4.3, 5.6 mm), 1 female (5.1 mm), (NTOU); Penghu County, 7-10 Jul 1997: 1 male (2.6 mm), (NTOU); no specific locality, 2005: 1 male (8.5 mm), 1 female (4.8 mm), (NTOU).

Diagnosis.– Shield subquadrate or slightly longer than broad. Ocular peduncles long, slender, corneas slightly less than 0.2 of peduncular length; ocular acicles each with 1-4 terminal spines. Antennular peduncles slightly shorter to slightly longer than ocular peduncles; antennal peduncles reaching to distal 0.3 of ocular

peduncles; antennal acicle reaching beyond distal margin of fourth segment. Chelipeds somewhat asymmetrical, right longer and broader; dorsal and lateral faces of both chelae covered with spinose tubercles or small spines, strongest on left chela; carpi each with 2 or 3 strong spines on dorsal margin. Third left pereopod with dactyl slightly longer than propodus, lateral face of propodus somewhat flattened, dorsolateral margin angular. Pereopodal dactyls each with row of 5-7 small corneous spinules on distal 0.3 of ventral margin and frequently 1 or 2 additional widely-spaced spinules in proximal 0.7. Telson with very slender median cleft, posterior lobes slightly asymmetrical, terminal margins each with row of very small spinules, but not extending onto lateral margins.

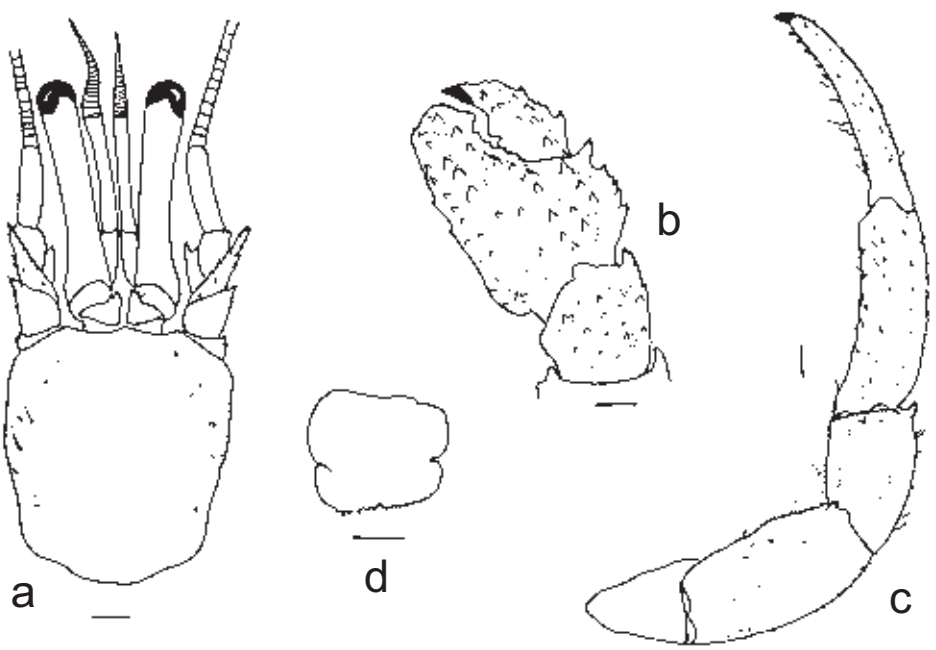
Size.– Maximum recorded shield length 10.1 mm.

Coloration.– Shield green or blue with patches of tan or orange. Ocular peduncles entirely olive-green to brownish-olive. Chelipeds dark green or blue, fingers yellowish-white or mottled blue and light orange. Ambulatory legs green, blue or bluish-tan with longitudinal brown, blue or bluish-black stripes, yellow or light orange at articulations.

Habitat.– Muddy sand substrate, and frequently associated with mangroves.

Distribution.– Red Sea, Indian Ocean, western Pacific including Indonesia and Taiwan; intertidal.

Remarks.– Miyake (1978) cited two specimens from Sagami Bay as *C. striolatus*, but which more probably represent *C. infraspinatus*. The occurrence of the true *C. striolatus* in Japanese mainland waters has never been verified, while *C. infraspinatus* is rather common on soft substrates in Tokyo and Sagami Bays. The impression given by the color photograph that the ocular peduncles each have a longitudinal stripe on the dorsal surface is an artifact caused by reflection from the camera flash. The ocular peduncles in this species are solidly colored as indicated in the coloration.



Male (6.6 mm), Aodi, Taipei County, 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius englaucus Ball & Haig, 1972

Aodi, Taipei County, 20 May 2005.

Clibanarius englaucus Ball & Haig, 1972: 97, fig. 5; Haig & Ball, 1988: 163; Rahayu & Forest, 1993: 776.
Clibanarius humilis– Yu & Foo, 1991: 44, unnumbered fig. [not *Clibanarius humilis* (Dana, 1851)].

Material examined.– Aodi, Taipei County, 20 May 2005: 2 males (3.9, 3.9 mm), (NTOU).–20 May 2006: 1 female (1.4 mm), (NTOU); Fulong, Taipei County, 20 Oct 2006: 46 males (2.0-4.8 mm), 18 females (1.8-3.1 mm), 13 ovig. females (2.0-4.0 mm), 20 juveniles (1.0-1.7 mm), (NTOU); Gongliao, Taipei County, 27 May 2005: 1 ovig. female (2.1 mm), (NTOU).– 6 Oct 2005: 2 males (2.4, 3.4 mm), 1 female (3.3 mm), (NTOU); Magang, Taipei County, 7 Oct 1996: 1 ovig. female (3.7 mm), (NTOU); Mao-ao, Taipei County, 11 Aug 2006: 38 males (2.3-4.4 mm), 6 females (1.6-2.0 mm), 21 ovig. females (1.9-2.4 mm), (NTOU); Meiyanshan, Taipei County, 7 Oct 2005: 3 males (2.8-3.8 mm), 4 ovig. females (2.6-3.0 mm), (NTOU); Shihyusan, Taitung County, 19 Sep 2006: 6 males (2.4-4.2 mm), 5 females (1.6-1.9 mm), 5 ovig. females (1.6-2.3 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 male (2.2 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 1 male (4.1 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 4 Jun 2005: 3 males (2.8-3.7 mm), 1 ovig. female (2.8 mm), (NTOU); Wanlitong, Pingtung County, 18 Mar 1992: 6 males (2.0-3.0 mm), 4 females (2.0-2.1 mm), (NTOU); Wukan, Penghu County, 28 May 2002: 2 females (1.9, 2.6 mm), (NTOU); no specific locality: 1 ovig. female (2.8 mm), (NTOU).

Diagnosis.– Shield nearly as broad as long. Ocular peduncles moderately short; ocular acicles multidenticulate. Antennular and antennal peduncles not reaching distal margins of corneas; antennal acicle reaching no farther than proximal margin of ultimate peduncular segment. Chelipeds subequal; carpi each

with blunt spine on dorsomesial margin distally; palms each with dorsal surfaces covered with corneous-tipped, tuberculate spines, largest forming row of 5 on dorsomesial margin and 1 at articulation with carpus. Ambulatory legs with propodi and dactyls of second and right third with convex lateral faces, left third with lateral faces of both segments distinctly flattened, dorsolateral margins sharply ridged; dactyls distinctly shorter than propodi, ventral margins each with row of "minute spiniform hairs". Telson with narrow median cleft separating asymmetrical posterior lobes, terminal margins unarmed.

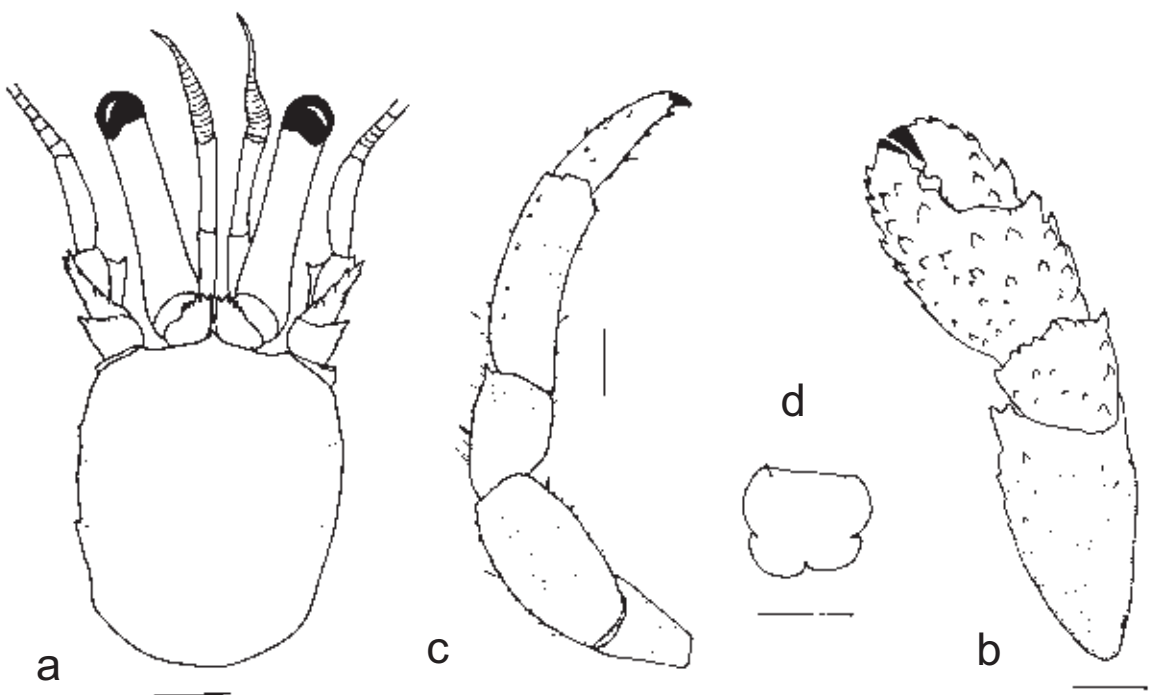
Size.– Maximum recorded shield length 5.0 mm.

Coloration.– Shield mottled pale grayish-green to grayish-blue and white. Ocular peduncles orange to brownish-orange, narrow blue band at base of cornea. Base color of chelipeds dark brown to bluish-black, spines and tubercles lighter. Ambulatory legs with meri and carpi uniform brownish-black to bluish-black, often with scattered small white spots; propodi brownish or bluish-black with irregular white or orange patch distally; dactyls white or orange, each with broad median blue band.

Habitat.– Rocky exposed areas, including black lava sand; sea grass areas; coral reefs and reef platforms.

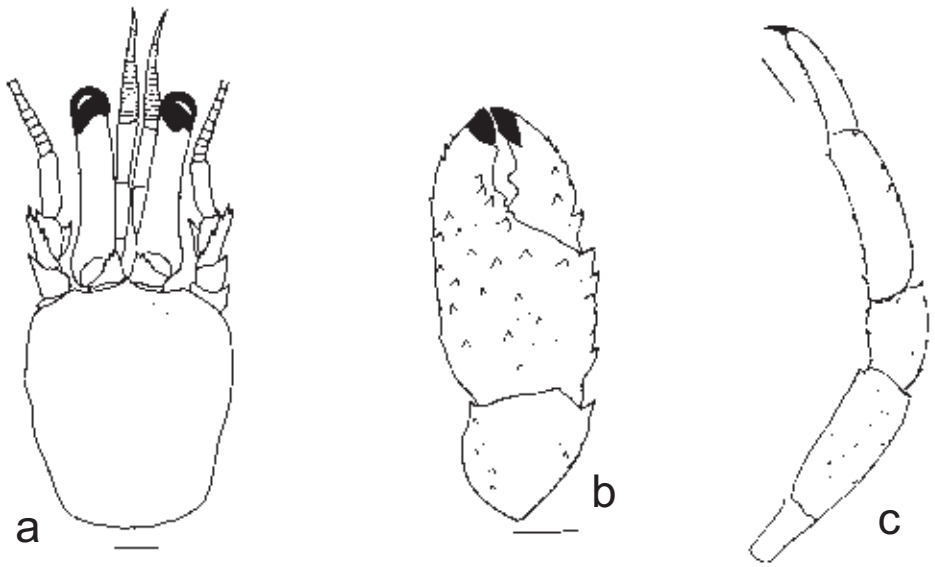
Distribution.– Indonesia, New Guinea, Taiwan, Japan; intertidal and shallow subtidal.

Remarks.– This species was reported from Taiwan as *Clibanarius humilis* by Yu & Foo (1991).



Ovig. female (3.7 mm), Magang, Taipei County, 7 Oct 1996: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius snelliusi Buitendijk, 1937



Male (2.9 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** left third pereopod (lateral view). Scales equal 0.5 mm.

Clibanarius snelliusi Buitendijk, 1937b: 259, figs. 7-9; Fize & Serène, 1955: 128, fig. 19; Rahayu & Forest, 1993: 770.

Material examined.– Aodi, Taipei County, May 2005: 1 male (2.8 mm), (NTOU); Huikua, Kending, Pingtung County, 22 Mar 2005: 1 female (3.7 mm), (NTOU); no specific locality: 1 male (2.9 mm), (NTOU).

Diagnosis.– Ocular peduncles slightly longer than extended antennular peduncles and antennal peduncles; corneas approximately 0.2 of peduncular length; ocular acicles multispinose. Antennal peduncles not reaching to bases of corneas; acicle reaching to proximal margin of fifth segment. Chelipeds subequal with left slightly larger, similarly armed; palms each with row of spines on dorsomesial margin and on dorsal surface; dactyls and fixed fingers each also with row of spines; carpi each with dorsomesial distal spine. Ambulatory legs with dactyls slightly flattened and very slightly shorter to equaling length of propodi, lateral surfaces convex, ventral margins each with row of spines; propodi of second and third right pereopods oval in cross-section; propodus of third left with mesial and lateral faces separated by slight crest, but lateral face convex or flattened; dactyl flattened, mesial and lateral faces clearly delimited.

Size.– Maximum recorded shield length approximately 4.5 mm.

Coloration.– Shield reddish-violet with some white patches, posterior carapace greenish-brown. Ocular peduncles brown, each with white ring at base of cornea. Antennular peduncles blue with orange flagella; antennal peduncles orange. Chelipeds reddish-violet with some white patches and white spines. Ambulatory legs reddish-violet with white patches; one longitudinal blue stripe extending length of each dactyl and distal part of propodus (after Rahayu & Forest, 1993).

Habitat.– Sand and rocky substrates.

Distribution.– Vietnam, New Guinea, Indonesia, and now Taiwan; intertidal.

Remarks.– *Clibanarius snelliusi* is reported from Taiwan for the first time and represents a substantial extension in the known range of this species.

Clibanarius virescens (Krauss, 1843)

Fulong, Taipei County, 23 Feb 2007.

Magang, Taipei County, 7 Oct 1996, juvenile.

Pagurus virescens Krauss, 1843: 56, pl. 4, fig. 3.

Pagurus (Clibanarius) virescens– Hilgendorf, 1879: 821, pl. 3, fig. 11.

Clibanarius virescens– Dana, 1852b: 466; McCulloch, 1913: 346, pl. 11, fig. 2; Fize & Serène, 1955: 138, fig. 21; Miyake, 1956: 315, figs. 8, 9; Utinomi, 1956: 65, pl. 23, fig. 5; Lee, 1969: 43; Tirmizi & Siddiqui, 1982: 77, fig. 40; Wang, 1991: 236, fig. 196; Yu & Foo, 1991: 42, unnumbered fig.; Wang, 1992: 60 (list); Rahayu & Forest, 1993: 772; Wang, 1995: 569 (list).

Clibanarius bimaculatus– Ortmann, 1892: 291; Balss, 1913: 41, fig. 28 [not *Clibanarius bimaculatus* (De Haan, 1849)].

Clibanarius aequabilis– Stebbing, 1920: 258 [not *Clibanarius aequabilis* (Dana. 1851)].

Clibanarius pacificus– Maki & Tsuchiya, 1923: 103, pl. 9, fig. 3 [not *Clibanarius pacificus* Stimpson, 1858].

Material examined.– Keelung: 1 male (6.3 mm), (USNM 55415); Aodi, Taipei County, 20 May 2005: 89 males (1.9-7.6 mm), 26 females (1.8-3.9 mm), 17 ovig. females (3.5-5.0 mm), (NTOU).– no specific date: 1 male (4.7 mm), (NTOU); Danhai, Taipei County, 19 Oct 1989: 4 females (2.5-3.2 mm), (NTOU); Fulong, Taipei County, 23 Feb 2007: 1 female (6.5 mm), (NTOU); Jinshan, Taipei County, 13 Oct 1985: 2 males (4.7, 6.4 mm), (NTOU); Longdong, Taipei County, 1 Dec 1984: 2 males (3.0, 3.6 mm), 3 females (2.5-3.2 mm), (NTOU); Magang, Taipei County, Jul 1984: 1 male (5.8 mm), (NTOU).– 14 Jul, 1984: 8 males (3.6-5.5 mm), (NTOU).– 7 Oct 1996: 74 males (2.2-6.9 mm), 34 females (1.8-4.7 mm), 8 ovig. females (2.4-4.8 mm), 3 juveniles (1.4-1.7 mm), (NTOU).– 19 Oct 2006: 77 males (1.9-7.3 mm), 56 females (1.9-5.5 mm), 124 juveniles (1.5-1.9 mm), (NTOU); Mao-ao, Taipei County, 22 Aug 2006: 23 males (1.8-6.3 mm), 18 females (2.0-4.9 mm), 6 juveniles (1.4-1.7 mm), (NTOU); Dasi, Yilan County, Oct 1985: 2 males, (2.0, 4.7 mm), 1 female (4.1 mm), (NTOU).– 9 May 1988: 1 male (5.4 mm), (NTOU); Fanzihliao, Yilan County, 1 Jul 1988: 8 males (2.2-5.8 mm), 3 females (3.0-3.9 mm), 5 ovig. females (3.2-5.5 mm), (NTOU).–21 Jun 1989: 3 males (4.3-6.5 mm), 1 female (3.5 mm), (NTOU); Gueishan Island, Yilan County, 19 Jul 2003: 1 female (5.0 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 male (2.4 mm), (NTOU); Wanlitong, Pingtung County, 18 Mar 1992: 2 males (2.4, 2.9 mm), (NTOU); Guoye, Penghu County, 23 Apr 1992: 1 male (4.4 mm), 1 female (2.3 mm), 2 ovig. females (2.9, 3.0 mm), 1 juvenile (1.7 mm) (NTOU); Wukan, Penghu County, 20 Apr 2002: 2 males (5.7, 6.3 mm), (NTOU).– 21 May 2002: 1 male (8.5 mm), (NTOU).– 28 May 2002: 2 males (4.8, 6.0 mm), (NTOU); Penghu County, 11 Oct 1984: 11 males (2.3-4.5 mm), 1 female (4.0 mm), (NTOU).– 7-10 Jul 1997: 5 males (4.1-6.4 mm), (NTOU); Wuciou, Kinmen County, 25 Apr 1988: 3 males (4.0-5.7 mm), (NTOU); no specific locality: 1 male (6.1 mm), (NTOU).– 1 female (8.2 mm), (NTOU).– 1 male (4.3 mm), (NTOU).

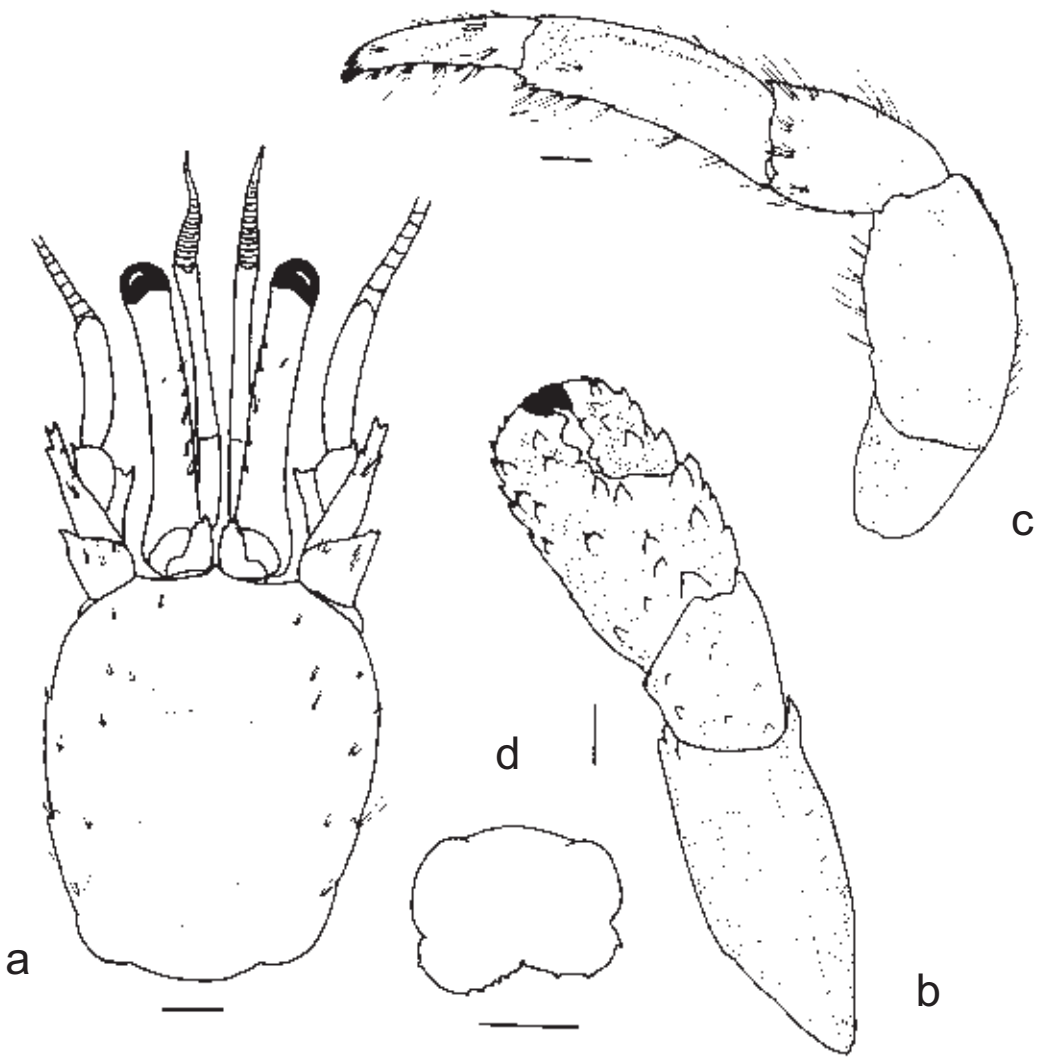
Diagnosis.– Shield slightly longer than broad. Ocular peduncles moderately long, 0.8 shield length; ocular acicles each with 2-4 spinules terminally. Antennular peduncles varying from slightly shorter to slightly longer than ocular peduncles; antennal peduncles reaching no further than bases of corneas; antennal acicle reaching to or slightly beyond distal margin of fourth peduncular segment. Chelipeds subequal, right somewhat longer; dorsal surfaces of palms and fixed fingers with several moderately strong, corneous-tipped spines; dorsal margins of carpi each with row of 3 spines, proximal-most smallest or reduced to spinulose tubercle or protuberance. Ambulatory legs with dactyls of third pereopods shorter than propodi, dorsolateral margins defined by distinct, tuberculate ridge, much better developed on left, lateral surfaces flattened or slightly convex (right) or slightly concave (left), ventral margins each with row of 6 or 7 corneous spines; propodi also with distinct dorsolateral tuberculate ridge, left strongest, lateral face with median longitudinal row of tubercles (right) or unarmed but slightly concave (left); carpi each with dorsodistal spine. Telson with slightly asymmetrical posterior lobes; terminal margins each with several small spines.

Size.– Maximum recorded shield length approximately 8.5 mm.

Coloration.– Shield olive or light to dark blue. Ocular peduncles solid olive-drab, dark brown, or greenish-black, each with narrow white ring at base of cornea. Antennal flagella light blue. Chelipeds olive, brown, or bluish-black, tips of dactyls and fixed fingers orange or whitish, spines yellowish-white to white. Ambulatory legs with meri, carpi and propodi olive, dark brown, blackish-blue or bluish-black; dactyls yellowish-white or white, with or without median dark brown or bluish-black band.

Habitat.– Seagrass beds and reef platforms, sand, rock and coral substrates.

Distribution.– East coast of Africa to Indonesia, Thailand, Taiwan, Japan, Fiji Islands; intertidal to shallow subtidal.



Male (4.7 mm), Aodi, Taipei County, no specific date: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius humilis (Dana, 1851)

Magang, Taipei County, 21 Jul 2006.

Pagurus humilis Dana, 1851: 271.

Clibanarius humilis– Dana, 1852b: 469; Dana, 1855: pl. 29, fig. 9; Forest, 1953a: 443, figs. 1, 5; Yu & Foo, 1991: 44, unnumbered fig.; Rahayu & Forest, 1993: 773.

Clibanarius aequabilis– Nobili, 1907: 367 [not *Clibanarius aequabilis* (Dana, 1851)].

Clibanarius aequabilis var. *merguiensis*– Bouvier, 1915: 29 [not *Clibanarius aequabilis* var. *merguiensis* De Man, 1888a].

Not *Clibanarius humilis*– Yu & Foo, 1991: 44, unnumbered fig. [= *Clibanarius englaucus* Ball & Haig, 1972].

Material examined.– Aodi, Taipei County, 2005: 2 ovig. females (2.2, 2.2 mm), (NTOU).– 20 May 2006: 1 female (1.7 mm), (NTOU).– no specific date: 1 male (4.0 mm), (NTOU); Fulong, Taipei County, 20 Oct 2006: 19 males (1.8-3.1 mm), 9 females (1.6-3.5 mm, 5 ovig.), (NTOU); Magang, Taipei County, 7 Oct 1996: 1 male (1.4 mm), 2 ovig. females (2.1, 2.1 mm), (NTOU).– 21 Jul 2006: 4 males (1.9-3.3 mm), 1 female (1.7 mm), 2 ovig. females (2.1, 2.2 mm), 1 juvenile (0.8 mm), (NTOU); Mao-ao, Taipei County, 11 Aug 2006: 18 males (1.6-3.3 mm), 4 females (1.6-3.3 mm, 3 ovig.), (NTOU); Shihtiping, Hualien County, 20 Sep 2006: 2 males (1.7, 2.0 mm), 3 females (1.1-1.4 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 3 males (1.6-2.2 mm), 4 females (1.4-2.1 mm), (NTOU); no specific locality: 1 female (2.0 mm), 1 ovig. female (2.5 mm), 1 juvenile (1.2 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad. Ocular peduncles shorter than antennular peduncles; corneas less than 0.3 length of peduncles; ocular acicles each with 3 or 4 spines. Antennal peduncles reaching

to or slightly beyond bases of corneas. Chelipeds usually slightly asymmetrical, right chela longer and broader, but similarly armed; dorsal and lateral surfaces of chelae each covered with small, sometimes spinulose tubercles and row of 1-4 subacute spines parallel to dorsal margin. Dactyl of left third pereopod slightly shorter to equaling length of propodus; dorsolateral margin of propodus with well defined carina, ventral margin unarmed but with few scattered tufts of setae; dactyls each with 5 or 6 corneous spines on ventral margin. Telson with shallow median cleft separating asymmetrical posterior lobes, terminal margins each with few small spinules and 1-3 larger, corneous tipped spines on lateral margins.

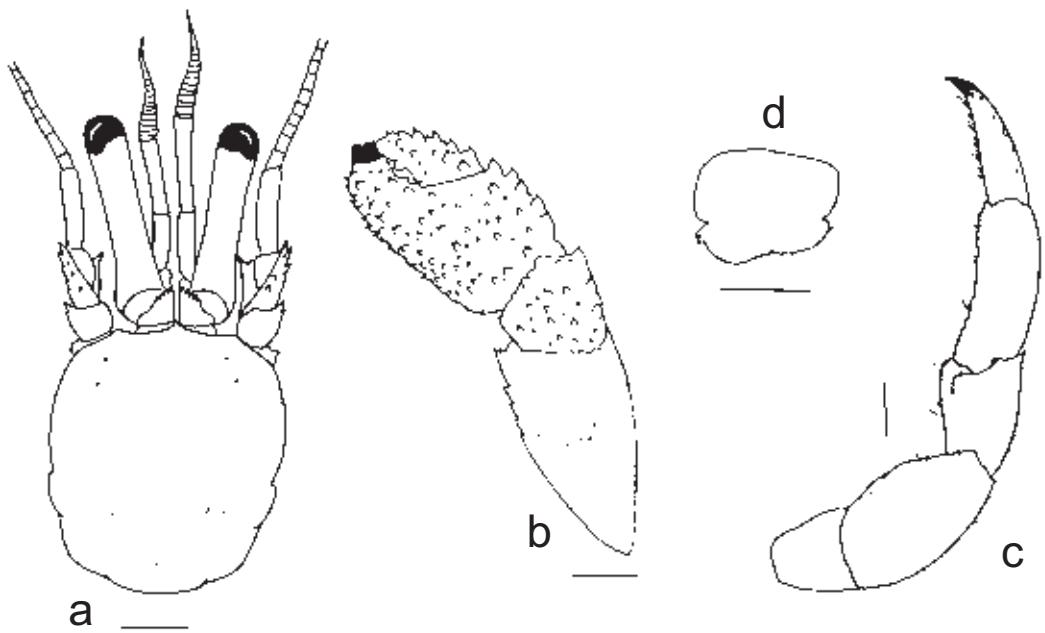
Size.– Maximum recorded shield length 5.0 mm.

Color.– Shield blue to bluish-green. Ocular peduncles each orange with whitish band distally. Chelipeds very dark green to bluish-black, fingers lighter. Dactyls of ambulatory legs yellowish-orange, darkest proximally; propodi dark blue distally, reddish-orange proximally; carpi dark blue or bluish-black; meri blue to bluish-black, each with broad reddish-orange stripe.

Habitat.– Mangroves and rocky areas.

Distribution.– Mauritius and Rodrigues Islands, eastern Indian Ocean to Japanese Ryukyu Islands, Taiwan, Indonesia, New Caledonia, French Polynesia; intertidal.

Remarks.– The record of *Clibanarius humilis* from Taiwan by Yu & Foo (1991) is actually a misidentification of *C. englaucus*. Therefore, this species can be considered as correctly recorded from Taiwan for the first time here.



Male (4.0 mm), Aodi, Taipei County, no specific date: **a,** Shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Clibanarius ransoni Forest, 1953

Aodi, Taipei County, 20 May 2005.

Clibanarius ransoni Forest, 1953a: 446, figs. 2, 6; Fize & Serène, 1955: 150, fig. 23; Rahayu & Forest, 1993: 774.

Material examined.– Aodi, Taipei County, 20 May 2005: 1 male (2.9 mm), (NTOU).– 20 May 2006: 1 male (2.4 mm), (NTOU); Meiyanshan, Taipei County, 7 Oct 2005: 1 male (4.2 mm), (NTOU).

Diagnosis.– Shield nearly as long as broad. Ocular peduncles moderately slender, corneas approximately 0.2 of peduncular length; ocular acicles each with 3 or 4 terminal spinules. Antennular peduncles overreaching distal margins of corneas; antennal peduncles reaching beyond bases of corneas; antennal acicle reaching distal margin of fourth peduncular segment or slightly beyond. Chelipeds subequal, each with covering of small spines or tubercles slightly more prominent on mesial margins of palms and on dactyls and fixed fingers. Ambulatory legs with dactyls usually shorter than propodi, ventral margins each with 4 or 5 corneous spines; second and right third pereopods with dorsolateral margins of propodi rounded, dorsolateral margin of left third propodus somewhat carinate. Telson with slightly asymmetrical posterior lobes; terminal margins each with several small spines.

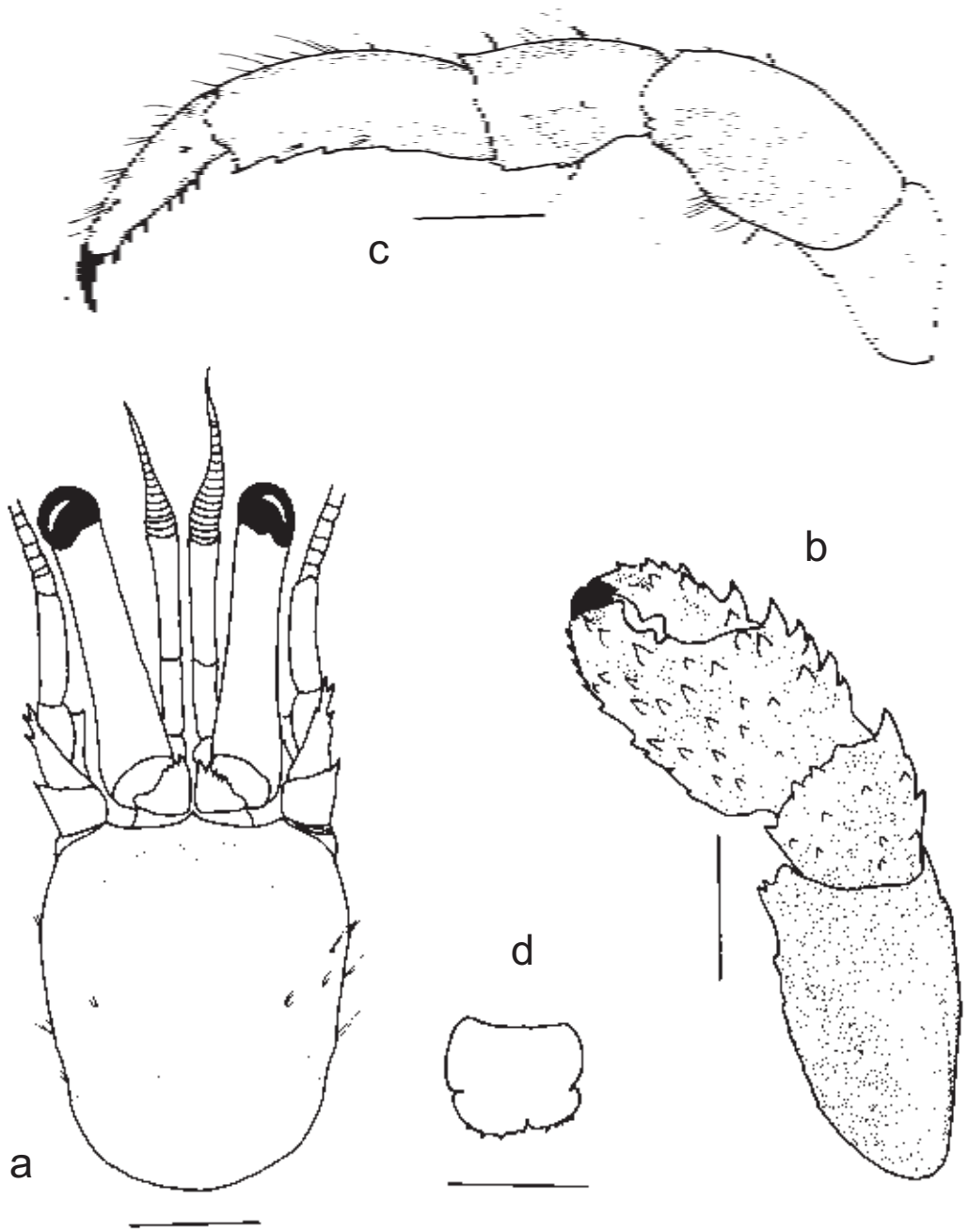
Size.– Maximum recorded shield length 4.5 mm.

Coloration.– Shield mottled light blue and orange. Ocular peduncles reddish-orange, each with blue band at base of cornea. Chelipeds bluish-black with lighter spines and tubercles. Ambulatory legs blue or bluish-black, each with broad light orange or tannish-orange stripe on lateral face extending from base of claw to proximal margin of merus.

Habitat.– Seagrass beds and reef platforms.

Distribution.– Tahiti, Indonesia, Vietnam, Taiwan; intertidal.

Remarks.– This is the first record of *Clibanarius ransoni* in Taiwanese intertidal waters.



Male (2.9 mm), Aodi, Taipei County, 20 May 2005: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, left cheliped; **c**, left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 0.5 mm.

Clibanarius merguiensis De Man, 1888

Aodi, Taipei County, 11 Jul 2005.

Clibanarius aequabilis var. *merguiensis* De Man, 1888a: 247.

Clibanarius merguiensis– Forest, 1953a: 446, fig. 7; Fize & Serène, 1955: 145, fig. 22; Rahayu & Forest, 1993: 774, fig. 7.

Not *Clibanarius merguiensis*– Kamezaki et al., 1988, unnumbered fig. (= *Clibanarius striolatus* Dana, 1852a).

Material examined.– Aodi, Taipei County, 20 May 2005: 1 male (2.7 mm), (NTOU); Fulong, Taipei County, 20 Oct 2006: 2 males (2.9, 3.5 mm), 1 female (2.5 mm), (NTOU); Mao-ao, Taipei County, 16 Oct 2006: 3 males (1.8-2.8 mm), 1 ovig. female (2.0 mm), (NTOU); Meiyanshan, Taipei County, 7 Oct 2005: 1 ovig. female (2.6 mm), (NTOU); Guanyin, Taoyuan County, 14 Sep 2006: 1 female (1.7 mm), (NTOU); Haikou, Kending, Pingtung County, 26 Apr 2006: 2 females (1.9, 2.3 mm), 5 ovig. females (1.9-2.5 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles moderately short; corneas approximately 0.2 of peduncular length; ocular acicles each with 5 or 6 spines. Antennular peduncles reaching only to bases of corneas; antennal peduncles reaching not quite or nearly to distal margins of corneas. Chelipeds equal or slightly subequal; similar in armament; chelae each with dorsal surface covered with tubercles or spines, more numerous and acute on dactyls and fixed fingers; carpi each with dorsomesial distal spine. Ambulatory legs with dactyls shorter than propodi, ventral margins each with 5 or 6 corneous spines; dorsal and lateral faces of dactyls and propodi unarmed, but with small pits from which setae arise; propodi of second and right third cylindrical, with lateral faces smooth and convex, left third with flattened lateral face and acutely ridged

dorsolateral margin; carpi each with single dorsodistal spine. Telson with posterior lobes subequal to distinctly unequal; terminal margins each with 5-10 spines extending onto lateral margins and partially concealed by long setae.

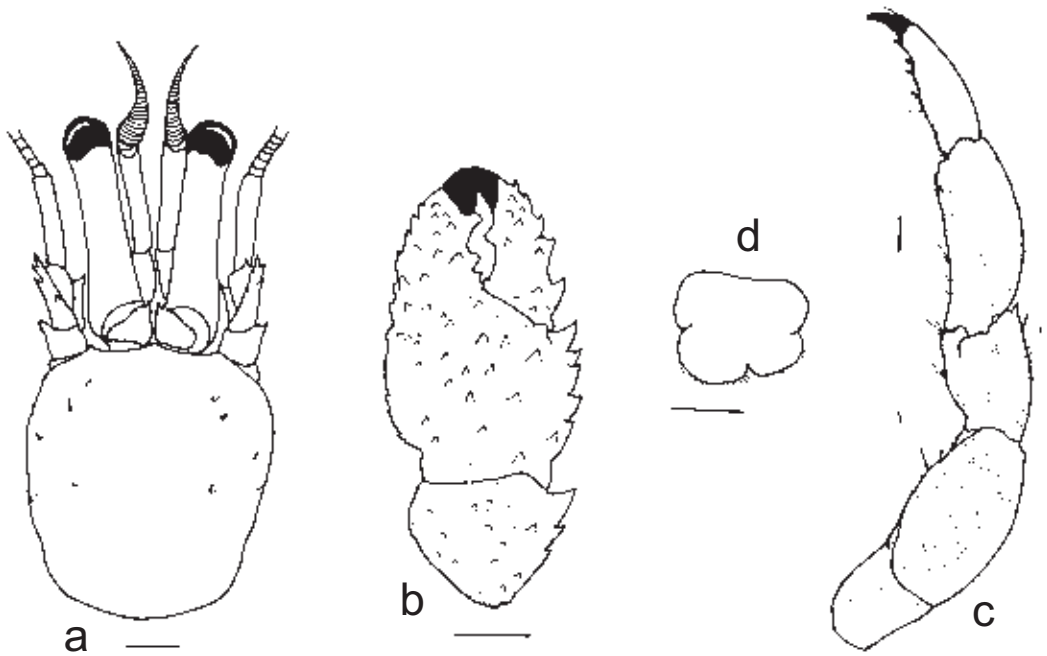
Size.– Maximum recorded shield length 5.0 mm.

Coloration.– Shield mottled olive, blue and white. Ocular peduncles orange with blue dorsal stripe. Antennular and antennal peduncles dark blue, antennular flagella orange. Chelipeds dark blue with occasional patches of orange. Ambulatory legs with background color of dark blue; dactyls each with orange band proximally, light blue or bluish-white stripe on lateral face and whitish or slightly orange tip; propodi each with patch of orange on lateral face distally, third pereopods each also with broad white or bluish-white stripe on lateral face and patch of orange at proximal margin; carpi of third pereopods each with orange patch on lateral face; meri each with patch of orange on lateral face proximally, largest on third pereopods.

Habitat.– Seagress beds, coral reefs and reef platforms and rocky areas.

Distribution.– Mozambique, Thailand, Vietnam, Malaysia, Indonesia, New Caledonia, Philippine Islands, Taiwan; intertidal.

Remarks.– This is the first report of this species from the Taiwanese intertidal.



Male (2.7 mm), Aodi, Taipei County, 20 May 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Clibanarius arethusa De Man, 1888

No specific locality.

Clibanarius arethusa De Man, 1888a: 252; Henderson, 1893: 424; Alcock, 1905: 48, pl. 4, fig. 3; Fize & Serène, 1955: 114, fig. 16; Yu & Foo, 1991: 45, unnumbered fig.

Material examined.– None.

Diagnosis.– Shield slightly longer than broad. Ocular peduncles approximately 0.8 length of shield; ocular acicles each with 3 terminal spines. Antennular peduncles nearly reaching distal margins of corneas; antennal peduncles not reaching bases of corneas; antennal acicle short, reaching distal margin of fourth peduncular segment. Chelipeds subequal, right slightly longer and more robust, similar in armature; dorsomesial margins of palms each with row of 4 or 5 small spines, dorsal surfaces with scattered spines and sparse tufts of stiff setae, mesial spines larger than lateral spines; dorsomesial margins of carpi each with 1 prominent spine distally. Ventral margins of dactyls of ambulatory legs each with row of 5 or 6 small corneous spines over entire length; dactyl of left third pereopod stout, subequal to or slightly longer than propodus. Telson with faint median cleft separating asymmetrical posterior lobes, left terminal margin with 5-7 corneous tipped spines noticeably increasing in size laterally, right terminal margin with 5 or 6 spinules, both spine rows not extending onto lateral margin.

Size.– Maximum recorded shield length 7.5 mm.

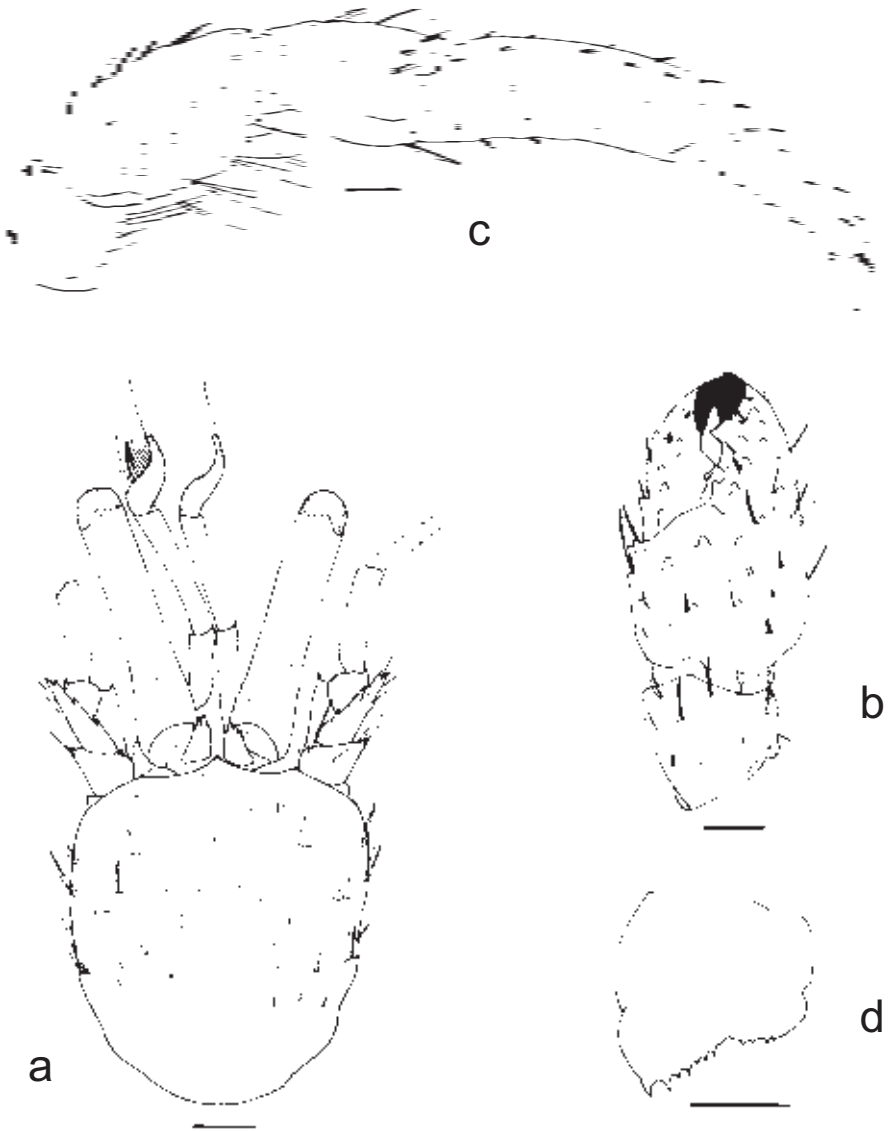
Coloration.– Cephalothorax white or light gray. Ocular peduncles entirely brown (no distinct stripes).

Antennular peduncles also entirely brown; flagella pale brown. Antennal peduncles dark brown on first to fourth segments, light brown on fifth segment and flagellum. Chelipeds and ambulatory legs entirely dark brown to reddish-brown, without stripes or bands.

Habitat.– Shallow coral reefs.

Distribution.– Mergui Archipelago, India, Vietnam and Taiwan; intertidal to 10 m.

Remarks.– The diagnosis and line drawings of this species are based on specimens from Thailand as the Taiwan specimen could not be located. The photograph provided, however, was taken of a specimen collected from Taiwan and was the same specimen, but not the same photograph used by Yu and Foo (1991).



Male (5.5 mm, CBM-ZC 5808), Man Nok, Gulf of Thailand: **a,** shield and cephalic appendages; **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

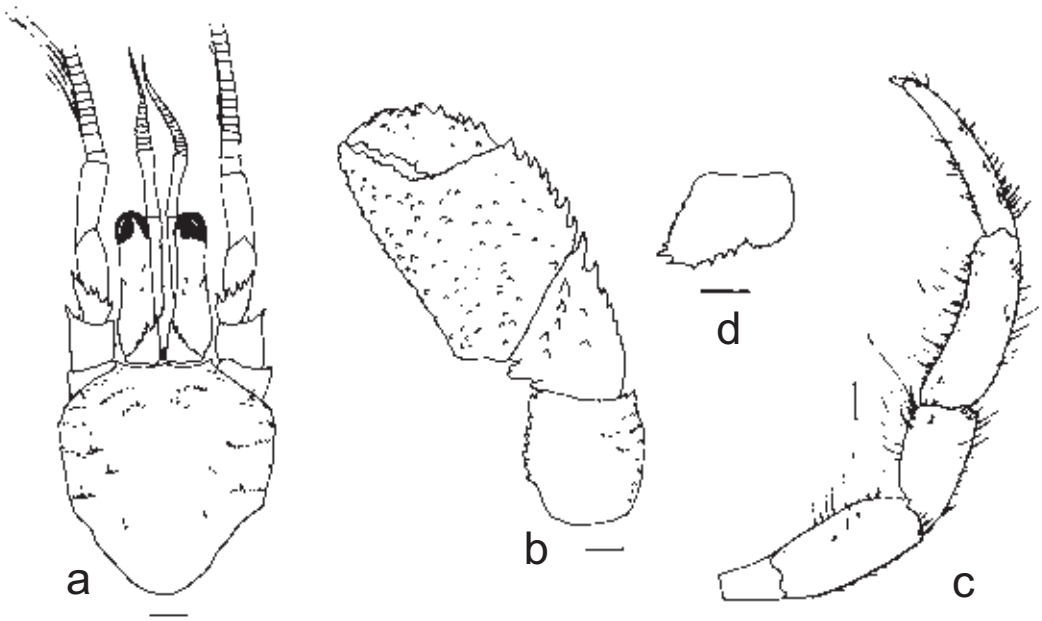
Diogenes Dana, 1851

Species of *Diogenes* are generally defined as having a spinose (intercalary rostriform) process developed from the ocular plate between the ocular acicles. Although, this process is represented by a moderately large, but simple spine in the majority of species in the genus, *Diogenes* actually was established by Dana (1851) for a relatively few species in which the intercalary rostral process forms a large, somewhat flattened, marginally spinose structure (McLaughlin & Holthuis, 2001). This process also is reduced or virtually absent in several species, a condition Henderson (1893) considered sufficiently diagnostic to justify distinct generic rank and for which he proposed the genus *Troglopagurus* Henderson, 1893. Henderson's genus was put into synonymy with *Diogenes* by Forest (1955). Seven Taiwanese species of *Diogenes* have a simple intercalary rostriform process; however, one species, *D. jubatus* (Nobili, 1903), represents the "*Troglopagurus* group" (cf. McLaughlin, 2005).

Key to the Taiwanese species of *Diogenes*

1. Intercalary rostriform process well developed ……2
- Intercalary rostriform process reduced or absent ……*D. jubatus*
2. Left chela with outer surface markedly setose ……*D. penicillatus*
- Left chela with outer surface not markedly setose ……3
3. Antennal peduncles overreaching distal corneal margins ……4
- Antennal peduncles not overreaching distal corneal margins ……*D. tumidus*
4. Carpi of second and third pereopods each with row of spines ……5
- Carpi of second pereopods each with row of spines; carpi of third pereopods each with dorsodistal spine ……*D. avarus*
5. Propodi of third pereopods each with row of small spines on dorsal surface ……6
- Propodi of third pereopods each without row of small spines on dorsal surface ……7
6. Outer surface of palm of left cheliped with covering of subacute spines or spiniform tubercles, never covered by sea anemone ……*D. spinifrons*
- Outer surface of palm of left cheliped unarmed or with only very small granules, tubercles or spinules, usually completely covered by anemone ……*D. edwardsii*
7. Telson with terminal margins weakly concave, each armed with row of very small spines, 1 somewhat larger spine at each outer angle, spines not continued onto lateral margins ……*D.* aff. *nitidimanus*
- Telson with terminal margins horizontal or oblique, each with row of small spines medianly, 2 or 3 very prominent curved spines at outer angles, spines continued onto lateral margins, at least on left ……*D. rectimanus*

Diogenes jubatus (Nobili, 1903)



Ovig. female (3.0 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Troglopagurus jubatus Nobili, 1903: 17.

Diogenes jubatus.– Forest, 1952a: 9; Lemaitre & Ng, 1996: 324, figs. 1-5; McLaughlin, 2005: 612, fig. 4a-c.

Diogenes platyops Rahayu & Forest, 1995: 399, figure 4; Rahayu, 1996: 348; Lemaitre and Ng, 1996: 330; Rahayu, 2000: 391; McLaughlin, 2005: 604.

Material examined.– No specific locality: 1 ovig. female (3.0 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles 0.6-0.8 length of shield; corneal diameters 0.2-0.3 of peduncular length; ocular acicles each with 3-6 spines. Intercalary rostriform process vestigial or reaching proximal 0.2 of ocular acicles. Antennular peduncles overreaching ocular peduncles by nearly full lengths of ultimate segments or beyond. Antennal peduncles reaching beyond distal margins of corneas by 0.3 to entire lengths of ultimate peduncular segments; antennal acicle with 4-9 spines on oblique or truncate inner margin; flagellum with very long ventral setae. Armature of left chela usually completely obscured by long setae; upper surface of palm with tubercles or spines; lower margin tuberculate or spinose, with tubercles or spines continuing onto fixed finger; outer face with scattered small spines or tubercles; upper margin of palm with row of acute or subacute spines; outer face of carpus with scattered spinules or spines, not concealed by accompanying tufts of setae. Right cheliped with chela completely masked by setae. Ambulatory legs unarmed, except for small dorsodistal spine on each carpus; dactyls equal to 1.5 longer than propodi; setation moderate to dense, particularly on third pereopods. Telson with left lobe prominently produced, right nearly level, terminal margin with series of small spines, sometimes extending onto lateral margins.

Size.– Maximum recorded shield length 4.8 mm.

Coloration.– Shield white except for black areas medially and posterior to anterolateral margin; with

some iridescence. Ocular peduncles mostly black except for white area basally and narrow white band adjacent to cornea; ocular acicles black with white distal margins. Basal and penultimate segments of antennular peduncle, and first three segments of antennal peduncle black; remaining segments and antennular and antennal flagella whitish; long setae of antennal flagellum light brown. Chelipeds white, each with wide black band distally on merus and carpus; palm with black inner face; dactyl with black area on inner face. Ambulatory legs white, each with black band on merus, carpus, propodus, and dactyl (after Lemaitre & Ng, 1996).

Habitats.– Mixed gravel, sand, and mud in areas with strong currents.

Distribution.– Malaysia, Singapore, Indonesia, Taiwan; 15-20 m.

Remarks.– This is the first record of *Diogenes jubatus* in Taiwanese waters.

Diogenes penicillatus Stimpson, 1858

Dasi fishing port, Yilan County, Aug 2003.

Diogenes penicillatus Stimpson, 1858: 256; Miyake, 1982: 107, pl. 36, fig. 2; Yu & Foo, 1991: 49, unnumbered fig.

Material examined.– Badouzih, Keelung, 14 Jul 2005, 3.6 m: 1 male (2.5 mm), 1 female (1.4 mm), 1 ovig. female (3.2 mm), (NTOU); Keelung, 9 Nov 1984: 2 males (3.4, 4.2 mm), (NTOU).– May 1985: 1 specimen not sexed (4.5 mm), (NTOU); Dasi fishing port, Yilan County, 14 Jan 1984: 2 specimens not sexed (3.2, 3.7 mm), (NTOU).– 19 May 1988: 2 specimens not sexed (5.4, 6.1 mm), (NTOU).– 20 Jul 1988: 5 specimens not sexed (3.6-5.0 mm), (NTOU).– 17 Nov 1991: 2 specimens not sexed (3.2, 3.7 mm), (NTOU).– 24 Sep 1996: 1 specimen not sexed (3.7 mm), (NTOU).– 29 Apr 1997: 1 male (4.0 mm), (NTOU).– 20 May 1997: 4 specimens not sexed (2.63-4.4 mm), 1 ovig. female (5.0 mm), (NTOU).– 28 May 1997: 3 specimens not sexed (4.2-5.5 mm), (NTOU).– 28 Nov 1997: 4 specimens not sexed (3.2-4.5 mm), (NTOU).– 8 Nov 1999: 1 specimen not sexed (3.9 mm), (NTOU).– 14 Jun 2002: 1 specimen not sexed (4.9 mm), (NTOU).– 7 Dec 2004: 1 specimen not sexed (3.7 mm), (NTOU).– 5 Jun 2005: 7 males (2.4-4.3 mm), (NTOU).– no specific date: 1 male (2.5 mm), 1 female (4.4 mm), (NTOU).– no specific date: 1 specimen not sexed (4.7 mm), (NTOU).– no specific date: 1 specimen not sexed (5.8 mm), (NTOU); Fanzihliao, Yilan County, 21 Jun 1989: 1 male (3.0 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 29 May 1997: 1 male (3.2 mm), (NTOU); Nanliao fishing port, Hsinchu, 7 Jan 1992: 1 specimen not sexed (6.9 mm), (NTOU); Mituo fishing port, Kaohsiung County, 30 Jul 2004: 1 specimen not sexed (2.2 mm), (NTOU); Singda Harbor, Kaohsiung County, 6 May 1988: 2 specimens not sexed (5.0, 5.2 mm), (NTOU); no specific locality: 3 males (2.7-4.2

mm), 1 female (5.1 mm), (NTOU).– 2 specimens not sexed (6.0, 6.5 mm), (NTOU).– 3 specimens not sexed (4.1-5.3 mm), (NTOU).– 13 Mar 1981: 2 males (4.0, 4.5 mm), (NTOU).– 27 May 1997: 1 male (3.0 mm), (NTOU).

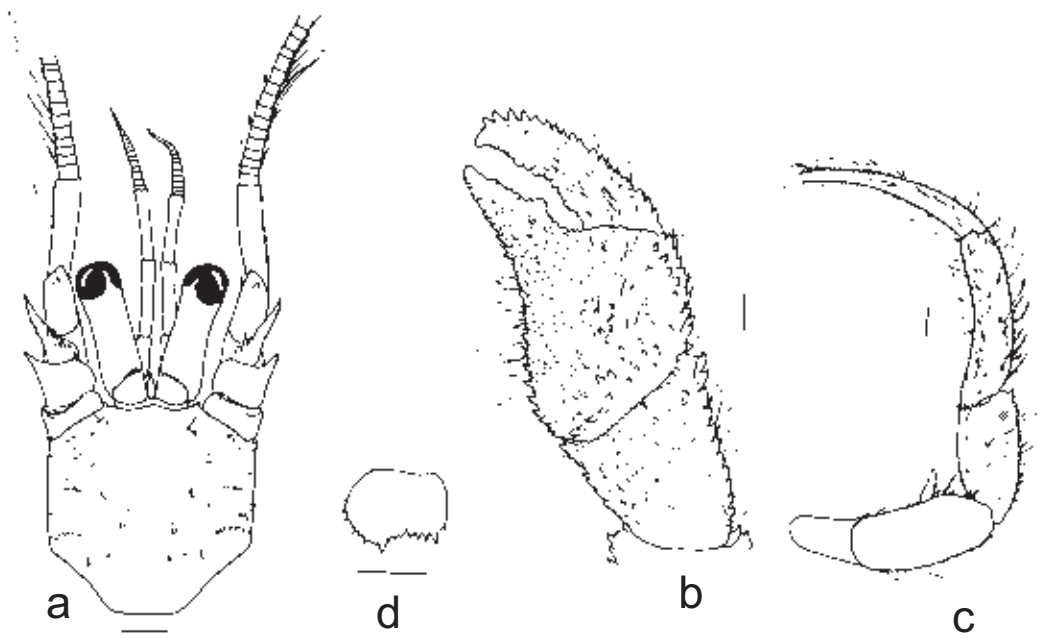
Diagnosis.– Shield as long as broad; rostrum obtusely rounded. Ocular peduncles slightly overreaching penultimate segments of antennal peduncles; corneas not dilated; ocular acicles broad, each with 2 or 3 spinules at apex. Branchiostegites each with row of prominent spines on dorsal margin. Intercalary rostriform process moderately small, spiniform, barely reaching distal margins of ocular acicles. Antennal peduncles equal to or shorter than ocular peduncles (including corneas); antennal acicle elongate, triangular, mesial margin with 6 or 7 spines; antennal flagellum short, with long ventral setae. Left cheliped stout and broad; palm oblique, with 2 parallel rows of small spines, 1 at margin, 1 adjacent on outer surface, outer surface thickly penicillate with fine silky setae, penicillate area defined posteriorly by transverse spinose crest; carpus with 1 spine at superior and inferior apices, and 10-12 spinules on upper margin. Right cheliped with 2 rows of spines on upper surface of carpus. Ambulatory legs with dactyls slightly longer than propodi, slender and slightly curved; carpi with spinulose dorsal surfaces; dorsal surfaces of all segments setose. Telson with moderately deep median cleft; terminal margins each with numerous small spines, extending onto lateral margins, at least on left.

Size.– Maximum recorded shield length 6.9 mm.

Coloration.– Shield reddish-pink. Ocular peduncles white distally, with large area of reddish-pink in proximal 0.6. Chelipeds and ambulatory legs generally light reddish-pink, with dark bands of reddish-pink or brown.

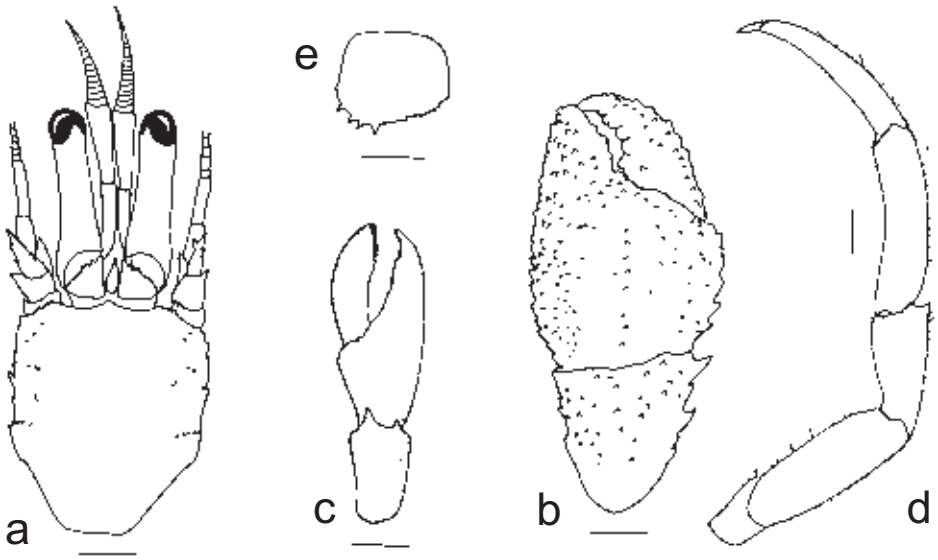
Habitat.– Sandy substrates.

Distribution.– Japan, Shamara Bay, Russia, Taiwan; 33-88 m.



Male (4.3 mm), Dasi fishing port, Yilan County, 5 Jun 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Diogenes tumidus Rahayu & Forest, 1995



Male (2.1 mm), Singda Harbor fishing port, Kaohsiung County, 3 Apr 1988: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** carpus and chela of right cheliped (outer face); **d,** left third pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 0.5 mm.

Diogenes tumidus Rahayu & Forest, 1995: 402, fig. 5; McLaughlin, 2002a: 420, fig. 4A-C.

Material examined.– Singda Harbor fishing port, Kaohsiung County, 3 Apr 1988: 2 males (1.5, 2.1 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles slender, little shorter than shield; ocular acicles broad, each with 4 or 5 prominent spines. Intercalary rostral process about same length as ocular acicles. Antennular peduncles slender, slightly longer than ocular peduncles. Antennal peduncles short, reaching approximately distal 0.2 of ocular peduncles; antennal acicle reaching nearly to or overreaching distal margin of fourth peduncular segment, with long setae and strong terminal spine, lateral and mesial margins each with 2 strong spines; antennal flagellum short, articles with short setae. Left cheliped with very weak longitudinal median carina marked by row of sharp spines on convex outer face of palm, between carina and upper margin, usually 1 or 2 rows of smaller spines; lower half of surface covered in part with spinose tubercles; upper margin armed with more or less developed spines; prominent hooked spines on upper margin of carpus and 1 distal spine on lower margin; outer face with scattered spinules. Right cheliped with prominent hiatus between dactyl and fixed finger; carpus with 2 or 3 spines near distal margin. Ambulatory legs with dactyls slightly longer than propodi; carpi each with dorsodistal spine; other segments unarmed. Chelipeds and ambulatory legs covered with fine, long, plumose setae, not obscuring armature. Telson without distinct median cleft; middle of terminal margin laterally with acute spines (left), or fine spinules (right).

Size.– Maximum reported shield length 3.5 mm.

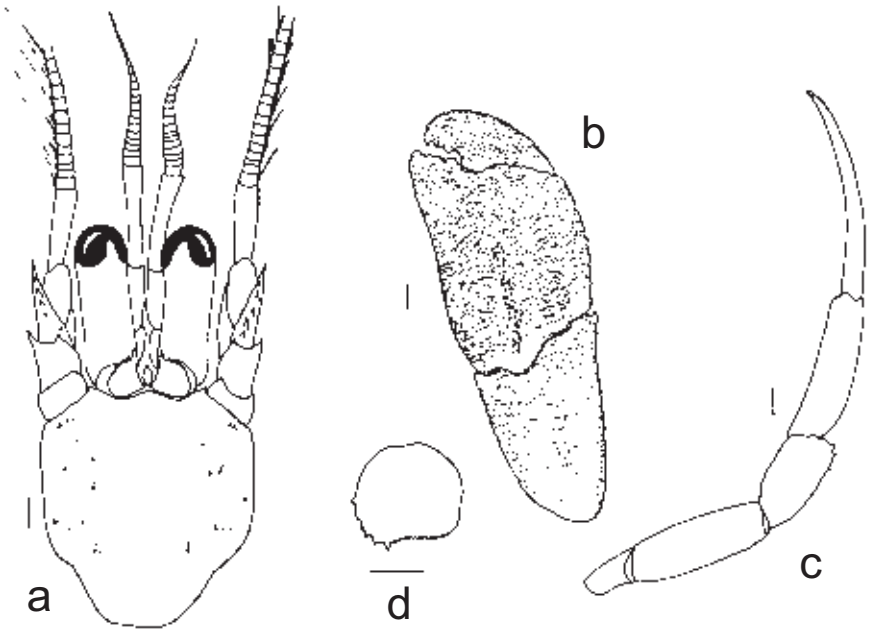
Coloration.– Not known.

Habitats.– Rocky reefs, seagrass beds and sand substrates.

Distribution.– Thailand, Indonesia, Singapore, Taiwan; intertidal and shallow subtidal.

Remarks.– This is the first record of *Diogenes tumidus* in Taiwanese waters.

Diogenes avarus Heller, 1865



Male (3.0 mm), no specific locality, 14 Jul 2000: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Diogenes avarus Heller, 1865: 83, pl. 7, fig. 2; Alcock, 1905: 68, pl. 6, fig. 6, 6a; Forest, 1956b: 524, figs. 1-4; Lewinsohn, 1969: 37, fig. 4; Tirmizi & Siddiqui, 1982: 54, fig. 29; Ajmal Khan & Natarajan, 1984: 18, fig. 15; Thomas, 1989: 74, fig. 2m-o; Wang, 1991: 228, fig. 187; McLaughlin & Clark, 1997: 39, figs. 3b, 8b, 9b-d, 11b; McLaughlin, 2002a: 416, fig. 3A-C.

Diogenes rectimanus– Lanchester, 1902: 366 (in part) [not *Diogenes rectimanus* Miers, 1884].

Diogenes pugilator– Bouvier, 1892: 55; Nobili, 1903: 16; Balss, 1915: 9 [not *Diogenes pugilator* (Roux, 1829)].

Diogenes pugilator var. *avarus*– Nobili, 1906: 119.

Material examined.– Sinbao, Changhua County, 7 Jul 1997: 4 males (2.0-3.3 mm), 1 ovig. female (2.9 mm), 1 specimen not sexed (3.1 mm), (NTOU); Baisha, Penghu County, 20 Sep 1999: 1 male (2.0 mm), 1 ovig. female (1.5 mm), (NTOU); Penghu County, Sep 1999: 2 males (2.0, 3.0 mm), (NTOU); no specific locality, 14 Jul 2000: 1 male (3.0 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles short and moderately stout; overreached by both antennular and antennal peduncles; ocular acicles broad, each with 1-3 spines and several minute spinules. Intercalary rostriform process slender, reaching beyond proximal halves of ocular acicles. Antennal peduncles slightly shorter to nearly equal lengths of antennular peduncles; antennal acicle with simple or bifid terminal spine, lateral margin usually with 1 or 2 spines distally, mesial margin with 3-7 small spines; antennal flagellum with paired long setae ventrally. Left cheliped with irregular rows of small tubercles or subacute spines on straight lower margin of palm and fixed finger, palm with convex outer surface armed with moderately to closely-spaced tubercles, spines or spinules, and with crest of stronger tubercles or spines

proximally near midpoint of proximal margin but not continued to articulation with dactyl, upper margin with irregular single or double row of small spines; upper surface of carpus with 3 rows of small spines, outer face armed with tubercles and small spines. Right cheliped with hiatus between dactyl and fixed finger; upper margins of carpus, palm and dactyl each with 1-3 rows of small spines partially obscured by long plumose setae. Ambulatory legs with dorsal margins of carpi each with double row of small spines on second, usually only single row of spinules on third; propodi each with irregular row of small spines or spinules, always on second, frequently on third. Telson with median cleft; terminal margin of left lobe with 3-6 large spines extending onto lateral margin and several very small spinules medianly, right terminal margin with 4-6 small spines.

Size.– Maximum recorded shield length 3.5 mm.

Coloration.– Shield pale gray and cream, sometimes with blue tinges. Ocular peduncles cream, sometimes with blue-green flecks basally; corneas black. Antennular peduncles cream, sometimes with green-blue spot on dorsal surface of penultimate segment near articulation with ultimate segment, and spots proximally and distally on ultimate segment; flagella cream. Antennal peduncles cream; flagella cream with narrow blue-green bands. Chelipeds cream with variable areas of brown especially ventrally on propodi. Ambulatory legs cream with some brown on propodi near midlengths, and scattered brown areas on carpi and meri (after Morgan, 1987).

Habitats.– Reef platforms, seagrass beds, mud flats and sandy substrates.

Distribution.– East Africa and Red Sea, across Indian Ocean to Malaysia, including Andaman and northern Arabian Seas, northern and northwestern Australia, Indonesia, Thailand, Philippine Islands, Taiwan, Japan; intertidal to 53 m.

Remarks.– This is the first record of *Diogenes avarus* in Taiwanese waters.

Diogenes edwardsii (De Haan, 1849)

Dasi fishing port, Yilan County, 5 Jan 1999.

Pagurus edwardsii De Haan, 1849: 211, pl. 50, fig. 1.

Diogenes edwardsii– Stimpson, 1907: 202, pl. 24, fig. 1; Namba, 1923: 463, figs. 1-6; Nakazawa, 1927: 1046, fig. 2014; Terao, 1932, pl. 57, fig. 4; Makarov, 1938: 158, pl. 1, fig. 3; Utinomi, 1961: 65, pl. 33, fig. 3; Lee, 1969: 52, fig. 8; Miyake, 1982: 107, pl. 36, fig. 1; Baba, 1986: 189, fig. 137; Wang, 1991: 226, fig. 184; Yu & Foo, 1991: 47, unnumbered fig.; Imafuku, 1992: 231, unnumbered fig. upper left; Wang, 1992: 60 (list); Asakura, 1995: 357, fig. 21-272C, pl. 93, fig. 5; Wang, 1995: 568 (list).

Material examined.– Keelung, May 1985: 1 specimen not sexed (5.4 mm), (NTOU); Dasi fishing port, Yilan County, 28 Aug 1995: 1 specimen not sexed (5.7 mm), (NTOU); 5 Jun 2005: 1 male (5.3 mm), (NTOU); Wuci fishing port, Taichung County, 29 May 1991: 2 males (5.7, 7.8 mm), 3 ovig. females (5.0-7.7 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 24 Jul 1984: 1 male (7.1 mm), (NTOU); no specific data: 1 specimen (7.1 mm), (NTOU).

Diagnosis.– Shield somewhat longer than broad. Ocular peduncles moderately short, overreached by both antennular and antennal peduncles. Intercalary rostriform process slender, terminally acute, shorter than ocular acicles. Antennal peduncles shorter than antennular peduncles; antennal acicle reaching beyond middle of second peduncular segment, mesial margin with few spines; antennal flagellum equal to or longer than carapace, articles with long setae ventrally. Left cheliped with prominent hiatus between dactyl and fixed finger, palm very short, shorter than dactyl, upper surface with 1 or 2 rows of spines and long setae, outer surface with ovate area partially circumscribed by weakly elevated ridge and almost always with attached

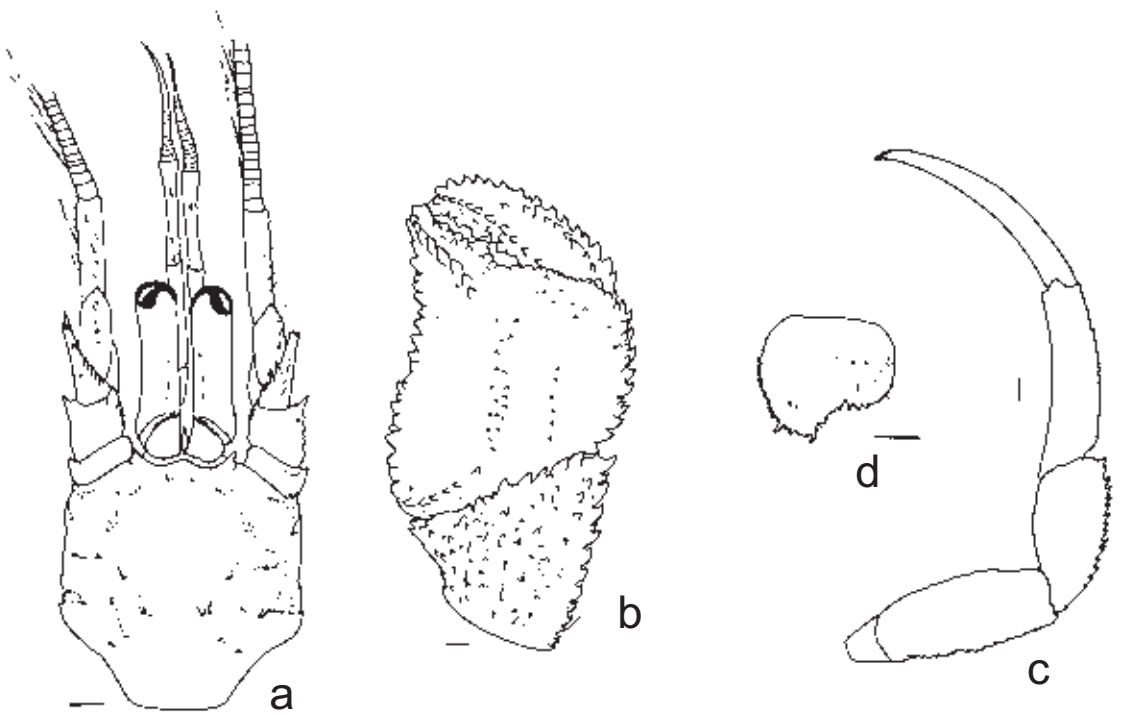
anemone; upper outer surface of carpus with rows of acute spines, 2 rows distinct, distal margin with prominent spines. Ambulatory legs long and slender, right longer than left; dactyls longer than propodi, each with median longitudinal sulcus; carpi and meri each with spinose dorsal surfaces. Telson with left lobe larger than right, terminal margins each with 5 or 6 spines, lateral margins with 6-12 spines; lateral and terminal margins also with sparse long setae.

Size.– Maximum recorded shield length approximately 14.0 mm.

Coloration.– Carapace light brown, pale red, brownish-gray or mottled tan and brown. Ocular peduncles yellow, light brown, bluish-gray, each with darker band proximally. Left chela white or light reddish-brown to orange; carpus and merus reddish-brown to brownish-gray mottled with white. Ambulatory legs gray, tan to light brown, with pale to dark reddish-brown or bluish-brown bands.

Habitat.– Muddy substrates, usually accompanied by anemone on palm of left chela.

Distribution.– Niigata Prefecture in Sea of Japan, Onagawa Bay on Japanese Pacific coast southward to Kyushu, East China Sea, Taiwan, Hong Kong; 16-97 m.



Male (7.8 mm), Wuci fishing port, Taichung County, 29 May 1991: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face, anemone removed); **c,** left second pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Diogenes spinifrons (De Haan, 1849)

Singda Harbor fishing port, Kaohsiung County, 27 Mar 1985.

Pagurus spinifrons De Haan, 1849: 212, pl. 49, fig. 6.

Diogenes spinifrons– Stimpson, 1858: 71; Miyake, 1982: 104, pl. 35, fig. 4; Yu & Foo, 1991: 48, unnumbered fig.; Asakura, 1995: 353, fig. 21-272C, pl. 93, fig. 4.

Material examined.– Dasi fishing port, Yilan County, 9 May 1988: 2 males (6.4, 7.7 mm), (NTOU); Kaohsiung Harbor, Kaohsiung, 5 Jan 1995: 1 specimen not sexed (5.7 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 24 Jul 1984: 1 male (6.0 mm), (NTOU); Donggang fishing port, Pingtung County, 15 Jul 1993: 1 ovig. female (4.9 mm), (NTOU); no specific locality: 1 specimen not sexed (6.1 mm), (NTOU).– 25 Feb 1995: 3 males (5.7-8.4 mm), (NTOU).– 14 Jul 2000: 3 ovig. females (3.7-4.4 mm), (NTOU).

Diagnosis.– Shield approximately as long as broad; rostrum obtuse. Ocular peduncles moderately short and stout; ocular acicles roundly subtriangular, terminal margins each with series of spines. Intercalary rostriform process short, subovate, subacute. Antennular peduncles overreaching distal margins of corneas by nearly entire lengths of ultimate segments. Antennal peduncles overreaching distal margins of corneas by 0.7-0.8 lengths of fifth segments, equaling or slightly longer than antennular peduncles; antennal acicle acutely triangular, mesial margin with row of prominent spines; antennal flagellum not much longer than shield, articles each with pair of long ventral setae. Left cheliped with acute or bluntly spinose, convex lower margin of palm, fixed finger sometimes deflexed; hiatus between dactyl and fixed finger; palm with 1 or 2 rows of small spines on upper surface, outer face with 4 or 5 longitudinal rows of rather widely-spaced small spines or tubercles, outer face of fixed finger with longitudinal tuberculate ridge. Carpus with rows of small spines or

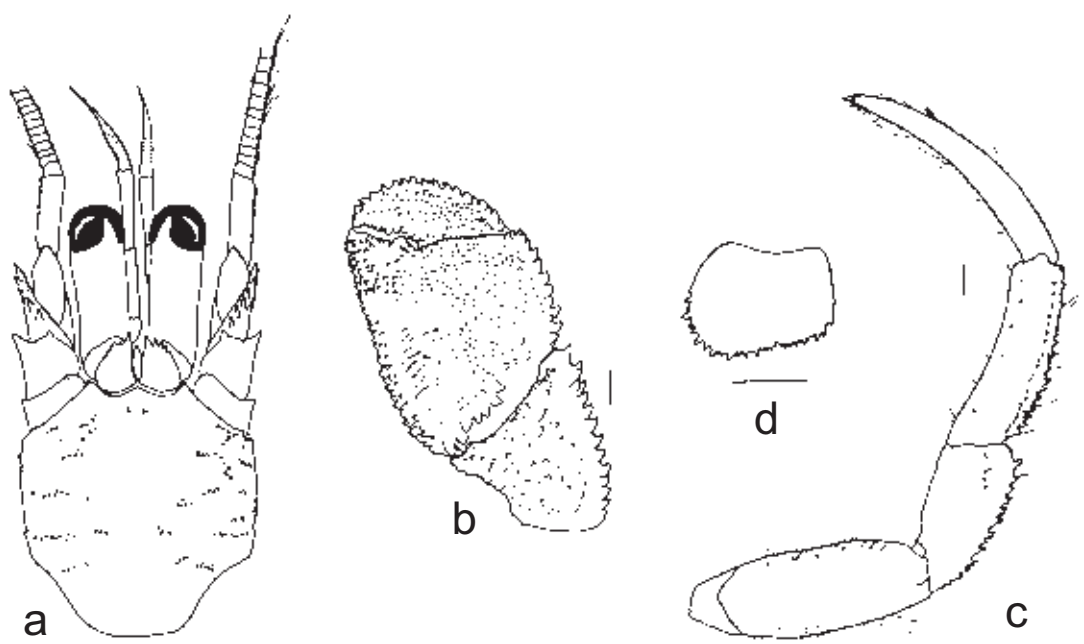
spinulose tubercles on upper and outer surfaces. Right cheliped with prominent hiatus between dactyl and fixed finger; upper and outer surfaces of dactyl and fixed finger spinose or tuberculate. Ambulatory legs with dactyls 1.5 length of propodi, lateral and mesial faces each with longitudinal sulcus, dorsal margins each with row of quite small spines extending not quite to tip; propodi each with 3 rows of spines on dorsal surface, 1 ventral row of moderately large spines; carpi each with row of spines on dorsal margin, second also with median row of small spines on lateral face. Telson with small median cleft separating somewhat asymmetrical posterior lobes; terminal margins each with almost double row of small spines medially, larger spines at outer angle and extending onto lateral margin, particularly on left.

Size.– Maximum recorded shield length 8.4 mm.

Coloration.– Carapace generally mottled tan and cream. Ocular peduncles light cream. Antennal flagella pale blue. Outer surface of left chela reddish-brown, sometimes with dark brown median patch; carpus also reddish-brown with broad darker brown band at midlength. Right cheliped with chela light reddish-orange; carpus darker brown. Ambulatory legs tan to brownish-orange, each with darker brown band on propodus and carpus, and two similar bands on merus.

Habitat.– Gastropod shells.

Distribution.– Japan, Taiwan; intertidal and subtidal.



Ovig. female (4.4 mm), no specific locality, 14 Jul 2000: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Diogenes aff. *nitidimanus* Terao, 1913

Tongsiao, Miaoli County, 12 Mar 1997.

? *Diogenes nitidimanus* Terao, 1913: 363, fig. 1 (see remarks).

Material examined.– Tongsiao, Miaoli County, 12 Mar 1997: 4 males (2.5-3.2 mm), (NTOU).

Diagnosis.– Shield longer than broad. Ocular peduncles stout, reaching to middle of last segments of both antennular and antennal peduncles; corneas 0.3 of peduncular length; ocular acicles juxtaposed, broad, each with 1-4 terminal spinules. Intercalary rostriform process short, acute, simple. Antennular peduncles shorter than antennal peduncles, both overreaching distal corneal margins; antennal acicle spinulose and slightly setose, slightly shorter than penultimate peduncular segment; antennal flagellum as long as carapace, with stout, long pinnate bristles ventrally. Left cheliped highly variable in shape, with upper margins of palm and carpus well-defined, all segments elongate; palm with irregular longitudinal groove on upper outer margin, 2 rows of spines or tubercles proximally, setae lacking. Ambulatory legs setose; dorsal margins of propodi and carpi spinulose; dactyls longer than propodi, each with longitudinal sulcus on lateral face. Telson with distinct median cleft; terminal margins weakly concave, each with row of very small spines and 1 larger spine at outer angle.

Size.– Maximum recorded shield length 3.2 mm.

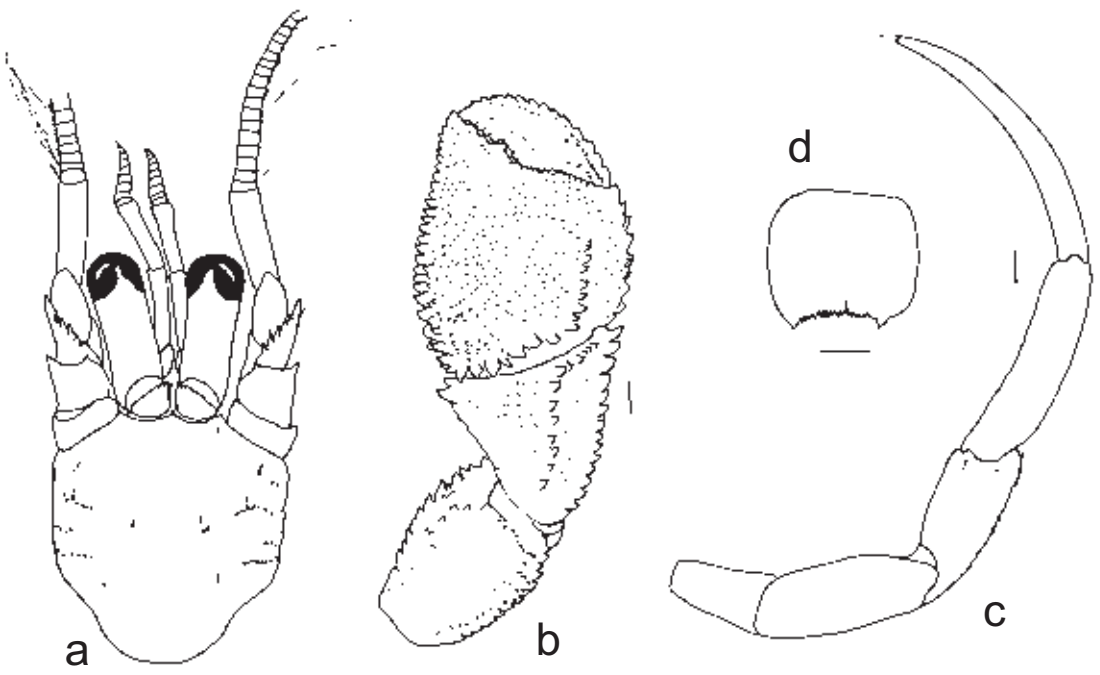
Coloration.– Shield and cephalic appendages bluish-green. Ocular peduncles light bluish-green with darker band proximally. Chelae of chelipeds white with tinges of green, faint tint of orange near upper margins; carpi yellowish to bluish-green; meri bluish-green, each with two darker narrow median bands. Ambulatory legs bluish-green, lighter on dactyls and distal halves of propodi; meri each with two darker

bands.

Habitat.– Sand flats.

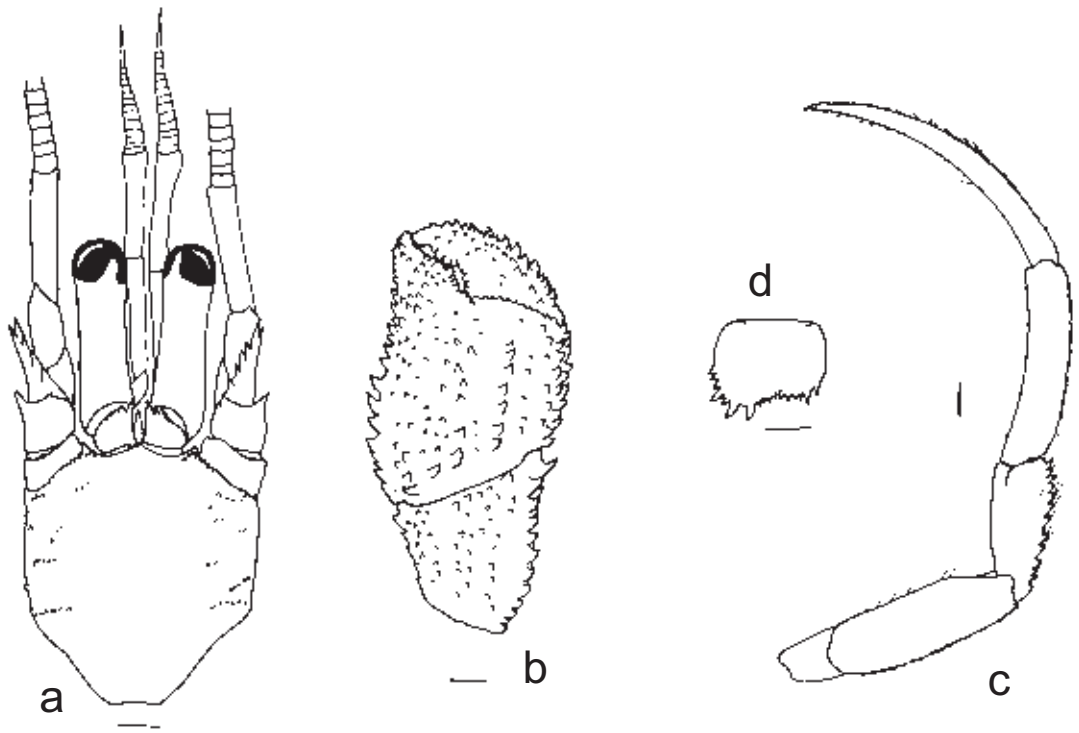
Distribution.– Japan, ? Taiwan; low intertidal and shallow subtidal.

Remarks.– The specimens from Taiwan are generally similar to *D. nitidimanus* in many respects. However, comparison with Japanese specimens of Terao's (1913) taxon has shown that the Taiwanese specimens differ in the armature of the left palm and the shape of the telson. The lower margin of the left chela is armed with sharp spines or spiniform tubercles in the Taiwanese material, rather than the blunt or rounded tubercles seen in the Japanese specimens. The terminal margins of the telson are concave in the Taiwanese specimens, but straight in specimens from Japan. Although these differences may prove to be simply geographically influenced variation, with only four Taiwanese specimens collected, we prefer to refer to these as *Diogenes* aff. *nitidimanus* until more material becomes available for evaluation.



Male (3.0 mm), Tongsiao, Miaoli County, 12 Mar 1997: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Diogenes rectimanus Miers, 1884



Male (2.6 mm), CP169: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Diogenes rectimanus Miers, 1884: 262, pl. 27, fig. c; Alcock, 1905: 71, pl. 6, fig. 8, 8a, pl. 7, fig. 2, 2a; Ajmal Khan & Natarajan, 1984: 20, fig. 17; Wang, 1991: 226, fig. 185; McLaughlin & Clark, 1997: 37, fig. 10b; McLaughlin, 2002a: 414, fig. 2A-C.

Not *Diogenes rectimanus*– Lanchester, 1902: 366 [= *Diogenes goniochirus* Forest, 1956b, and *Diogenes avarus* Heller, 1865].

Material examined.– CP169, 22°27.29'N, 120°17.90'E, 36 m, 25 May 2002: 1 male (2.6 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad. Branchiostegites each with 5 or 6 moderately well-developed spines. Ocular peduncles more than 0.5 length of shield, rather stout; corneas approximately 0.3 of peduncular length; ocular acicles with straight inner margins, broadly rounded anterolaterally, each with 3 small, but prominent spines and several additional smaller spinules, not extending entire length of terminal margin. Intercalary rostriform process reaching beyond proximal halves of ocular acicles, with subacute tip. Antennular and antennal peduncles both overreaching distal margins of corneas, antennular peduncles longer; antennal acicle not reaching to apex of fourth segment, with bifid terminal spine and 3 or 4 accessory spines on mesial margin. Upper surface of palm of left cheliped with irregular rows of spines, outer surface with slightly concave area just below upper margin and few scattered spinules and tubercles, upper outer face with adjacent longitudinal row of moderately prominent spines in proximal half, not reaching articulation of dactyl, remaining outer surface with scattered smaller spines; proximal margin with row of larger spines continuing to lower margin, lower margin with row of prominent, outwardly directed spines; carpus with row of moderately

blunt spines on upper margin, distal 2 or 3 stronger; outer surface convex, with series of small tuberculate spines. Ambulatory legs with numerous long setae, propodi and carpi each with row of spinules on dorsal surfaces, strongest on third, but sometimes concealed by setae; dactyls longer than propodi. Telson with small median cleft; terminal margins horizontal or oblique, both with moderately small spines medially, longer spines at outer angles, extending down lateral margins, at least on left.

Size.– Maximum reported shield length 6.4 mm.

Coloration.– Ocular, antennular and antennal peduncles pale orange-yellow. Dactyls and propodi of chelipeds cream or pale orange with darker green-gray tubercles; carpi and meri cream with green-gray or brown tinges. Ambulatory legs cream with tinges of yellow; propodi, carpi, meri, each with darker green or brown patches middorsally and midventrally (after McLaughlin, 2002a).

Habitat.– Frequently found on mud substrates.

Distribution.– Gulf of Aden, India, Sri Lanka, Thailand, Torres Strait, Australia, Taiwan; intertidal to 36 m.

Remarks.– This is the first report of *Diogenes rectimanus* in Taiwanese waters and represents a major range extension for the species.

Calcinus Dana, 1851

Species of *Calcinus* are colorful inhabitants of tropical and subtropical, intertidal and shallow subtidal environs around the world, but most abundant in the Indo-Pacific. Ten of the species occurring in Taiwanese waters have been well studied, most recently by Yu (1987), Foo (1989), Yu & Foo (1991), Shih & Yu (1995) and Shih & Lee (1997). The only addition to their faunal list is *Calcinus morgani* Rahayu & Forest, 1999, a species previously regarded only as a color morph of *C. gaimardii* (H. Milne Edwards, 1848).

Wang (1992, 1995) listed *Calcinus formosus* Neumann, 1878 as being present in Taiwan, but indicated that his 1992 records were taken only from literature. *Calcinus formosus* was listed as a western Atlantic species by Fize & Serène (1955), and was considered a junior synonym of another western Atlantic species, *Calcinus tibicen* (Herbst, 1791), by Lemaitre & Campos (1993). *Calcinus tibicen* sensu H. Milne Edwards, 1836 (not Herbst, 1791) is synonymous with *C. laevimanus* (Randall, 1840), but as Wang (1992, 1995) also cited Randall's (1840) species in his list of taxa occurring in Taiwan, it is not possible to determine what species or literature account Wang (1992, 1995) might have been referring to.

Key to the Taiwanese species of *Calcinus*

1. Dactyl and distal portion of propodus of left third pereopod with dense row of tufts of setae forming brush on ventral margins ……2
- Dactyl and distal portion of propodus of left third pereopod with or without tufts of setae on ventral margins, but not sufficiently dense to form setal brush ……4
2. Second and third pereopods with colored bands [ocular peduncles blue with brown patch basally; propodi, carpi and meri of ambulatory legs banded blue and black] ……*C. elegans*
- Second and third pereopods without colored bands ……3
3. Shield red-brown, at least in anterior 0.2 of dorsal surface ……*C. gaimardii*
- Shield cream to pale greenish-blue with patches of brown on rostrum and anterolateral margins ……*C. morgani*
4. Dorsal margin of right chela smooth or slightly granular ……5
- Dorsal margin of right chela prominently tuberculate or spinose ……6
5. Dactyl of left third pereopod distinctly shorter than propodus; propodus without dorsolateral ridge [ocular peduncles with basal orange band, blue proximally, orange distally; dactyls of second and third pereopods white, each with subdistal brown or green band, brown or green lateral and mesial spot proximally; propodi uniformly brown] ……*C. laevimanus*
- Dactyl of left third pereopod subequal in length to propodus; propodus with dorsolateral ridge [ocular peduncles with basal orange band, then pale blue grading through green to orange distally; dactyls and propodi of second and third pereopods white with green-brown or green-gray bands] ……*C. seurati*
6. Ventral margins of dactyls and propodi of third pereopods with more numerous tufts of setae than second 7
- Ventral margins of dactyls and propodi of third pereopods without more numerous tufts of setae than second ……8
7. Telson with 1-6 spines on left terminal margin, 0-3 on right [ocular peduncles salmon-gray or orange; dactyls of ambulatory legs cream, each with red-purple or brown-purple band composed of several short longitudinal stripes] ……*C. latens*
- Telson with numerous spines on both terminal margins, extending onto lateral margins [ocular peduncles dark gray with large black patches on dorsal surfaces proximally; dactyls of second and third pereopods

cream] ……*C. vachoni*

8. Outer margin of left posterior telsonal lobe armed with row of spines ……9

- Outer margin of left posterior telsonal lobe unarmed [ocular peduncles pink or orange; dactyls and distal portions of propodi of second and third pereopods orange, remainder of appendages white with small orange spots] ……*C. minutus*

9. Outer and inner faces of palms each with dark spots; second and third pereopods each with longitudinal flecks or stripes ……10

- Outer and inner faces of palms without dark spots; second and third pereopods without flecks or stripes [ocular peduncles cream, each usually with dark band proximally; dactyls of second and third pereopods cream, each with dark proximal band] ……*C. guamensis*

10. Second and third pereopods each with dark maroon longitudinal stripes on propodus [ocular peduncles rose-pink] ……*C. lineapropodus*

- Second and third pereopods each with broad, subdistal band of dark gray-brown on propodus [ocular peduncles rose-brown on proximal half, cream distally] ……*C. pulcher*

Calcinus elegans (H. Milne Edwards, 1836)

Magang, Taipei County, 26 Jun 2006.

Pagurus elegans H. Milne Edwards, 1836: 278, pl. 13, fig. 2.

Pagurus pictus Owen, 1839: 83, pl. 25, fig. 2, 2a.

Pagurus decorus Randall, 1840: 134.

Calcinus elegans– Dana, 1851: 267; Dana, 1852b: 458; Dana, 1855: pl. 28 fig. 10a-c; Alcock, 1905: 55, pl. 5, fig. 2; Boone, 1935: 23, pl. 3; Yap-Chiongco, 1938: 206, pl. 2, fig. 10; Edmondson, 1946: 263, fig. 161b; Miyake, 1956: 18, figs. 12, 13; Lee, 1969: 54, fig. 10; Miyake, 1982: 113, pl. 38, fig. 1; Yu, 1987: 11, pl. 1C; Morgan, 1991: 874, figs. 7-9; Yu & Foo, 1991: 34, unnumbered fig.; Wang, 1992: 60 (list); Jones & Morgan, 1994: 113, 115, unnumbered figs; Poupin, 1994: 15, fig. 11; Shih & Yu, 1995: 242 (key); Asakura, 1995: 355, pl. 94, fig. 5; Wang, 1995: 569 (list).

Material examined.– Magang, Taipei County, 26 Jun 2006: 2 males (2.6, 6.1 mm), 5 females (2.2-5.0 mm), (NTOU).– 23 Aug 2006: 2 males (3.0, 6.3 mm), 5 females (2.2-3.5 mm), 1 ovig. female (6.3 mm), (NTOU); Dongcingwan, Lanyu, Taitung County, 30 Mar 1998: 3 males (3.2-7.8 mm), 1 female (5.2 mm), 1 ovig. female (6.5 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 male (6.9 mm), 1 female (3.8 mm), (NTOU); Wukan, Penghu County, 15 May 2002: 2 males (7.5, 8.7 mm), 1 female (8.6 mm), 1 ovig. female (7.2 mm), (NTOU); no specific locality: 1 male (4.8 mm), (NTOU).

Diagnosis.– Rostrum acute. Ocular acicles simple. Outer face of palm of large left cheliped with closely-spaced tubercles, upper margin sometimes with 4 or 5 more prominent tubercles. Right cheliped with 5 sharp spines on upper surface of palm; dorsal margin of carpus spinose. Dactyl of left third pereopod

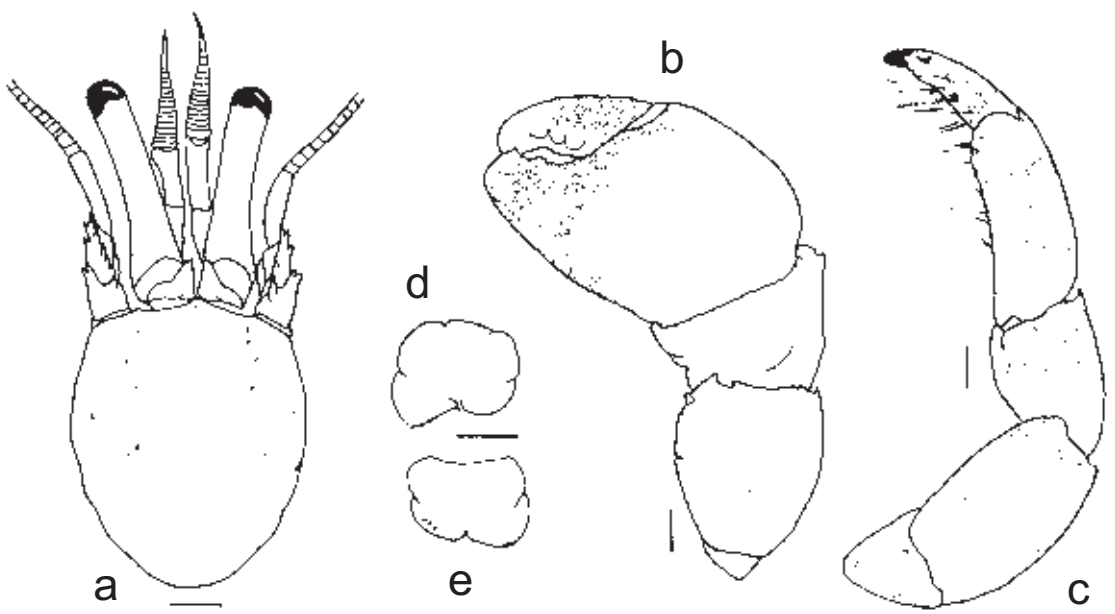
markedly shorter than propodus; 4-8 tufts of long setae on ventral margin of dactyl and propodus distally, forming dense brush. Not more than 3 tufts of thin setae on ventral margin of dactyl of left second pereopod. Telson with asymmetrical posterior lobes, left lobe longer; terminal margins each with 3-5 spines.

Size.– Maximum reported shield length 11.0 mm.

Coloration.– Carapace mottled with shades of brown and white. Ocular peduncles bright blue with narrow dark brown areas at bases. Antennules and antennae uniform orange. Chelipeds dark brown with white tubercles on fingers and distal part of palms. Meri and carpi of ambulatory legs bright blue in proximal and dark blue or brown in distal halves or blue with brown patches; propodi blue proximally and distally with broad dark blue or brown band medially; dactyls bright blue with dark blue or brown spots, and narrow light blue or white band next to claw; dactyls and propodi with bright red setae ventrally. In Hawaiian Islands brightly colored bands of ambulatory legs orange rather than blue.

Habitats.– Intertidally on wet erosion beaches and exposed rocky shores, and subtidally on outer edges of reef-flats, on algal ridges, coral and coral rubble. In Taiwan occurring on shallow rocky shores, and uncommon.

Distribution.– East coast of Africa to Hawaiian Islands and Tuamotu Archipelago, including Maluku region of Indonesia, Taiwan; intertidal to 10 m.



Male (4.8 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e,** telson (ventral surface). Scales equal 1 mm.

Calcinus gaimardii (H. Milne Edwards, 1848)

Magang, Taipei County, 14 Dec 2006.

Pagurus Gaimardii H. Milne Edwards, 1848: 63.

Calcinus Gaimardii– Dana, 1851: 267; Dana, 1852b: 457; Dana, 1855: pl. 28, fig. 9.

Calcinus gaimardii– Morgan, 1991: 876 (in part), fig. 13, not figs. 10-12; Jones & Morgan, 1994: 113, 114, unnumbered figs.; Asakura, 1995: 355, pl. 94, fig. 6; Tudge, 1995: 10, (in part), figs. 4C, D, not pl. 1, fig. 4E; Rahayu & Forest, 1999: 463, figs. 1A, 2A, B, E, F, I, 3.

Calcinus gaimardi– Fize & Serène, 1955: 49 (in part), pl. 2, figs. 7, 8, not text figs. 7, 8, pl. 2, figs. 5, 6.

Not *Calcinus gaimardii*– Alcock, 1905: 56, pl. 5, fig. 3; Miyake, 1956: 326, figs. 16, 17; Lee, 1969: 53, fig. 11; Miyake 1982: 114, pl. 38, fig. 4; Yu, 1987: 11, pl. 1E; Haig & Ball, 1988: 159; Yu & Foo, 1991: 37, unnumbered fig.; Wang, 1992: 60 (list); Wang, 1995: 569 (list); Poupin, 1997: 688, figs. 2B, 5D [= *Calcinus morgani* Rahayu & Forest, 1999].

Material examined.– Magang, Taipei County, 19 Oct 2006: 2 females (3.8, 6.9 mm), 1 ovig. female (6.6 mm), (NTOU); Gueishan Island, Yilan County, 19 Jul 2003: 1 female (4.6 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 1 male (5.2 mm), (NTOU); Kending, Pingtung County, 28 Aug 1999: 1 male (4.9 mm), (NTOU); no specific locality: 2 males (6.4, 7.0 mm) (NTOU).– 1 male (3.7 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum acute. Ocular peduncles long, considerably overreaching antennular and antennal peduncles; ocular acicles simple. Outer surface of chela of left cheliped with distinct, closely-spaced tubercles, strongest distally and on fixed finger and dactyl. Upper margin of palm and carpus of right cheliped spinose. Dactyl of left third pereopod shorter than propodus; with brush of long, plumose

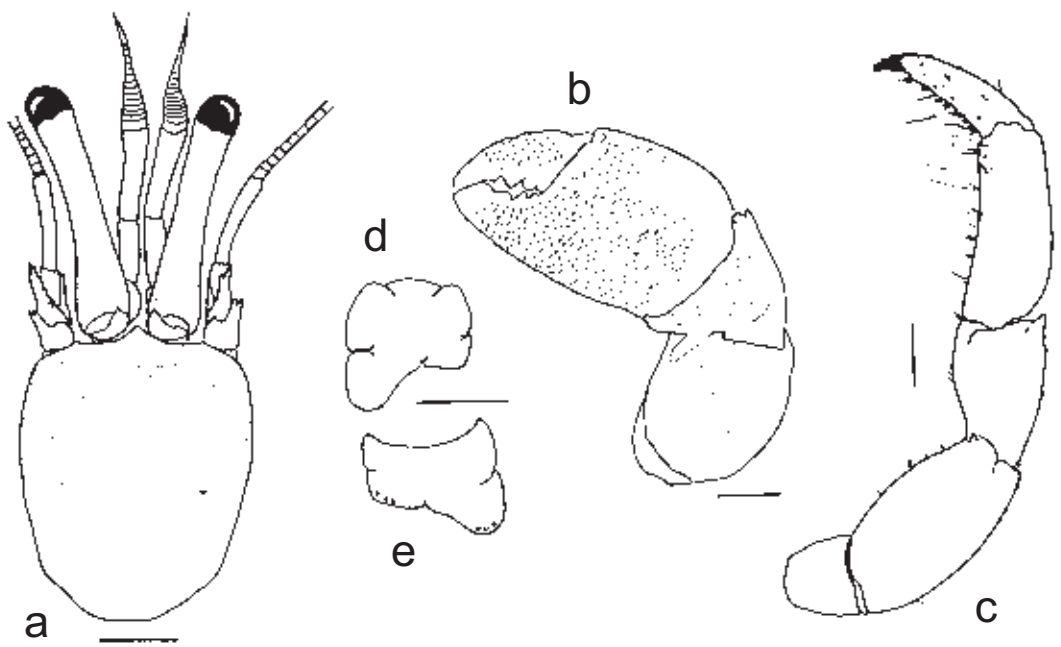
setae on ventral margins of dactyl and distal part of propodus. Telson with several spines on terminal margins of left and right posterior lobes.

Size.– Maximum reported shield length 10.6 mm.

Coloration.– Shield varying from partially to completely dark or medium brown through reddish-brown to partially pinkish-cream with scattered brown spots. Ocular peduncles dark brown, orange or reddish-brown or brownish-green proximally and dorsally, paler orange or reddish-brown ventrally and distally, with bright blue distal band below cornea; acicles dark brown or reddish-brown. Antennular peduncles brown or greenish or reddish-brown, ultimate segments orange distally. Chelipeds with fingers orange or reddish-brown with paler, often cream tubercles and finger tips; palm darker reddish or bluish-brown or deep chocolate; carpus and merus reddish or bluish-brown often with paler, bluish-white tubercles. Ambulatory legs generally reddish to bluish-brown; dactyls reddish-orange.

Habitats.– On coral, sand and rocks, utilizing shells of *Conus, Turbo, Strombus, Trochus, Drupa* and *Cypraea*.

Distribution.– East Africa across Indian Ocean to Indonesia, southern Japan, Taiwan, New Guinea, east to Hawaiian and Society Islands, Cocos (Keeling) and Christmas Islands, Australia including north Tasman Sea and Lord Howe Island; intertidal to 20 m.



Male (3.7 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e,** telson (ventral surface). Scales equal 1 mm.

Calcinus morgani Rahayu & Forest, 1999

Meiyanshan, Taipei County, 20 May 2006.

Magang, Taipei County, 25 Jun 2006, juvenile.

Calcinus gaimardii– Alcock, 1905: 56, pl 5, fig. 5; Miyake, 1956: 326, figs. 16, 17; Lee, 1969: 53, fig. 11; Miyake, 1982: 114, pl. 38, fig. 4; Yu & Foo, 1991: 37, unnumbered fig.; Morgan, 1991: 876, figs. 10-12; Wang, 1992: 60 (list); Tudge, 1995: 10 (in part), fig. 4A. B, pl. 1, fig. E; Wang, 1995: 569 (list); Poupin, 1997: 688, figs. 2B, 5D [not *Calcinus gaimardii* (H. Milne Edwards, 1848)].

Calcinus gaimardi– Fize & Serène, 1955: 49 (in part), text figs. 7, 8, pl. 2, figs. 5, 6.

Calcinus morgani Rahayu & Forest, 1999: 465, Figs. 1B, 2C, D, G, H, 3; Asakura et al., 2002: 35, fig. 1A; Komai, 2004b: 35, figs. 1-9.

Calcinus areolatus Rahayu & Forest, 1999: 468, fig. 4; Asakura, 2002a: 11, figs. 1-4; Asakura, 2002b: 64, fig. 21E; Asakura, 2002c: 561, fig. 4D; Poupin et al., 2003: 96, table 1; Komai, 2004b: 27.

Material examined.– Aodi, Taipei County, 20 May 2006: 1 male (5.3 mm), 1 juvenile (1.3 mm), (NTOU); Magang, Taipei County, 25 Jun 2006: 1 male (1.9 mm), (NTOU).– 26 Jun 2006: 18 males (2.3-8.1 mm), 4 females (2.3-3.1 mm), 6 ovig. females (4.2-5.1 mm), (NTOU).– 23 Aug 2006: 10 males (2.6-4.7 mm), 3 females (3.3-4.1 mm, 4 ovig. females (3.7-3.1 mm), (NTOU).– 21 Oct 2006: 12 males (1.9-5.5 mm), 7 females (1.9-3.9 mm), 1 ovig. female (4.2 mm), 7 juveniles (1.5-1.7 mm), (NTOU); Mao-ao, Taipei County, 30 Aug 2006: 9 males (3.3-8.7 mm), 1 ovig. female (7.7 mm), (NTOU); Meiyanshan, Taipei County, 7 Oct 2005: 1 ovig. female (3.9 mm), (NTOU).– 20 May 2006: 1 male (7.1 mm), (NTOU).– 27 May 2006: 1 female (4.1 m), (NTOU); Yeliou, Taipei County, 22 Jun 1986: 1 male (7.6 mm), (NTOU); Dayuan, Yilan County, 1 Jul 1988: 2 males (5.7, 7.7 mm), (NTOU); Gueishan Island, Yilan County, 19 Jul 2003: 1 male (6.4 mm), (NTOU); Shihtiping, Hualien County, 20 Sep 2006: 2 males (3.8, 4.2 mm), 3 females (3.1-3.6 mm), 4 juveniles (1.3-1.4 mm), (NTOU); Lanyu, Taitung County, 8 Jul 1997: 2 males (6.3, 8.0 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 7 males (2.2-6.8 mm), 4 females (2.4-4.7 mm), 1 ovig. female (7.0 mm), 5 juveniles (1.2-1.6 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 6 males (3.3-8.4 mm), 4 females (2.3-6.5 mm), 1 ovig. female (5.3 mm), (NTOU).– 8 Sep 2005: 1 male (2.5 mm), 1 juvenile (1.4 mm), (NTOU).– 9 Sep 2005: 3 males (5.4-7.0 mm), 1 female (2.4 mm), 1 ovig. female (5.9 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 8 Sep 2005: 4 males (4.0-7.5 mm), 1 female (3.7 mm), 2 ovig. females (4.1, 4.7 mm), (NTOU).– 9 Sep 2005: 12 males (2.2-6.7 mm), 7 females (2.2-4.1 mm), 5 ovig. females (3.3-4.1 mm), 3 juveniles (1.5-1.6 mm), (NTOU).– 10 Sep 2005: 14 males (1.8-6.5 mm), 8 females (2.5-4.1 mm), 11 ovig. females (2.8-5.3 mm), (NTOU).– 29 Apr 2006: 1 male (1.8 mm), (NTOU); Jioupeng, Pingtung County, 6 May 1992: 2 males (8.0, 8.1 mm), (NTOU); Kending, Pingtung County, 28 Aug 1999: 1 male (2.6 mm), (NTOU); SiaoLiouciou, Pingtung, County, 13 Sep 1984: 2 males (4.0, 4.9 mm), 1 ovig. female (4.9 mm), (NTOU).– 7 May 1988: 3 ovig. females (4.0-5.9 mm), (NTOU); Wanlitong, Pingtung County, 18 Mar 1992: 1 female (3.7 mm), (NTOU); Wukan, Penghu County, 20 Apr 2002: 1 male (7.4 mm), (NTOU).– 21 May 2002: 3 males (6.9-8.5 mm), 1 female (6.2 mm), 1 ovig. female (5.5 mm), (NTOU); no specific locality: 1 male (7.5 mm), 1 female (7.2 mm), 1 ovig. female (7.1 mm), (NTOU).– 1 male (6.4 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum acute. Ocular peduncles long, considerably overreaching antennular and antennal peduncles; ocular acicles each with single terminal spine. Outer surface of chela of left cheliped with distinct, closely-spaced tubercles, strongest distally and on fixed finger and dactyl. Upper margin of palm of right cheliped usually smooth, but occasionally with row of small tubercles. Dactyl of left third pereopod shorter than propodus; with brush of long, plumose setae on ventral margins of dactyl and distal part of propodus. Telson with 2-12 spines on terminal margin of left posterior lobe, 1-4 on right.

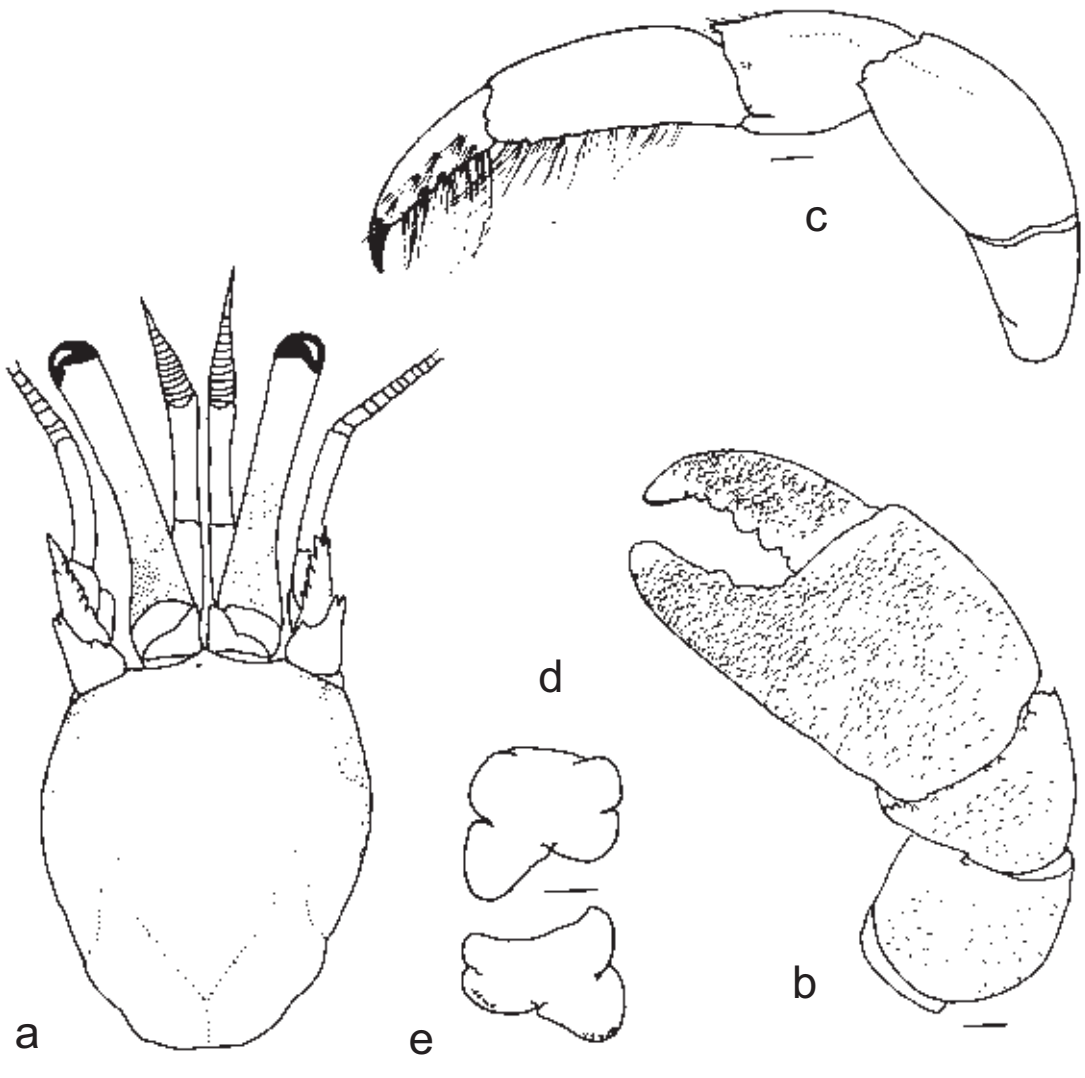
Size.– Maximum recorded shield length 8.7 mm.

Coloration.– Shield gray-white to cream. Ocular peduncles dark brown proximally, blue in distal half, with narrow dark ring adjacent to each corneal base. Antennular peduncles dark brown, flagella yellow or

orange. Antennal peduncles and flagella generally yellow-orange. Chelipeds generally dark blue or brown, deep reddish-brown distally, tips whitish. Ambulatory legs reddish-brown to dark brown, but extent of dark areas increasing from proximal to distal with size; dactyls often with white tips; segments frequently with dark brown spots, number decreasing with growth. In small juveniles, ambulatory legs mostly whitish and covered with dark brown dots.

Habitats.– Coral, sand and rock substrates.

Distribution.– Widely distributed in Indo-Pacific, South Africa, Somalia, Madagascar, Australia, New Guinea, Indonesia, Malaysia, Vietnam, Taiwan, southern Japan, Vanuatu, Marianas, French Polynesia; intertidal to subtidal.



Male (6.4 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e,** telson (ventral surface). Scales equal 1 mm.

Calcinus laevimanus (Randall, 1840)

Magang, Taipei County, 14 Dec 2006.

Pagurus tibicen– H. Milne Edwards, 1836: 278; 1840: pl. 59, fig. 37 (not *Cancer tibicen* Herbst, 1791).

Pagurus laevimanus Randall, 1840: 135.

Pagurus lividus H. Milne Edwards, 1848: 63.

Calcinus tibicen– Dana, 1852b: 457 [not *Calcinus tibicen* (Herbst, 1791)].

Calcinus Herbstii De Man, 1888b: 437.

Calcinus herbsti– Ortmann, 1892: 292; Melin, 1939: 22, figs. 7, 8; Fize & Serène, 1955: 41, fig. 6, pl. 2, figs. 1-4.

Calcinus herbstii– Alcock, 1905: 53, pl. 5, fig. 4; Edmondson, 1946: 264, fig. 161a; Boone, 1935: 20, pl. 2, fig. 1; Yap-Chiongco, 1938: 205, pl. 2, fig. 5; Forest, 1951: 89, figs. 2, 5, 6, 9.

Calcinus laevimanus– Rathbun, 1907: 208; Barnard, 1950: 437, fig. 80e, f; Miyake, 1956: 323, figs. 14, 15; Lee, 1969: 53; Miyake, 1982: 113, pl. 38, fig. 3; Morgan, 1991: 888, figs. 30-33; Yu & Foo, 1991: 39, unnumbered fig.; Wang, 1992: 60 (list); Poupin, 1994: 16, fig. 12; Jones & Morgan, 1995: 115 unnumbered fig.; Tudge, 1995: 12, fig. 5, pl. 2, fig. A; Wang, 1995: 569 (list).

Material examined.– Fulong, Taipei County, 9 Aug 2006: 16 males (1.8-7.8 mm), 17 females (2.0-5.2 mm), 8 ovig. females (3.8-4.0 mm), 2 juveniles (1.0, 1.5 mm), (NTOU).– 3 Oct 2006: 24 males (1.8-6.7 mm), 28 females (2.0-5.2 mm), 5 ovig. females (2.6-4.0 mm), (NTOU); Magang, Taipei County, 14 Jul 1984: 2 males (6.3, 6.4 mm), 1 female (5.2 mm), (NTOU).– Jul 1984: 1 ovig. female (5.0 mm), (NTOU).– 7 Oct 1996: 21 males (2.7-5.9 mm), 13 females (2.1-4.3 mm), 4 ovig. females (3.6-4.2 mm), (NTOU).– 23 Aug 2006: 67

males (1.7-6.8 mm), 51 females (1.8-4.4 mm), 7 juveniles (1.3-1.6 mm), (NTOU).– 12 Dec 2006: 1 male (6.4 mm); Dasi, Yilan County, 4 May 1988: 6 males (2.7-4.2 mm), 2 females (3.4, 6.0 mm), (NTOU); Fanzihliao, Yilan County, 1 Jul 1988: 2 ovig. females (4.9, 5.2 mm), (NTOU); Shihyusan Taitung County, 21 Sep 2006: 9 males (2.2-4.5 mm), 9 females (1.5-4.3 mm), 2 ovig. females (3.7, 4.4 mm), (NTOU); Dongcingwan, Lanyu, Taitung County, 21 Dec 1992: 4 males (3.0-6.9 mm), 2 females (3.7, 4.3 mm), (NTOU); Lanyu, Tautung County, 30 Mar 1998: 1 male (4.7 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 3 males (2.5-3.3 mm), 3 females (3.1-3.3 mm), (NTOU); Fonggang, Pingtung County, 23 Dec 1988: 1 female (3.4 mm), (NTOU); Haikou, Kending, Pingtung County, 8 Sep 2005: 3 males (3.7-5.6 mm), 1 ovig. female (4.2 mm), (NTOU).– 29 Apr 2006: 2 males (3.2, 6.6 mm), 2 females (2.9, 3.3 mm), 1 ovig. female (5.2 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 3 Jun 2005: 4 males (2.2-4.4 mm), 3 females (2.1-4.3 mm), (NTOU).– 9 Sep 2005: 11 males (2.0-4.7 mm), 3 females (2.3-3.5 mm), (NTOU); Jioupeng, Pingtung County, 6 May 1992: 1 male (5.7 mm), 1 female (4.0 mm), (NTOU); South Bay, Pingtung County, 23 Jun 1986: 1 female (5.2 mm), (NTOU); Wanlitong, Pingtung County, 29 Jan 1986: 1 male (4.5 mm), 1 female (3.3 mm), (NTOU); Magong, Penghu County, 11 Oct 1984: 3 females (3.8-5.5 mm), (NTOU); Wukan, Penghu County, 20 Apr 2002: 1 male (7.6 mm), (NTOU).–24 May 2002: 1 male (6.6 mm), 1 ovig. female (6.9 mm), (NTOU); Penghu County, 7-10 Jul 1997: 1 male (6.4 mm), (NTOU); no specific locality: 2 males (4.2, 5.4 mm), (NTOU).– 1 female (4.0 mm), (NTOU).– 1 female (4.1 mm), (NTOU).

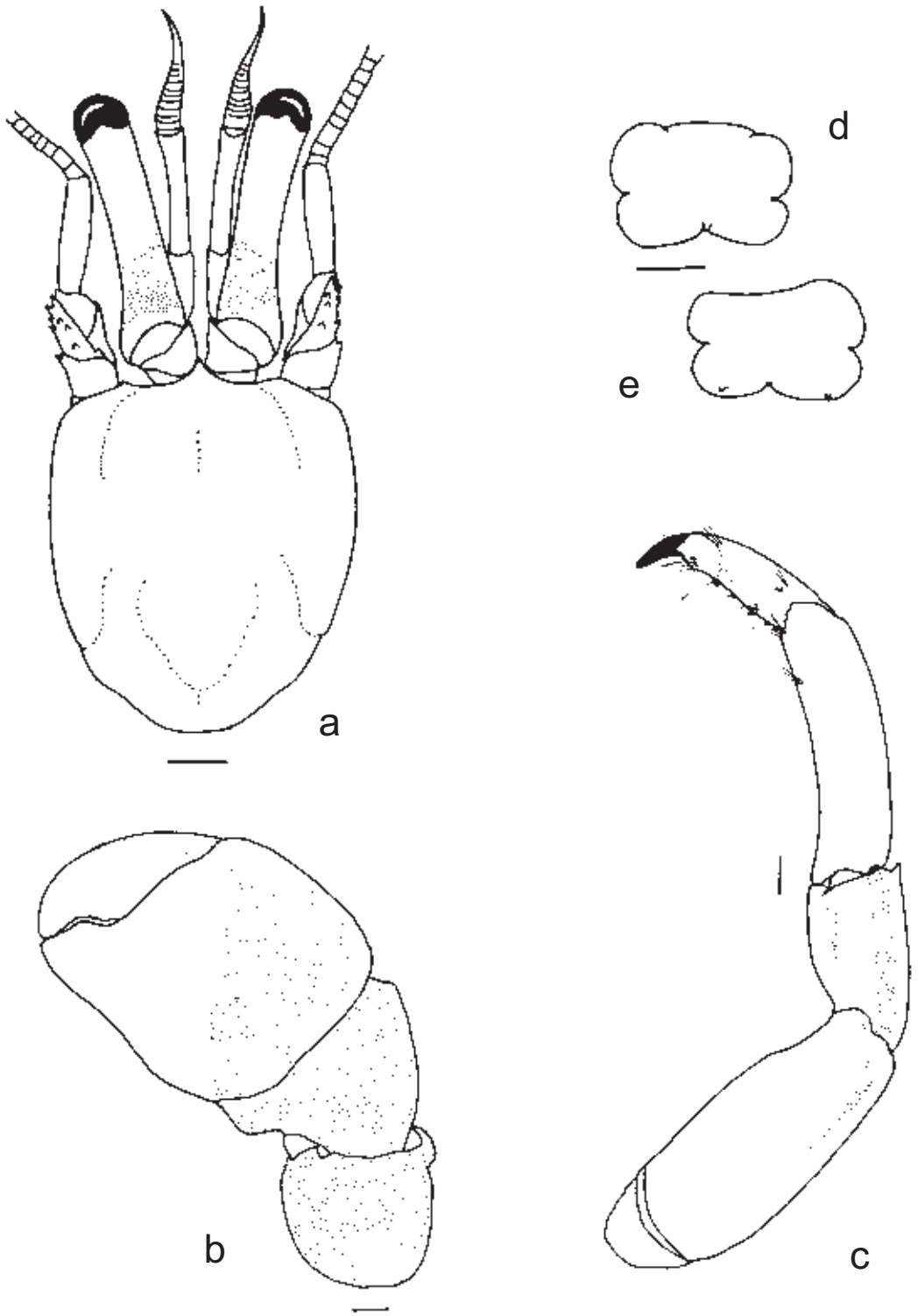
Diagnosis.– Shield nearly as broad as long; rostrum triangular. Ocular peduncles approximately as long as shield; ocular acicles triangular, simple. Chelipeds with outer face of palm of left cheliped rounded and almost smooth, upper margin similar. Upper margin of palm of right chela and dorsal margin of carpus also smooth or only slightly granular. Dactyl of left third pereopod distinctly shorter than propodus; no brush of setae on ventral margins of dactyl and propodus. Telson with posterior lobes asymmetrical, left larger; terminal margins of both lobes unarmed or with single spine.

Size.– Maximum reported shield length 10.2 mm.

Coloration.– Shield cream, pale orange, orange-green or grayish-green. Ocular peduncles with or without thin orange proximal band, blue on proximal 0.5 to 0.3, orange on distal 0.5 to 0.7; ocular acicles pale orange, tan or cream. Chelipeds predominantly dark chocolate brown to bluish-black. Left cheliped with tip of dactyl, most of fixed finger and cutting edges white or cream, white extending some distance along ventral margin of palm and sometimes dorsally and covering most of palm. Right cheliped with distal halves of fingers and cutting edges white. Ambulatory legs with dactyls white or cream with subdistal dark brown or green band and lateral and mesial dark spot in proximal halves; propodi rather uniform greenish- or blackish-brown or darker distally; carpi brownish-orange, each with lateral longitudinal bluish-black, brown, green or gray stripe; meri each with diffuse distolateral longitudinal bluish-black or brown stripe.

Habitat.– Hard substrates of littoral zone, particularly in areas of shallow pools and ridges towards the upper part of shore with sparse algal growth, also on coral rubble, rocky platforms, sand and mud flats.

Distribution.– East Africa, across Indian Ocean, Cocos (Keeling) and Christmas Islands, Australia, New Caledonia, Indonesia Philippine Islands, Japan, Taiwan, Marianas, French Polynesia, Hawaiian Islands; intertidal to very shallow subtidal.



Male (6.2 mm), Magang, Taipei County, 7 Oct 1996: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e,** telson (ventral surface). Scales equal 1 mm.

Calcinus seurati Forest, 1951

Lanyu, Taitung County, 16 Apr 1996 (photographed by H.T. Shih).

Calcinus seurati Forest, 1951: 84, figs. 1, 3, 4, 7, 8; Morgan, 1991: 898, figs. 46-48; Yu & Foo, 1991: 38, unnumbered fig.; Poupin, 1994: 19, fig. 15; Poupin, 1997: 710, figs. 2H, 3I, 4F; Shih & Lee, 1997: 23, figs. 4-6.

Not *Calcinus seurati*– Miyake, 1963: 63; Minei, 1973: 53, fig. 19; Utinomi, 1975: 113; Matsuzawa, 1977: pl. 79, fig. 3; Miyake, 1978: 54 (key); Miyake & Imafuku, 1980a: 5; Miyake, 1982: 217 (key); Miyake, 1983: 113; Kamezaki et al., 1988: 113; Murata et al., 1991: 23, fig. 1; Chang & Chen, 1992: 108 [= *Calcinus vachoni* Forest, 1958].

Material examined.– Lanyu, Taitung County, 23 Jun 1993: 4 males (3.7-6.4 mm), 7 females (1.0-4.2 mm), (NMNS).

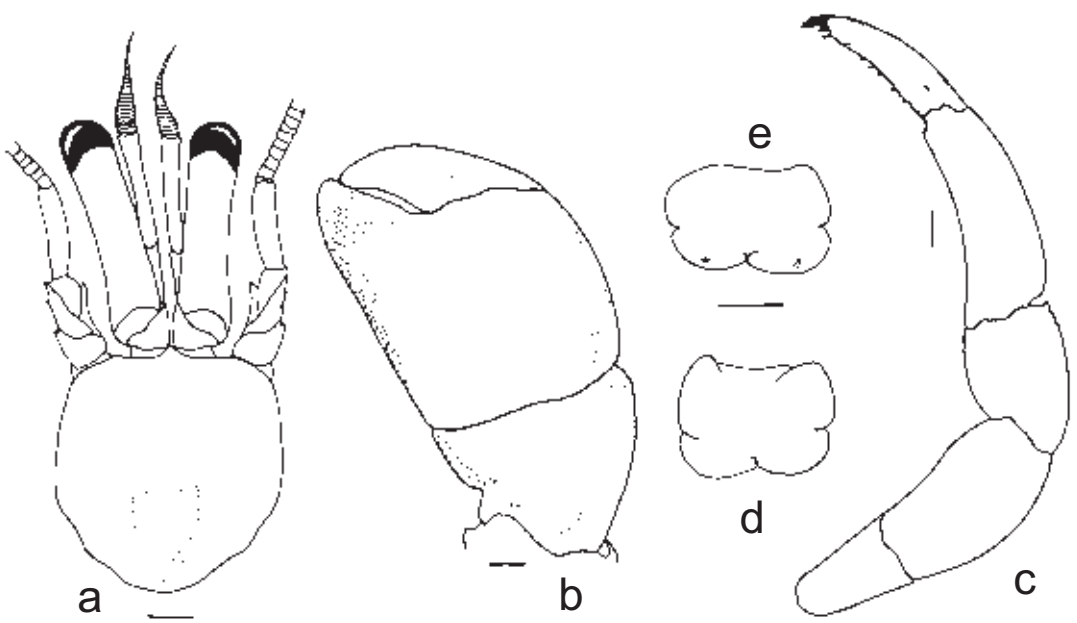
Diagnosis.– Shield somewhat longer than broad; rostrum acutely triangular. Ocular peduncles approximately equal to length of shield; acicles simple. Antennular peduncles reaching to or slightly beyond distal corneal margins; antennal peduncles reaching to bases of corneas. Lateral face of palm of left cheliped smooth or granular. Dorsal margins of palm and carpus of right cheliped smooth or slightly granular. Dactyl of left third pereopod subequal to propodus; no brush of dense long setae on ventral margins of dactyl and propodus. Telson with single marginal spine on both left and right posterior lobes.

Size.– Maximum recorded shield length 6.5 mm.

Coloration.– Shield cream to grayish-white, sometimes with pale diffuse submedian longitudinal greenish-gray stripes. Ocular peduncles each with narrow greenish-orange band proximally, then pale blue to bluish-gray, grading via greenish-brown to brownish-orange distally; acicles grayish-white to pale bluish-green. Antennular peduncles each with penultimate segment pale blue with pale orange patch distally; ultimate segment deeper blue with orange proximally; flagella orange. Antennal peduncles white or cream with pale greenish-gray or greenish-blue patches, ultimate segments brownish-orange; flagella orange or brownish-orange. Chelipeds with dactyls, fixed fingers and palms cream, grayish or bluish-white, sometimes tinged with pale green; carpi pale green or grayish-blue, sometimes darker areas proximally and usually dark brown patch mesially; meri grayish-white distally, broad greenish or grayish-blue area centrally and paler proximally. Dactyls of ambulatory legs each white with proximal greenish-brown, greenish-gray or greenish-blue band and paler subdistal band, tips white; propodi white or grayish-white with distal and proximal greenish-brown, greenish-gray or greenish-blue bands, distal bands darker; carpi bluish or grayish-white, each with longitudinal greenish-brown, greenish-gray or greenish-blue stripe; meri grayish-white, each with broad, oblique greenish-blue band near midlength and paler grayish-blue tint proximally.

Habitat.– Rocky platforms and tide pools, utilizing a variety of gastropod shells.

Distribution.– Somalia, Cocos (Keeling) and Christmas Islands, Western Australia, Taiwan, southern Japan, Tuamotu, Society, Mariana and Hawaiian Islands; high intertidal and splash zones.



Male (4.1 mm), (NMNS), Lanyu, Taitung County, 23 Jun 1993: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal view); **e,** telson (ventral view). Scales equal 1 mm.

Calcinus latens (Randall, 1840)

Haikou, Kending, Pingtung County, 22 Mar 2005.

Pagurus latens Randall, 1840: 135.

Pagurus cristimanus H. Milne Edwards, 1848: 64.

Calcinus latens– Dana, 1852b: 459; Dana, 1855: pl. 28, fig. 2; Alcock, 1905: 58, pl. 5, fig. 5; Forest, 1951: 85, figs. 14-18; Fize & Serène, 1955: 58, fig. 9a-c, pl. 2, figs. 9-11; Miyake, 1956: 331, figs. 20, 21; Lee, 1969: 53, fig. 12; Miyake, 1982: 113, pl. 38, fig. 2; Yu, 1987: 10, pl. 1B; Morgan, 1991: 890, figs. 34-36; Yu & Foo, 1991: 36, unnumbered fig.; Wang, 1992: 60 (list); Jones & Morgan, 1994: 115, unnumbered fig.; Poupin, 1994: 17, fig. 13, pl. 2 fig. b; Asakura, 1995: 356, pl. 94, fig. 9; Shih & Yu, 1995: 243, fig. 2; Tudge, 1995: 13, fig. 6, pl. 2, fig. B; Wang, 1995: 569 (list).

Calcinus intermedius De Man, 1881: 102.

Calcinus terrae-reginae Haswell, 1882: 760.

Calcinus abrolhensis Morgan, 1988: 218, fig. 1.

Material examined.– Aodi, Taipei County: 1 male (4.4 mm), 2 females (3.9, 4.6 mm), (NTOU); Bitoujiao, Taipei County, 4 Aug 1988: 6 males (3.2-4.0 mm), 2 females (3.1, 4.1 mm); Fulong, Taipei County, 12 Aug 2006: 14 males (1.8-4.0 mm), 10 females (1.9-3.4 mm), 3 ovig. females (2.1-2.8 mm), 19 juveniles 1.1-1.7 mm), (NTOU); Magang, Taipei County, 14 Jul 1984: 8 males (3.4-5.8 mm), 1 female (4.2 mm), (NTOU).– 7 Oct 1996: 1 male (1.8 mm), 1 female (2.0 mm), (NTOU).– 21 Oct 2006: 60 males (1.9-5.3 mm), 17 females (2.1-3.9 mm), 12 ovig. females (2.3-4.9 mm), 120 juveniles (1.2-1.8 mm), (NTOU); Dasi, Yilan County, Oct 1985: 1 male (2.7 mm), (NTOU); Shihtiping, Hualien County, 21 Sep 2006: 2 males (2.0, 2.2

mm), 1 female (1.4 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 2 males (2.3, 3.1 mm), 1 female (2.9 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 2 males (3.0, 4.7 mm), 2 females (1.7, 3.6 mm), (NTOU); Jioupeng, Pingtung County, 6 May 1992: 1 male (5.1 mm), (NTOU); South Bay, Pingtung County, 23 Jun 1986: 1 male (3.2 mm), (NTOU); SiaoLiouciou, Pingtung County, 7 May 1988: 2 males (1.9, 4.1 mm), 2 females (2.4, 2.9 mm), 2 ovig. females (2.7, 3.3 mm), (NTOU); Wanilitong, Pingtung County, 18 Mar 1992: 1 male (2.3 mm), (NTOU); Wukan, Penghu County, 20 Apr 2002: 1 male (4.5 mm), (NTOU);– 28 May 2002: 2 males (2.5, 4.2 mm), 1 ovig. female (2.9 mm), (NTOU); no specific locality: 1 male (5.3 mm), 2 females (2.0, 2.0 mm), 2 ovig. females (3.0, 3.9 mm), (NTOU).– 1 male (4.6 mm), (NTOU).– 1 male (4.9 mm), (NTOU).

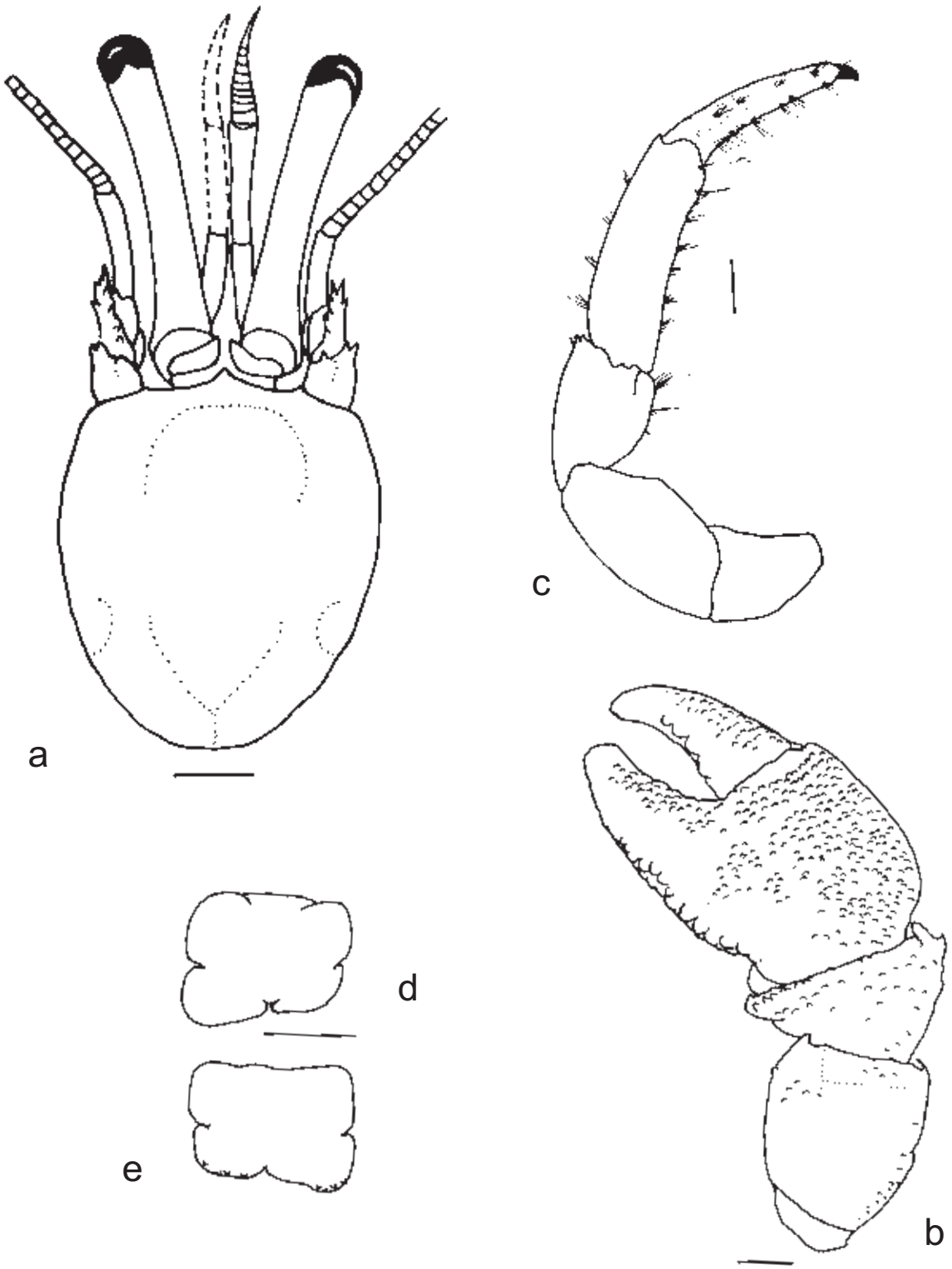
Diagnosis.– Rostrum acute. Ocular peduncles long, slender; ocular acicles small, simple (rarely with additional spinules). Left cheliped with outer face of palm naked, smooth, granular or weakly tuberculate; upper margin variously armed with spines, spinules, tubercles, granules, or unarmed. Right cheliped with 5 strong spines on upper margin of palm; upper margin of carpus carinate and spinose. Dactyl of left third pereopod longer than propodus, slightly greater development of long setae on dactyls and distal part of propodi than on second pereopods; carpi each with sharp spine on dorsodistal margin. Telson with 1-6 spines on terminal margin of left posterior lobe, terminal margin of right posterior lobe with 0-3 spines, all directed ventrally.

Size.– Maximum reported shield length 7.1 mm.

Coloration.– Shield greenish-gray, deep green, or dark blue with pale areas. Ocular peduncles pale salmon-gray or orange, paler at bases of corneas; acicles salmon-gray, cream, pale orange or green. Antennular peduncles bright blue with darker green band proximally on ultimate and sometimes penultimate segments; flagella orange. Antennal peduncles green and cream, ultimate segments and flagella pale orange. Dactyls of chelipeds white or cream; chelae with fingers and distal part of palms white or cream, remainder green, greenish-brown, greenish-gray or grayish-blue; carpi and meri green, greenish-brown or blue with cream tubercles. Ambulatory legs with dactyls cream or white, each with proximal dark reddish-purple or brownish-purple band comprised of several short longitudinal stripes on slightly paler background; propodi pale salmon-brown, grayish-brown or purple proximally grading to pale green, bluish-gray or cream for distal 0.3; carpi and meri greenish-gray or blue with cream tubercles, meri each with orange or lavender patch or oblique stripe distally.

Habitats.– Wide variety of habitats including inner and outer coral reef flats not exposed to high surf, rocky platforms, rocky pools on lower shore, coral heads in lagoons, rubble and sand, occupying variety of gastropod shells.

Distribution.– Persian Gulf, Indian Ocean from East Africa to Thailand and Indonesia, Philippine Islands, Taiwan, southern Japan, New Guinea, Australia, Norfolk and Lord Howe Islands, east to Tuamotu Archipelago, Hawaii, French Polynesia; intertidal and shallow subtidal to 5 m.



Male (4.6 mm), no specific locality: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, left cheliped (outer face); **c**, right third pereopod (lateral view); **d**, telson (dorsal surface); **e**, telson (ventral surface). Scales equal 1 mm.

Calcinus vachoni Forest, 1958

Magang, Taipei County, 23 Aug 2006.

Calcinus vachoni Forest, 1958: 285, figs. 2, 3, 9, 10, 15, 19; Morgan, 1990: 11, fig. 2; Morgan, 1991: 205, figs. 60-62; Poupin, 1997: 712, figs. 6E, F, 8A-F; Shih & Lee, 1997: 22, figs. 1-3.

Calcinus seurati– Miyake, 1963: 63; Minei, 1973: 53, fig. 19; Utinomi, 1975: 113; Matsuzawa, 1977: pl. 79, fig. 3; Miyake, 1978: 54 (key); Miyake & Imafuku, 1980a: 5; Miyake, 1982: 217 (key); Miyake, 1983: 113; Kamezaki et al., 1988: 113; Murata et al., 1991: 23, fig. 1; Chang & Chen, 1992: 108 [not *Calcinus seurati* Forest, 1951].

Not *Calcinus vachoni*– Lewinsohn, 1982b: 53 [= *Calcinus guamensis* Wooster, 1984].

Material examined.– Aodi, Taipei County, May 2005: 3 males (2.7-4.1 mm), (NTOU); Magang, Taipei County, 24 Jun 2006: 3 males (1.7-2.8 mm), 1 female (2.4 mm), 3 ovig. females (1.8-2.1 mm), (NTOU).– 5 Oct 2006: 3 males (1.5-3.6 mm), 27 females (1.7-3.7 mm), (NTOU); Mao-ao, Taipei County, 16 Aug 2006: 3 males (2.9-3.7 mm), 5 females (1.8-2.5 mm), 3 ovig. females (1.9-2.2 mm), (NTOU); Meiyanshan, Taipei County, 20 May 2006: 1 male (2.5 mm), (NTOU).– 27 May 2006: 3 males (1.8-2.0 mm), 2 females (1.8, 2.3 mm), (NTOU); Gueishan Island, Yilan County, 19 Jul 2003: 2 males (2.3, 2.5 mm), 1 ovig. female (1.9 mm), 2 juveniles (1.1, 1.4 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 male (2.9 mm), 1 female (2.1 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 2 males (2.0, 4.3 mm), 1 female (2.8 mm), (NTOU).– 8 Sep 2005: 24 males (2.1-4.2 mm), 20 females (1.9-3.7 mm), 12 ovig. females (2.0-3.2 mm), (NTOU).– 9 Sep 2005: 8 males (1.9-4.9 mm), 4 females (2.2-2.9 mm), 13 ovig. females (2.2-3.2 mm), (NTOU).–29 Apr 2006: 1 male (2.8 mm), 1 ovig. female (3.9 mm), (NTOU); Hongchaikeng, Kending,

Pingtung County, 23 Mar 2005: 1 male (3.4 mm), 1 female (2.6 mm), (NTOU).–3 Jun 2005: 1 juvenile (1.3 mm), (NTOU).– 9 Sep 2005: 6 males (2.0-2.7 mm), 7 females (1.8-2.9 mm), 2 ovig. females (2.1, 2.4 mm), (NTOU).– 10 Sep 2005: 10 males (2.6-3.9 mm), 4 females (2.5-3.7 mm), 4 ovig. females (2.3-3.5 mm), (NTOU); Wukan, Penghu County, 28 May 2002: 1 male (3.7 mm), (NTOU); no specific locality: 1 male (3.0 mm), (NTOU).– 1 male (3.7 mm), (NTOU).

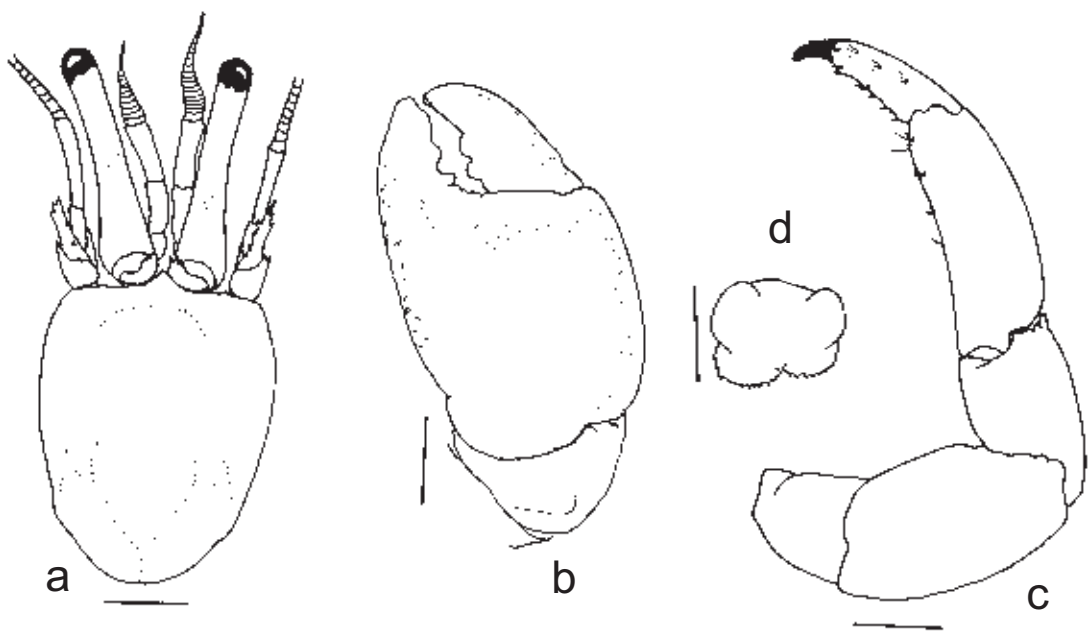
Diagnosis.– Shield width approximately equaling length to distinctly longer; rostrum well developed. Ocular peduncles longer than both antennular and antennal peduncles; ocular acicles bi- or trifid. Outer face of palm of left cheliped smooth or finely tuberculate, upper margin smooth or with small tubercles. Upper margin of palm of right cheliped with 3 to 6 small spines; dorsal margin of carpus with low spines. Dactyl of left third pereopod markedly shorter than propodus; moderate development of brush of setae on ventral margins of dactyl and propodus distally. Telson markedly asymmetrical, left posterior lobe larger; terminal margins of both posterior lobes with several spines, extending onto lateral margins.

Size.– Maximum reported shield length 4.9 mm.

Coloration.– Shield cream or with pinkish tint, sometimes with some gray and grayish-brown patches. Ocular peduncles dark gray with large black or dark blue patches on dorsal surfaces proximally; cream or white proximal to black patches and thin white bands at bases of corneas; acicles gray. Chelipeds with fingers cream, palms grayish-green or blue, carpi and meri gray or bluish-gray. Ambulatory legs with dactyls cream; propodi cream with gray tinge proximally; carpi and meri grayish-cream, meri often slightly darker.

Habitats.– Living coral, coral rubble and rocky reefs.

Distribution.– Northern Western Australia, Vietnam, Taiwan, southern Japan, Mauritius, French Polynesia; shallow subtidal to 20 m.



Male (3.6 mm), Aodi, Taipei County, May 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface). Scales equal 1 mm.

Calcinus minutus Buitendijk, 1937

Gueishan Island, Yilan County, 17 Jul 2003.

Calcinus minutus Buitendijk, 1937b: 269, figs. 13-15; Forest, 1958: 185, figs. 1, 6-8, 14, 18; Nakasone, 1975: 3, fig. 2; Takeda, 1982: 61, fig. 183; Yu, 1987: 10, pl. 1A; Kamezaki et al., 1988: 112, unnumbered fig.; Morgan, 1991: 894, figs. 40-42; Yu & Foo, 1991: 35, unnumbered fig.; Takeda, 1994b: 194, unnumbered fig.; Asakura, 1995: 356, pl. 94, fig. 10; Tudge, 1995: 14, pl. 2 fig. C; Gosliner et al., 1996: 223, fig. 809; Poupin, 1997: 704, fig. 6A.

Calcinus minimus– Forest, 1956a: 221 (misspelling).

Calcinus nitidus– Miyake, 1983: 113, unnumbered fig.; Poupin, 1994 18 (in part) [not *Calcinus nitidus* Heller, 1865].

Material examined.– Gueishan Island, Yilan County, 17 Jul 2003: 1 female (2.0 mm), 1 ovig. female (4.4 mm), (NTOU).– 18 Jul 2003: 1 ovig. female (3.7 mm), (NTOU); Lanyu, Taitung County, Jul 1997: 1 male (2.1 mm), (NTOU).–27 Mar 1998: 1 ovig. female (3.6 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 male (1.8 mm), 1 ovig. female (3.5 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 9 Sep 2005: 1 male (3.9 mm), 1 female (2.6 mm), 3 ovig. females (3.2-3.6 mm), (NTOU); Kending, Pingtung County, 28 Aug 1999: 1 damaged specimen (2.9 mm), (NTOU); South Bay, Pingtung County, 26 Mar 1986: 1 male (3.0 mm), 1 female (3.8 mm), (NTOU); no specific locality: 1 male (3.0 mm), (NTOU).– 1 male (4.1 mm), (NTOU).

Diagnosis.– Shield considerably longer than broad; rostrum triangular. Ocular peduncles longer than shield; ocular acicles each with 1-4 spines. Lateral face of palm of left cheliped finely granular. Upper margin

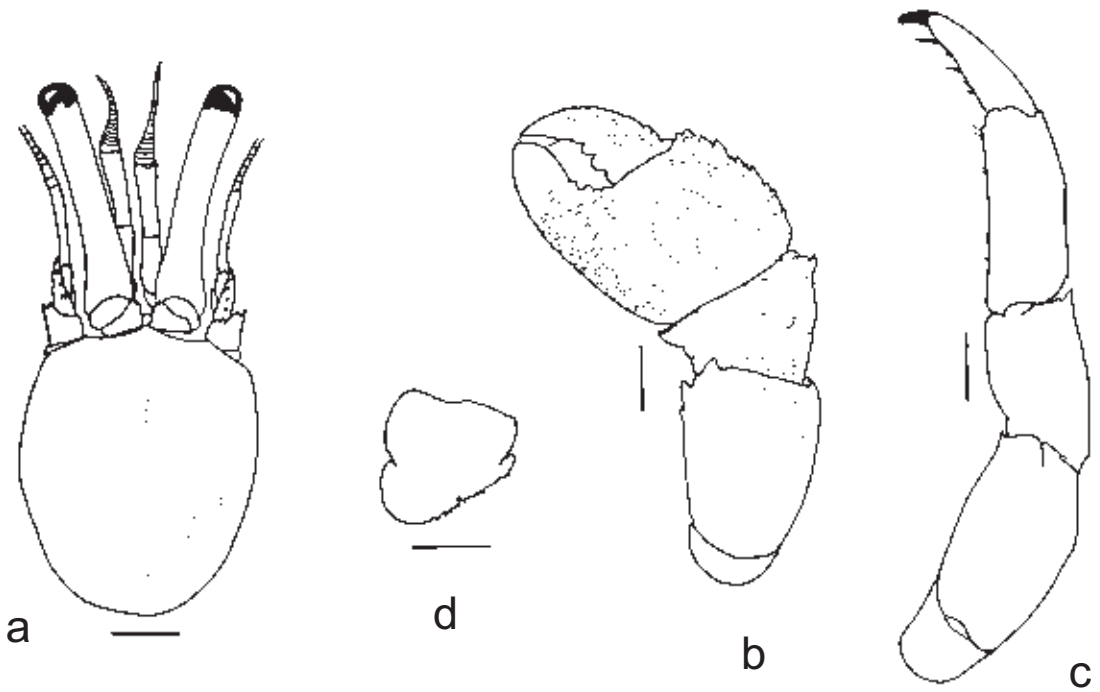
of palm of right cheliped with 4-6 corneous-tipped spines. Dactyl of left third pereopod distinctly shorter than propodus; no brush of long setae on ventral margins of dactyl and propodus. Telson with left and right posterior lobes each with 4-8 marginal spines.

Size.– Maximum recorded shield length 5.9 mm.

Coloration.– Shield cream with some faint orange flecks; sometimes medial orange patch just anterior of center. Ocular peduncles pale pink or orange; acicles cream with areas of brown or simply brown. Antennular peduncles with penultimate segments dark green-brown, ultimate segments dark green-brown proximally, cream distally; flagella orange-green. Antennal peduncles green and cream, ultimate segments pale green; flagella pale orange. Fingers of chelipeds white with some orange dots; palm white, often with pale orange patch mesially; carpus white or cream, sometimes with orange patch dorsally; merus white, cream or with faint bluish tint, sometimes pale orange patch laterally and mesially. Second and third pereopods with orange dactyls; propodi orange distally, remainder of propodi, carpi and meri white with minute orange dots.

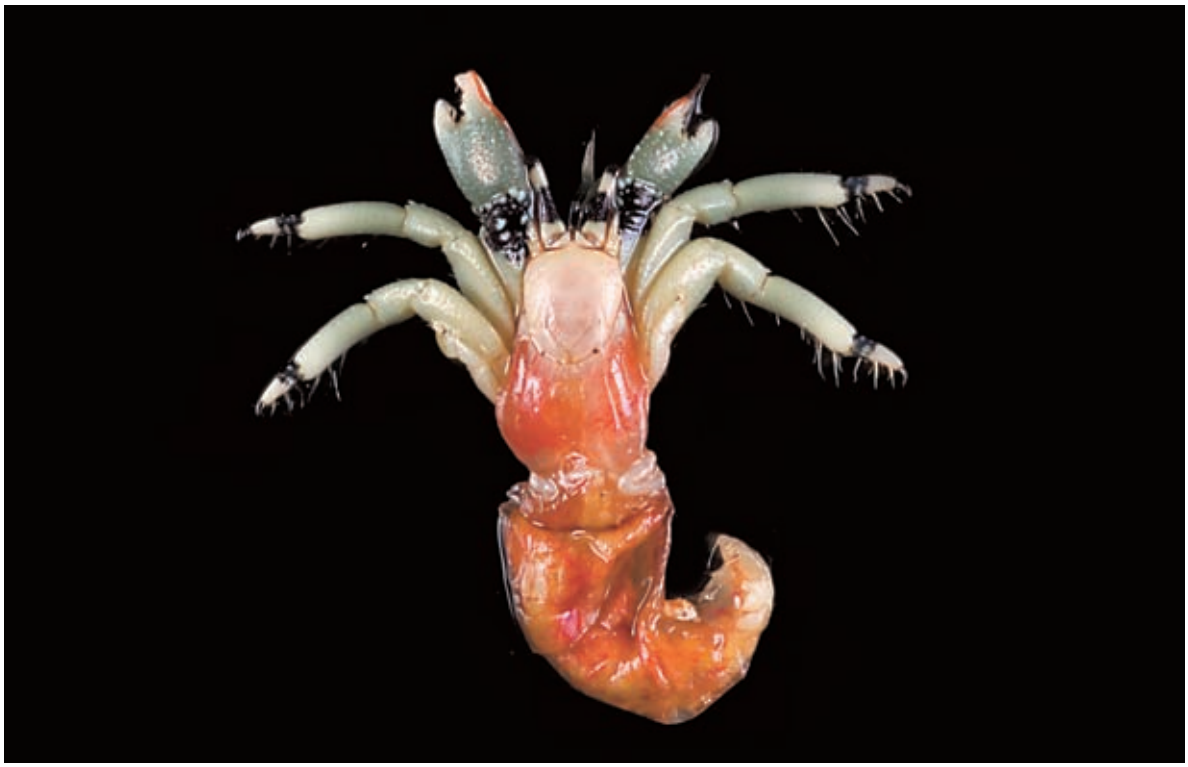
Habitat.– Usually associated with living coral, sometimes coral rubble, often amongst branching corals and found occupying a variety of small gastropod shells.

Distribution.– Cocos (Keeling) and Christmas Islands, Australia, New Guinea, Malaysia, Indonesia, Vietnam, Taiwan, southern Japan, Mariana, Palau and West Caroline Islands; intertidal to 30 m.



Ovig, female (4.4 mm), Gueishan Island, Yilan County, 17 Jul 2003: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface). Scales equal 1 mm.

Calcinus guamensis Wooster, 1984



Fulong, Taipei County, 12 Aug 2006.

Calcinus latens– Miyake, 1956: 331, figs. 20, 21 [not *Calcinus latens* (Randall, 1840)].

Calcinus vachoni (?)– Forest, 1958: 286.

Calcinus vachoni– Lewinsohn, 1982b: 53 [not *Calcinus vachoni* Forest, 1958].

Calcinus guamensis Wooster, 1984: 141, fig. 4; Morgan, 1991: 79, figs. 14-16; Asakura, 1992: 37, fig. 1; Asakura, 1995: 356, pl. 4, fig. 7; Shih & Yu, 1997: 242, fig. 1.

Material examined.– Aodi, Taipei County, May 2005: 1 ovig. female (2.8 mm), (NTOU); Fulong, Taipei County, 12 Aug 2006: 1 male (2.8 mm), (NTOU).–3 Oct 2006: 3 males (1.9-2.6 mm), 3 females (2.0-2.5 mm), 2 juveniles (1.5, 1.6 mm), (NTOU); Meiyanshan, Taipei County, 27 May 2006: 1 female (3.1 mm), (NTOU); Siaogang, Taitung County, 20 Sep 2006: 1 female (2.3 mm), (NTOU); Haikou, Kending, Pingtung County, 22 Mar 2005: 1 female (2.6 mm), (NTOU).– 8 Sep 2005: 3 males (2.0-4.3 mm), 4 females (2.3-3.0 mm), 1 ovig. female (2.0 mm), (NTOU).–29 Apr 2006: 1 ovig. female (3.2 mm), (NTOU); Hongchaikeng, Kending, Pingtung County, 8 Sep 2005: 2 males (3.3, 3.3 mm), (NTOU).– 9 Sep 2005: 2 males (2.0, 2.7 mm), 2 females (2.3, 2.7 mm), 1 ovig. female (2.8 mm), (NTOU).– 3 Jun 2006: 1 female (2.1 mm), (NTOU).

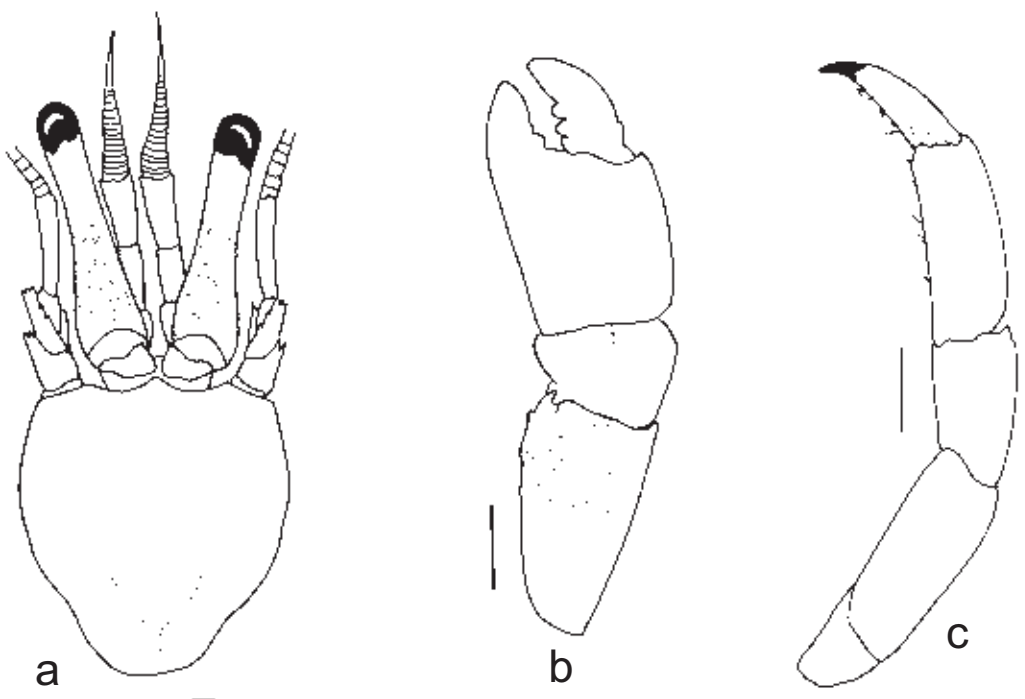
Diagnosis.– Shield longer than broad; rostrum prominent, acute or subacute. Ocular peduncles moderately short and stout; acicles bi- or trispinose. Outer face of palm of large left cheliped with numerous small tubercles. Upper margins of palm and carpus of right cheliped with small spines. Dactyl of left third pereopod distinctly shorter than propodus; no brush of long setae ventrally on dactyl and propodus. Telson with row of spines on both left and right posterior lobes.

Size.– Maximum reported shield length 4.6 mm.

Coloration.– Shield cream, sometimes with tint of pink and often with some pink or brown tinges posteriorly; 2 black spots submedially on cervical groove. Ocular peduncles white or bluish-white proximally and distally, with broad central black band with minute white spots; ocular acicles cream. Antennular peduncles very dark green or black proximally grading distally to blue-green; flagella green-orange. Antennal peduncles cream with ultimate segments orange; flagella orange. Chelipeds with fingers distally cream and proximally greenish-gray to grayish-blue, tubercles cream or white; palm greenish-gray or grayish-blue; carpus black with variously sized white spots on tubercles; merus cream with black distal band and white tubercles. Second and third pereopods each with dactyl cream with broad black proximal band marked with white spots and patches; propodus, carpus and merus cream, pale grayish-green or light bluish-gray, propodus very pale distally.

Habitats.– Coral reefs and rubble, often amongst branches of living coral and inhabiting variety of small gastropod shells.

Distribution.– Mariana and Hawaiian Islands, Indonesia, southern Japan, Taiwan, Vietnam, Cocos (Keeling) and Christmas Islands, northwestern Australia; intertidal and subtidal to about 20 m.



Ovig. female (2.8 mm), Aodi, Taipei County, May 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view). Scale equals 1 mm.

Calcinus lineapropodus Morgan & Forest, 1991

Lanyu, Taitung County, 23 Jun 1993, (photographed by P.H. Ho).

Calcinus sp. 1.– Wooster, 1984: 138.

Calcinus undescribed sp.– Haig & Ball, 1988: 161.

Calcinus sp.– Kamezaki et al., 1988: 138; Takeda, 1994a: 195.

Calcinus lineapropodus Morgan & Forest, 1991: 650, figs. 1, 2; Morgan, 1991: 893, figs. 37-39; Shih & Yu, 1995: 243, fig. 3; Asakura & Nomura, 2001: 102, figs. 4-7, 8G.

Material examined.– Badouzih Keelung, 3.6 m, 14 Jul 2005: 1 ovig. female (6.4 mm), (NTOU); Lanyu, Taitung County, 23 Jun 1993: 1 male (5.1 mm), (NMNS).

Diagnosis.– Shield longer than broad; rostrum broadly triangular, reaching or slightly overreaching lateral projections. Ocular peduncles as long or longer than shield; acicles multispinose. Lateral face of palm of left chela minutely tuberculate. Dorsal margin of carpus and palm of right cheliped carinate and spinose. Dactyl of third left pereopod approximately equaling length of propodus; no brush of long setae on ventral margins of dactyl and propodus. Telson with numerous marginal spines on left and right posterior lobes.

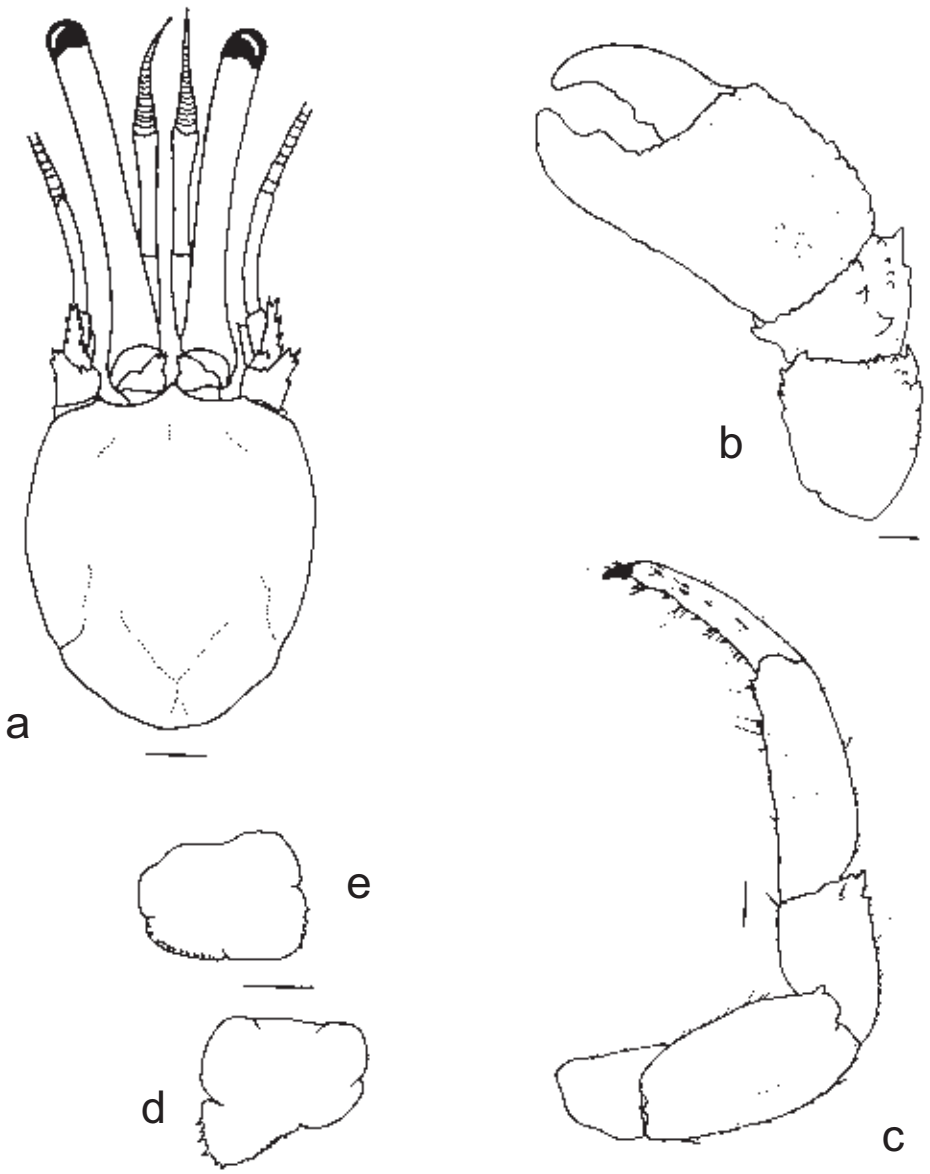
Size.– Maximum recorded shield length 6.4 mm.

Coloration.– Shield cream or pale brown, darker laterally. Ocular peduncles rose-pink, paler near corneas; acicles pink and cream. Antennular peduncles pale brown proximally, ultimate segments blue distally; flagella orange. Antennal peduncles cream and pale orange; flagella pale orange. Chelipeds with fingers cream with some orange dots; palm distally cream, remainder gray-brown with dark brown spot proximal to midlength on lateral and mesial faces; carpus and merus gray-brown with pale tubercles. Second

and third pereopods with dactyls rose-pink with cream tips; propodi cream with scattered orange flecks and 3 longitudinal brown or maroon stripes on both lateral and mesial faces; carpi rose-pink with some cream proximally and distally; meri cream with some orange dots and maroon patch mid-dorsally, rose-pink patch laterally and ventrally.

Habitats.– Live coral, dead coral rubble, rocks.

Distribution.– Eastern Indian Ocean, Cocos (Keeling), Christmas and Carrier Islands, Western Australia, New Guinea, Indonesia, Taiwan, Ryukyu and Izu Islands of Japan, Mariana Islands; subtidal to 30 m.



Male (5.1 mm), Lanyu, Taitung County, 23 Jun 1993: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e,** telson (ventral surface). Scales equal 1 mm.

Calcinus pulcher Forest, 1958

Badouzih, Keelung, 14 Jul 2005.

Calcinus pulcher Forest, 1958: 287, figs. 4, 12, 13, 16; Morgan, 1991: 896, figs. 43-45; Shih & Yu, 1995: 244, fig. 4; Asakura & Nomura, 2001: 95, figs. 1-3, 8A-F.

Not *Calcinus pulcher*– Miyake, 1982: 114, pl. 38, fig. 5 [= *Calcinus anani* Poupin & McLaughlin, 1998].

Material examined.– Badouzih Keelung, 3.6 m, 14 Jul 2005: 1 ovig. female, (5.5 mm), (NTOU).

Diagnosis.– Shield considerably longer than broad; rostrum obtusely triangular. Ocular peduncles approximately as long as shield; acicles multispinose. Upper margin of palm of left cheliped tuberculate or with row of spines; outer face with scattered tubercles, largest near upper and lower margins. Upper margin of palm and carpus of right cheliped spinose. Dactyl of third left pereopod slightly shorter than propodus; no brush of long setae on ventral margins of dactyl and propodus. Telson with several spines marginally on left and right terminal margins and extending onto left outer (lateral) margin.

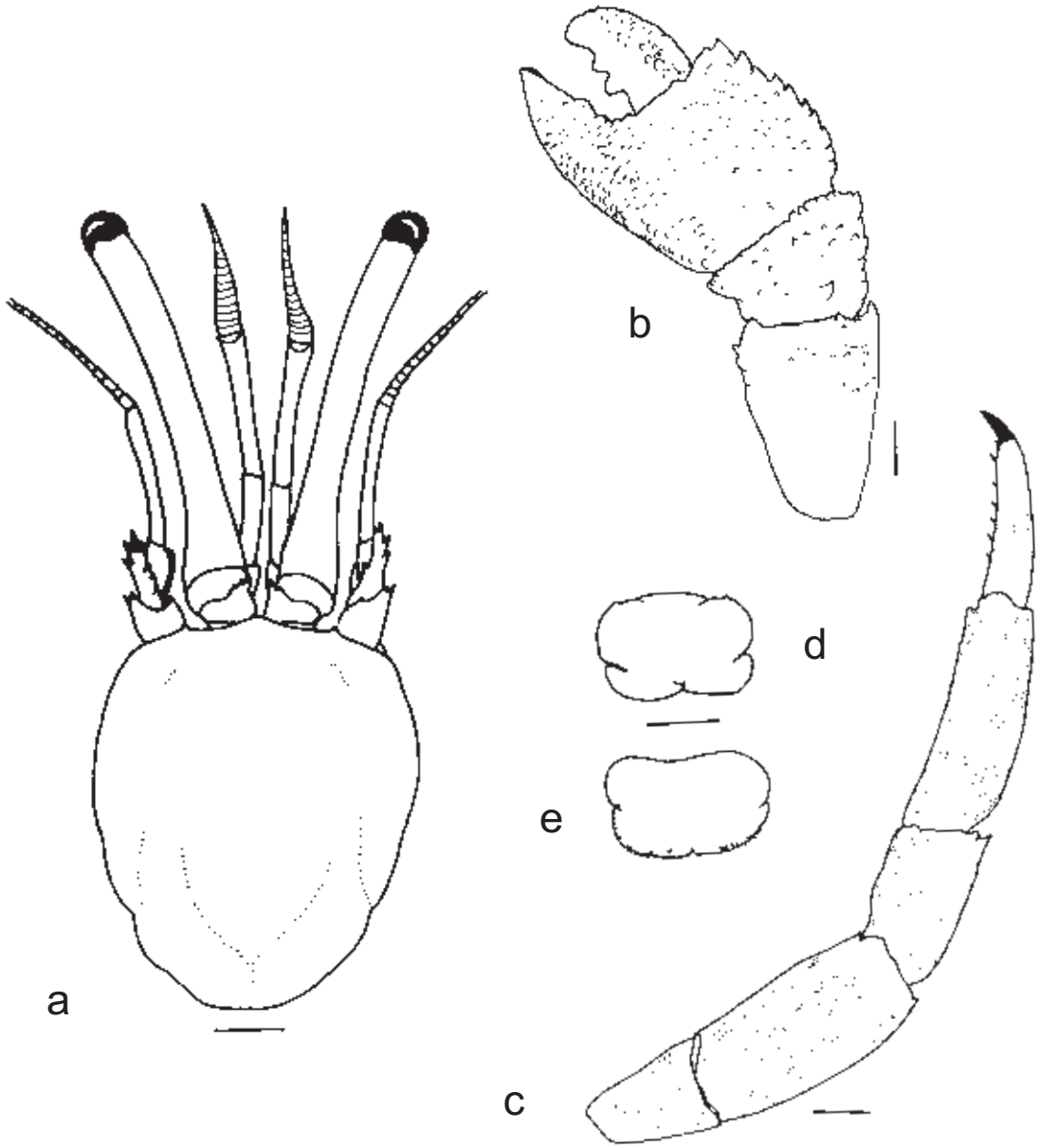
Size.– Maximum recorded shield length 5.7 mm.

Coloration.– Shield cream, pale or medium brown, often darker anteriorly and laterally. Ocular peduncles rose-brown on proximal 0.5-0.7, cream distally; ocular acicles brown or orange. Antennular peduncles with penultimate segments orange or brown, ultimate segments orange or brown proximally, blue distally; flagella orange. Antennal peduncles mostly cream with ultimate segments orange; flagella orange. Fingers of chelipeds cream or white; palms cream distally grading to grayish-brown proximally; dark gray, brown or blue spot on outer and inner faces of palms of both chelae; carpi and meri grayish-brown to grayish-blue. Second and third pereopods cream, each with numerous short longitudinal grayish-green, grayish-brown

or maroon flecks; broad band of very dark grayish-blue or brown at approximate midlength of each dactyl and subdistally on propodus; carpi of third pereopods and meri of both pairs each with similar, usually incomplete and mostly dorsal, dark grayish-blue or brown band; carpi of second pereopods mostly intense rose or maroon.

Habitat.– Usually associated with coral and dead coral rubble.

Distribution.– Andaman Sea off Phuket, Thailand, Cocos (Keeling) Islands, northwestern Australia, Indonesia, Vietnam, Taiwan, southern Japan; subtidal to about 30 m.



Ovig. female (5.5 mm), Badouzih, Keelung, 14 Jul 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left cheliped (outer face); **c,** left third pereopod (lateral view); **d,** telson (dorsal surface); **e.** telson (ventral surface). Scales equal 1 mm.

Family Paguridae Fabricius, 1775

Members of the Paguridae are commonly referred to as "right handed" hermit crabs, because many, albeit not all, genera are characterized by having much larger right chelipeds. The family has the highest number of genera and species in the superfamily. Its members also exhibit the most morphological diversity. Pagurids are more common occupants of the intertidal areas in the temperate zones than in the tropics, but the majority of genera are found at depths between 50 and 500 meters. Of the 17 genera of the family now recognized from Taiwanese waters, only four were known at the time of Yu & Foo's (1991) catalog.

Key to the Taiwanese genera of the family Paguridae

1. Gill formula includes 3 well developed or reduced pleurobranchs, 1 each on thoracic somites 5-7 (above pereopods 2-4) ……2
- Gill formula includes fewer than 3 pleurobranchs ……6
2. Pleurobranchs on thoracic somites 4 and 5 (above pereopods 2 and 3) reduced, rudimentary or vestigial …3
- Pleurobranchs on thoracic somites 4 and 5 (above pereopods 2 and 3) well developed ……4
3. Corneas well developed; chelipeds markedly unequal; female with paired gonopores on coxae of third pereopods, paired and modified first pleopods absent ……*Propagurus*
- Corneas reduced; chelipeds subequal; female with single gonopore on coxa of left third pereopod, paired and modified first pleopods present ……*Chanopagurus*
4. Right cheliped with chela operculate; males and females both without paired, modified first pleopods …5
- Right cheliped with chela moderate to broad and dorsoventrally flattened, but not operculate; males without, females with paired, modified first pleopods ……*Pylopaguropsis*
5. Pleon twisted; males without paired, modified second pleopods; uropods asymmetrical …*Bathypaguropsis*
- Pleon straight; males with paired, modified second pleopods; uropods symmetrical ……*Tomopaguroides*
6. Pleurobranch present on thoracic somite 7 (above pereopod 4); crista dentata with 1 or more accessory teeth ……7
- No pleurobranch present thoracic somite 7 (above pereopod 4); crista dentata without accessory tooth ……*Catapaguroides*
7. Dactyl of left second pereopod with row of closely-spaced, corneous spines on ventral margin effectively forming comb ……*Pagurodofleinia*
- Dactyl of left second pereopod with or without row of corneous spines on ventral margin, but never forming comb ……8
8. Antennal acicle with unarmed mesial and lateral surfaces ……9
- Antennal acicle with 1 or more spines on mesial and/or lateral surfaces ……*Alloeopagurodes*
9. Chelipeds equal or subequal, right stronger, but not necessarily longer; males with short to long sexual tube (s) ……10
- Chelipeds distinctly unequal, right appreciably stronger and usually longer; males with or without sexual tube (s) ……14
10. Males with distinct left sexual tube; telson with acutely triangular posterior lobes separated by extremely deep median cleft ……*Spiropagurus*
- Males with distinct right sexual tube; telson with variable posterior lobes but not separated by extremely deep median cleft ……11
11. Telson with terminal margins each armed with few moderate to long corneous spines ……*Icelopagurus*

- Telson with terminal margins unarmed or with calcareous spines ……12

12. Gills deeply quadriserial; male with short right and/or left sexual tube (s) ……*Michelopagurus*
- Gills biserial or distally only slightly quadriserial; male with moderate to long right sexual tube ……13

13. Males with right sexual tube directed from right to left across ventral body surface; females with first pleopods paired and modified ……*Nematopagurus*
- Males with right sexual tube directed toward exterior and frequently curved over dorsal surface of pleon; females without paired first pleopods ……*Catapagurus*

14. Gills biserial; males without sexual tube(s) ……15
- Gills distally quadriserial; males with moderate to long right sexual tube directed from right to left across ventral body surface ……*Cestopagurus*

15. Telson with broad, frequently armed median cleft, separating crescent-shaped posterior lobes ……*Diacanthurus*
- Telson without armed median cleft separating crescent-shaped posterior lobes ……16

16. Ultimate segment of antennular peduncle with or without row(s) or tufts of setae ventrally; male with gonopore on right fifth coxa partially concealed by tuft of stiff setae directed medially; female with paired or only single left gonopore ……*Pagurixus*
- Ultimate segment of antennular peduncle without row(s) or tufts of setae ventrally; male without gonopore on right fifth coxa partially concealed by medially directed tuft of stiff setae; female with paired gonopores ……*Pagurus*

Propagurus McLaughlin & de Saint Laurent, 1998

A small genus with only four assigned species, two of which are found in Taiwanese waters.

Key to the Taiwanese species of *Propagurus*

1. Dorsal surface of right palm covered with rounded or flattened tubercles, each at least partially encircled by dense plumose setae ……*P. miyakei*
- Dorsal surface of right palm covered with rows of spines partially to completely concealed by long setae ……*P. obtusifrons*

Propagurus miyakei (Baba, 1986)

Dasi fishing port, Yilan County, 27 Apr 1995.

Pagurus sp.– Miyake & Imafuku, 1980b: 63, pl. 2, fig. 6.

Pagurus miyakei Baba, 1986: 205, fig. 22, pl. 152.

Propagurus miyakei– McLaughlin & Lemaitre, 2000: 59, figs. 1, 2; Komai & Konishi, 2003: 954, figs. 1-7.

Material examined.– Dasi fishing port, Yilan County, 27 Apr 1995: 1 male (14.1 mm), (NTOU).– 15 May 1998: 2 males (14.7, 12.0 mm), (NTOU).– 3 Sep 2002: 1 male (12.2 mm), (NTOU).– 28 Sep 2002: 1 male (14.4 mm), (NTOU).– 5 Mar 2005: 1 male (11.8 mm), (NTOU); Gueishan Island, vent st. 7, 24°52.171'N, 121°58.530'E, PCP, 247 m, 13 Jul 2005: 1 male (4.4 mm), (NTOU); DW60, 24°41.2'N, 122°11.8'E, 532-418 m, 4 Aug 2001: 1 male (8.3 mm), (NTOU); CP71, 24°52.33'N, 122°03.10'E, 600 m, 6 May 2001: 3 males (11.0-16.5 mm), 1 female (9.5 mm), (MNHN Pg 7668); CP88, 24°51.28'N, 122°02.80'E, 650 m, 9 May 2001: 2 males (12.4, 16.5 mm) (MNHN Pg 7669); CP89, 24°53.60'N, 122°01.39'E, 310-420 m, 9 May 2001: 4 males (5.7-18.0 mm), 1 female (11.5 mm), (MNHN Pg 7670); CP99, 24°53.21'N, 122°04.04'E, 506-680 m, 18 May 2001: 1 male (12.5 mm), (MNHN Pg 7671); CP110, 24°48.28'N, 122°03.99'E, 316-350 m, 20 May 2001: 1 male (7.4 mm), (MNHN Pg 7672); CP111, 24°52.24'N, 122°04.35'E, 540-700 m, 21 May 2001: 1 male (14.3 mm), (NTOU); CP112, 24°50.84'N, 122°01.95'E, 500-600 m, 21 May 2001: 1 male (14.5 mm), 1 female (13.0 mm), (MNHN Pg 7673); CP 115, 24°53.87'N, 122°02.05'E, 381-440 m, 21 May 2001: 1 ovig. female (7. 6 mm), (MNHN Pg 7674); CD120, 24°51.79'N, 122°02.54'E, 520-640 m, 31 Jul 2001: 1 male (10.5 mm), 1 female (7.4 mm), (MNHN Pg 7675); CD121, 24°48.47'N, 122°02.4'E, 471-531 m, 1 Aug 2001: 1 male (15.5 mm), (MNHN Pg 7676); CP195, 24°52.02'N,

122°03.11'E, 605-572 m, 11 Sep 2003: 3 males (7.1-15.1 mm), (NTOU); CP211, 24°40.591'N, 122°11.216'E, 517-518 m, 26 Aug 2003: 1 male (10.5 mm), (NTOU); CP234, 25°22.36'N, 122°31.8'E, 550-549 m, 22 Jul 2004: 4 males (6.0-8.5 mm), 3 females (5.3-6.7 mm), 1 ovig. female (6.9 mm), (NTOU); CP248, 24°51.74'N, 122°02.43'E, 516-557 m, 28 Aug 2004: 2 females (6.1, 7.2 mm), (NTOU), 1 male (14.5 mm), 3 females (6.9-8.1 mm), 3 ovig. females (7.9-8.5 mm), (MNHN Pg 7677); CP274, 24°47.76'N, 122°00.32'E, 338-277 m, 13 Jun 2005: 1 juvenile (5.7 mm), (NTOU).

Diagnosis.– Shield distinctly longer than broad; rostrum roundly subtriangular, subacute. Ocular peduncles approximately 0.5 length of shield; corneas not dilated; ocular acicles each with submarginal spinule. Antennular peduncles overreaching distal margins of corneas by half to nearly entire lengths of ultimate segments; antennal peduncles overreaching distal margins of corneas by less than half lengths of ultimate segments. Right cheliped with convex dorsal surface of dactyl covered with closely-spaced rounded tubercles each encircled by densely plumose setae; palm with convex dorsal surface covered with rounded and/or flattened tubercles circumscribed partially or completely with densely plumose setae, 2 or 3 longitudinal slightly oblique grooves not extending onto fixed finger; carpus with 1-3 rows of spines on dorsomesial margin, dorsal surface with few small spines and spinulose tubercles and numerous sparse tufts of stiff setae. Left cheliped with convex dorsal surface of palm covered on lateral half with closely-spaced rounded and/or flattened tubercles, each circumscribed by densely plumose setae, dorsomesial margin with 3 or 4 large, blunt, tuberculate spines; carpus subtriangular, with short row of spines and tufts of stiff setae on dorsolateral margin distally and shorter row of tuberculate spines on dorsomesial margin proximally. Dactyls of second and right third pereopods moderately long, stout, and similar; lateral and mesial faces each with weak longitudinal sulcus in proximal half, ventral margins each with row of 14 or 15 prominent corneous spines; propodi with tufts of long stiff setae dorsally and ventrally; dactyl of left third pereopod with row of very long dense setae dorsally and ventrally, lateral face with longitudinal glabrous concavity flanked dorsally and ventrally by row tubercles, mesial face with shallow sulcus proximally, propodus also with dense dorsal and ventral row of long setae, lateral face somewhat flattened and with numerous tubercles forming 3 irregular rows in distal 0.6. Carpi each with row of prominent spines on dorsal surface (second) or small dorsodistal spine and 2 smaller proximal spines (third). Fourth pereopods each with prominent preungual process at base of claw. Telson with weakly asymmetrical posterior lobes separated by shallow median cleft; terminal margins each with row of very closely-spaced calcareous spines, not extending onto lateral margins.

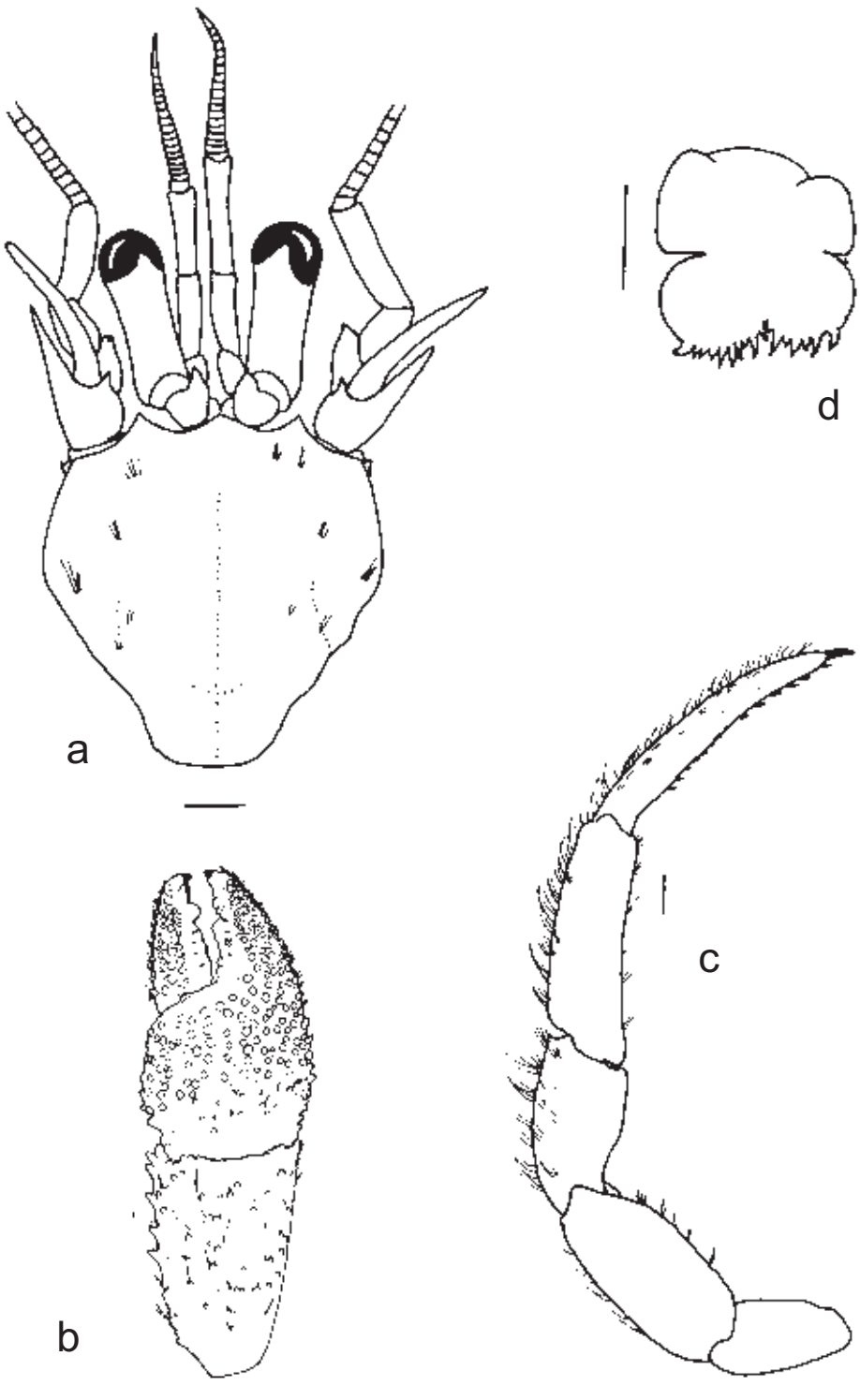
Size.– Maximum recorded shield length 18.5 mm.

Coloration.– Generally reddish-brown to light orange. Ocular peduncles with two or three irregular red or orange bands. Articles of antennal flagella alternating dull red and white. Chelae light orange proximally on palms, remainder of dorsal surfaces greenish-blue with flattened spines lighter. Carpi and meri of chelipeds and all segments of ambulatory legs light orange with small numerous light-colored spots.

Habitat.– Gastropod shells covered by unidentified colonial hydrozoans.

Distribution.– Japan from Boso Peninsula to west of Kyushu, Taiwan; 150-700 m.

Remarks.– Although only recently reported from Taiwanese waters on the basis of two specimens (McLaughlin & Lemaitre, 2000; Komai & Konishi, 2003), *Propagurus miyakei* has proved to be quite common in the deeper waters of northeastern Taiwan.



Male (11.8 mm), Dasi fishing port, Yilan County, 5 Mar 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Propagurus obtusifrons (Ortmann, 1892)

Dasi fishing port, Yilan County, 19 Oct 1995.

Eupagurus obtusifrons Ortmann, 1892: 313, pl. 12, fig. 8.

Eupagurus gracilipes Yokoya, 1933: 89, fig. 33 [not *Eupagurus gracilipes* Stimpson, 1858].

Pagurus yokoyai Makarov, 1938: 185; Miyake, 1978: 110, figs. 44, 45; Miyake, 1982: 131, pl. 44, fig. 2; Baba, 1986: 209, 305, fig. 154; McLaughlin, 1997: 536, fig. 27i.

Propagurus yokoyai– McLaughlin & de Saint Laurent, 1998: 181, figs. 4D, 7D, 10B, D, 11G-I, 12C, D.

Propagurus obtusifrons– Komai & Yu, 1999: 189, figs. 1-5.

Not *Pagurus obtusifrons*– Miyake, 1978: 106, pl. 2, fig. 4; Miyake, 1982: 128, pl. 43, fig. 5; Baba, 1986: 203, 304, fig. 151; Yu & Foo, 1991: 65, unnumbered fig.; Okutani, 1994: 228, fig. 6 [= *Pagurus confusus* Komai & Yu, 1999].

Material examined.– Dasi fishing port, Yilan County, Mar 1997: 1 male (11.4 mm), 1 damaged specimen (10.9 mm), (NTOU).– 20 May 1997: 1 male (10.9 mm), (NTOU).– 30 May 1997: 1 male (13.7 mm), (NTOU).– 19 Feb 1998: 1 male (12.5 mm), (NTOU).– 15 May 1998: 2 males (10.3, 11.1 mm), (NTOU).– May 1998: 1 female (6.3 mm), (NTOU).– 7 Sep 1998: 2 males (9.9, 14.1 mm), (NTOU).–28 Apr 2005: 1 male (7.5 mm), (NTOU).– 2005: 1 male (10.4 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 23 Mar 1991: 4 males (9.3-11.2 mm), (NTOU).– 17 May 1996: 2 males (9.8, 12.9 mm), (NTOU).– 6 Aug 1996: 1 male (8.7 mm), (NTOU).– 28 May 1997: 1 male (7.4 mm), (NTOU).– 18 Nov 1997: 3 males (6.4-7.4 mm), 1 female (7.1 mm), 1 ovig. female (8.6 mm), (NTOU); Tongsiao fishing port, Miaoli County: 1 male (8.8 mm), (NTOU); Singda Harbor, Kaohsiung County, 31 Dec 1984: 1 female (10.1 mm), (NTOU); CP73,

24°52.86'N, 122°00.98'E, 220-330 m, 7 May 2001: 4 males (7.5-13.0 mm), 1 ovig. female (8.0 mm), (MNHN Pg 7678); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 2 males (10.5, 15.0 mm), 3 females (4.0-10.0 mm), (MNHN Pg 7679); CP85, 24°00.55'N, 122°00.54'E, 255-390, 9 May 2001: 4 males (6.7-14.5 mm), 1 female (10.0 mm), (MNHN Pg 7680); CP91, 24°50.60'N, 122°01.39'E, 400 m, 10 May 2001: 4 males (10.5, 12.5 mm), (MNHN Pg 7681); CP95, 24°55.80'N, 122°05.73'E, 269-360 m, 18 May 2001: 4 males (9.0-12.5 mm), (MNHN Pg 7682); CP 107, 24°48.18'N, 122°11.31'E, 335-420 m, 20 May 2001: 1 male (13.0 mm), (MNHN Pg 7683); CP109, 24°48.29'N, 122°83.98'E, 246-256 m, 20 May 2001: 2 males (11.0, 11.5 mm), (MNHN Pg 7684); CP110, 24°48.28'N, 122°03.99'E, 316-350 m, 20 May 2001: 2 females (10.0, 12.0 mm), (MNHN Pg 7685); CP115, 24°53.87'N, 122°02.05'E, 381-440 m, 21 May 2001: 2 males (10.0, 11.5 mm), (MNHN Pg 7686); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 14 males (5.1-11.2 mm), 3 females (4.6-9.4 mm), 2 juveniles (3.7, 4.2 mm), (NTOU); CP265, 24°28.65'N, 121°55.96'E, 350-345 m, 1 Sept 2004: 1 male (10.5 mm), (MNHN Pg 7687); CP268, 24°30.46'N, 122°06.28'E, 421-531 m, 2 Sep 2004: 3 males (9.0-12.5 mm), (MNHN Pg 7688); OCP288, 24°56.303'N, 122°05.190'E, 263-352 m, 2 Sep 2004: 4 males (8.9-11.5 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m: 1 male (7.4 mm); no specific locality: 1 male (6.7 mm), (NTOU).– 1 female (6.4 mm), (NTOU).

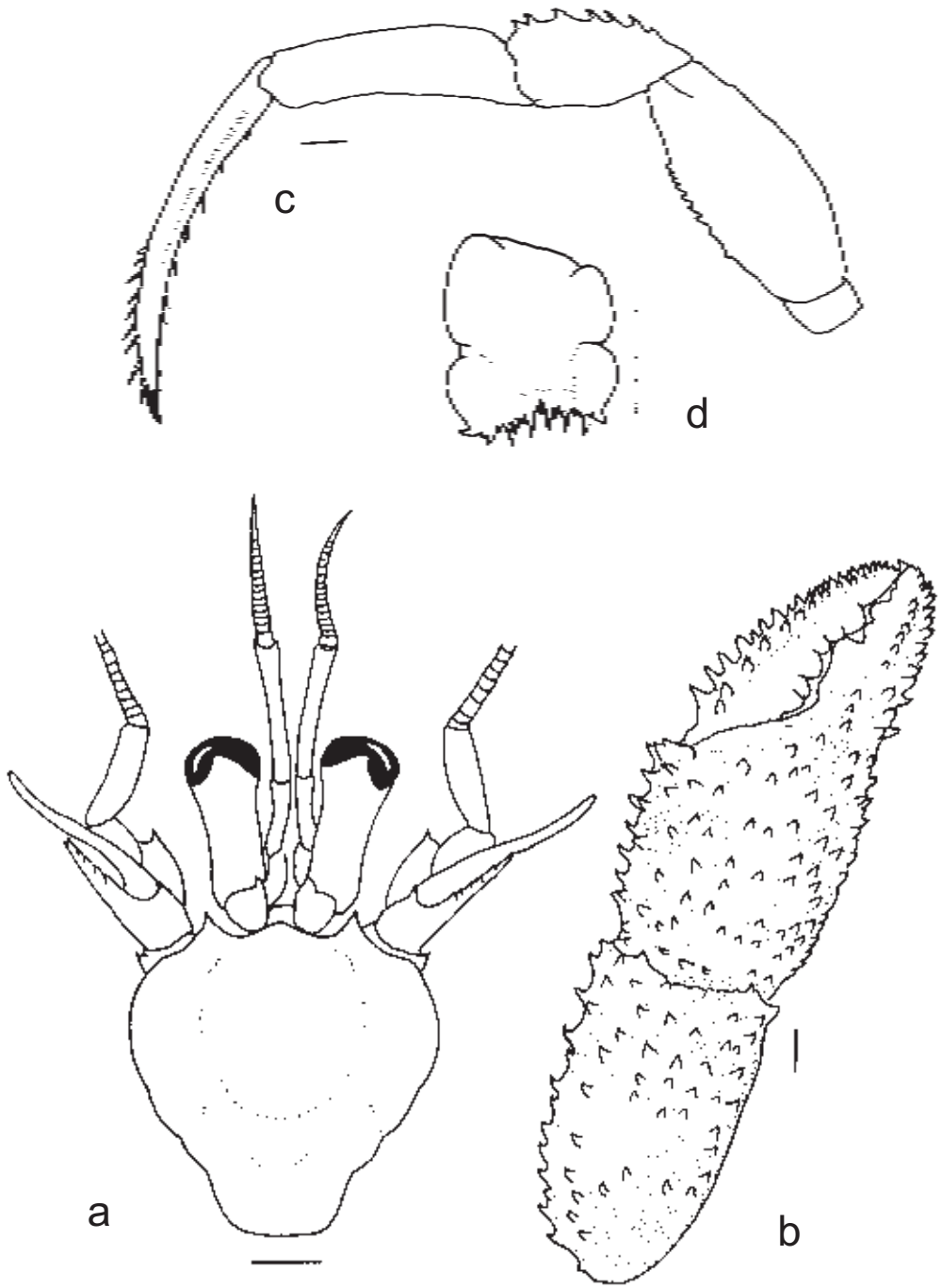
Diagnosis.– Shield slightly longer than broad; rostrum obtusely triangular or rounded. Ocular peduncles shorter than shield; ocular acicles simple. Antennular peduncles overreaching distal corneal margins by nearly half lengths of ultimate peduncular segments; antennal peduncles also usually overreaching corneas. Chelipeds grossly unequal, armature at least partially concealed by long, thick setae; palm of right cheliped with irregular double row of spines on weakly delimited dorsomesial margin, dorsal surface with 7-9 rows of prominent spines, dorsolateral margin not delimited; carpus with double row of prominent spines on dorsomesial margin, dorsal surface with scattered small spines, dorsolateral margin not delimited. Left cheliped with palm elevated in midline and armed with prominent rows of spines, dorsolateral surface and dorsolateral margin also with single or double rows of spines; carpus with dorsomesial and dorsolateral row of prominent spines. Ambulatory legs with dactyls longer than propodi, dorsal surfaces each with double row of long thick setae, ventral margins each with 7-15 prominent corneous spines; propodi with setose surfaces, particularly on left third; carpi each with row of prominent spines on dorsal surfaces of second pereopods, third with dorsodistal spine and occasionally few additional small spines. Fourth pereopods each with small preungual process at base of claw. Telson with posterior lobes separated by small median cleft, terminal margins each with 4-8 prominent calcareous spines interspersed with smaller similar spines, often 2 or 3 rows of small spines submarginally.

Size.– Maximum recorded shield length 14.5 mm.

Coloration.– Shield light brown to reddish-orange, sometimes with tinge of reddish-brown laterally. Ocular peduncles with dark red or reddish-brown spot or band proximally on purple dorsal surface, similar spot at each corneal indentation. Antennal flagella alternated with red and white bands. Chelipeds and ambulatory legs generally light brown to purplish-red.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kyushu, Taiwan; 38-440 m, possibly to 531 m.

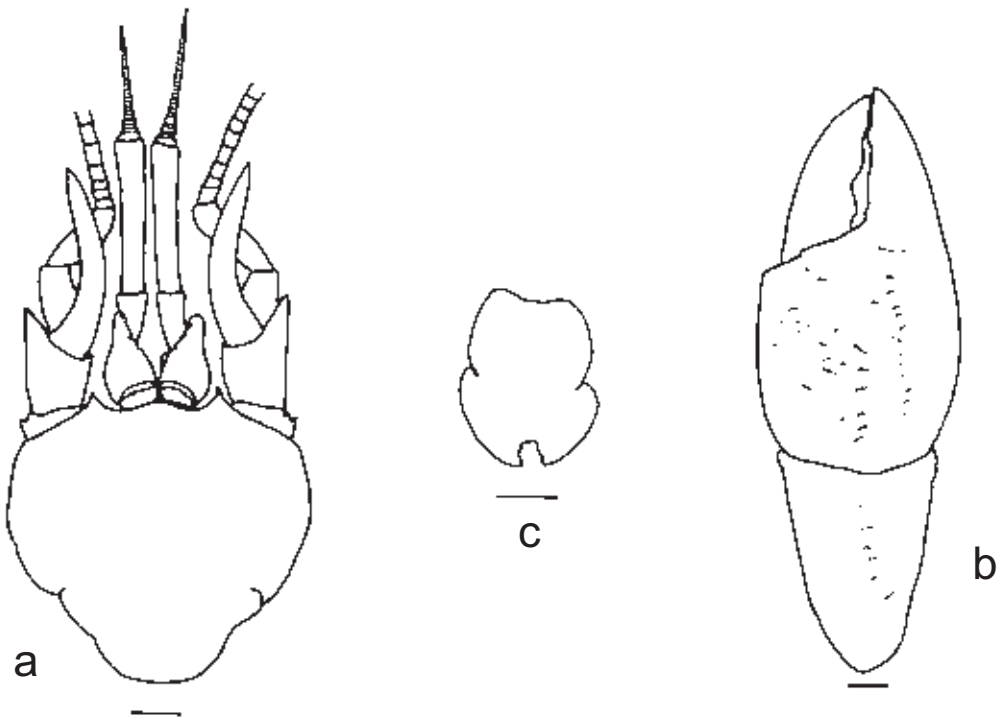


Male (13.7 mm), Dasi fishing port, Yilan County, 30 May 1997: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left second pereopod (lateral view); **d,** telson. Setae omitted. Scales equal 3 mm.

Chanopagurus Lemaitre, 2003

This monotypic genus is presently known only from Taiwanese waters.

Chanopagurus atopos Lemaitre, 2003



Ovig. female (6.0 mm), holotype, CP23: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** telson. Scales equal 1 mm.

Chanopagurus atopos Lemaitre, 2003: 106, figs. 1-3.

Material examined.– CP23, 22°14.8'N, 120°02.8'E, 880-1070 m, 29 Jul 2000: 1 ovig. female (6.0 mm), holotype, (NTOU).

Diagnosis.– Shield length approximately equal to width; rostrum broadly rounded. Ocular peduncles short, stout, and nearly contiguous basally, tapering distally, corneas reduced; ocular acicles very broad, narrowly separated. Antennular and antennal peduncles markedly longer than ocular peduncles. Chelipeds subequal in length, right stouter; chela of right cheliped unarmed except for setose tubercles on dorsal surface; carpus with spine dorsomesially at distal margin and setose tubercles on dorsal surface. Left cheliped with palm unarmed but with short rows of long stiff setae; carpus with dorsodistal spine and weak longitudinal depression on dorsal surface. Ambulatory legs with numerous long setae on all segments; dactyls longer than propodi, ventromesial margins each with 3-8 spinules; propodi unarmed; carpi each with dorsodistal spine. Female with single left gonopore; paired and modified first pleopods, unpaired left pleopods 2-5. Telson with prominent U-shaped median cleft with 2 or 3 minute spinules marginally, posterior lobes rounded, 1 spine at each inner angle.

Size.– Maximum reported shield length 6.0 mm.

Coloration.– In preservative, uniformly orangish with yellow setae (Lemaitre, 2003).

Habitat.– Gastropod shells.

Distribution.– Southwest of Taiwan; 880 m, possibly to 1070 m.

Pylopaguropsis Alcock, 1905

Of the 16 colorful species described in this genus, 14 are found in the Indo-Pacific, one in the western Atlantic and one in the eastern Pacific. Two of the 14 are now recognized in Taiwanese waters, each characterized by brightly striped appendages.

Key to the Taiwanese species of *Pylopaguropsis*

1. Ambulatory legs not markedly dissimilar; lateral face of propodus of right third pereopod evenly convex ..... *P. pustulosa*
- Ambulatory legs markedly dissimilar; lateral face of propodus of right third pereopod concave dorsally and flattened median ridge ..... *P. zebra*

Pylopaguropsis pustulosa McLaughlin & Haig, 1989

Dasi fishing port, Yilan County, 14 Dec 2006.

Pylopaguropsis pustulosa McLaughlin & Haig, 1989: 159, figs. 1e, k; 2e, k; 4b; 6b; 10b; 12b; 13h.

Material examined.– Dasi fishing port, Yilan County, 14 Dec 2006: 1 female (2.4 mm), (NTOU); CP116, 24°55.40'N, 120°00.39'E, 100 m, 21 May 2001: 1 ovig. female (4.9 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum prominent, acute. Ocular peduncles moderately long and stout; ocular acicles triangular, subacute. Antennular peduncles overreaching distal corneal margins by approximately half lengths of ultimate peduncular segments; antennal peduncles reaching only slightly beyond corneal margins. Right cheliped with mesial face of dactyl armed with numerous blister-like small tubercles, dorsal surface with scattered tiny tubercles or granules; palm with dorsomesial margin delimited proximally by irregular row of small tubercles, dorsoproximal margin with few more prominent tubercles, dorsal surface slightly convex, roughened, and with few, scattered very tiny tubercles, dorsolateral margin delimited by double row of small tubercles only on fixed finger, ventral surface with rows of closely-spaced small tubercles; dorsomesial margin of carpus with irregular double row of small spines. Left cheliped with chela rotated counterclockwise approximately 65°-70°; palm with few spinulose tubercles on dorsal surface; carpus with row of spines on dorsomesial margin, largest distally. Second and third left pereopods not markedly dissimilar but right third with weak longitudinal sulcus on lateral face of dactyl, ventral margins each with row of approximately 14 corneous spines, dorsal, mesial and lateral faces all with rows of corneous spines; ventral surfaces of propodi each with few to row of small corneous spinules; carpi each with small dorsodistal spine. Telson with posterior lobes distinctly asymmetrical; separated by narrow median cleft; terminal margins

oblique, each with several prominent spines.

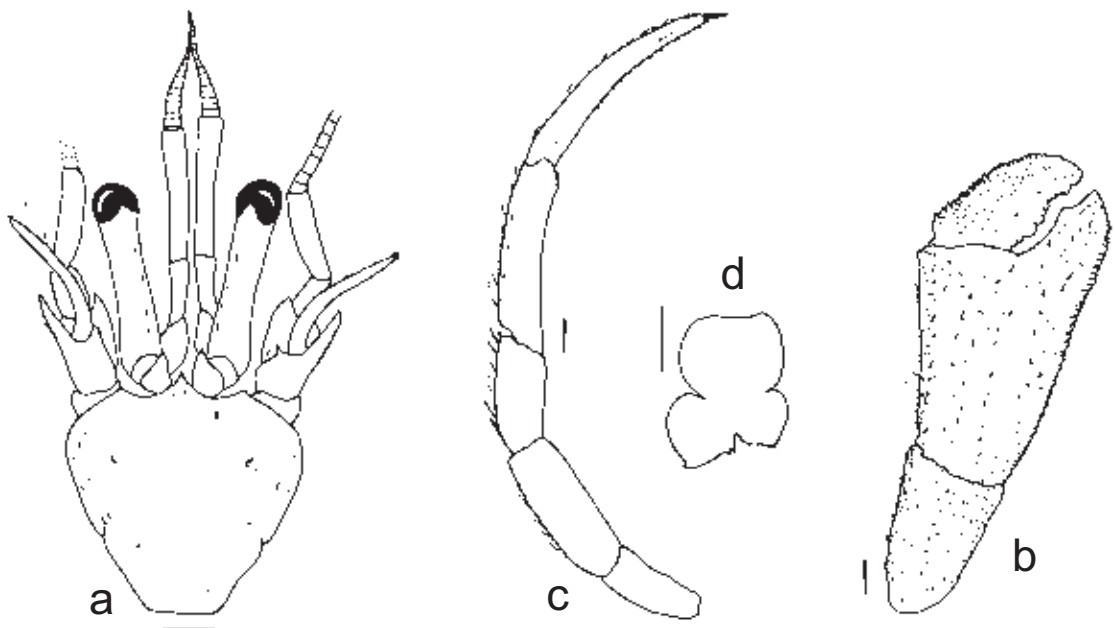
Size.– Maximum recorded shield length 4.9 mm.

Coloration.– Shield generally light orange, at least centrally, red marginally and in series of patches circumscribing gastric region. Ocular peduncles white, each with broad red stripes dorsally, laterally and mesially. Antennular flagella whitish while antennal flagella red. Chela of right cheliped whitish with red splotches dorsally and marginally; carpus reddish-orange with similar splotches of red; merus generally reddish-orange with dorsal white stripe. Left cheliped and ambulatory legs striped red and white on all segments.

Habitat.– Gastropod shells.

Distribution.– Somalia, Taiwan; 90-100 m.

Remarks.– This is the first record of *Pylopaguropsis pustulosa* since its original description and not only a new distributional record, but a major range extension.



Ovig. female (4.9 mm), CP116: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Pylopaguropsis zebra (Henderson, 1893)

Badiouzih Keelung, 14 Jul 2005.

Eupagurus zebra Henderson, 1893: 425 (in part), pl. 39, figs. 12-15.

Pagurus zebra– Miyake, 1975: 260, pl. 116, fig. 2; Miyake, 1978: (in part) 108, fig. 43.

Pylopagurus zebra– McLaughlin & Haig, 1989: 143, figs. 3b, 5b, 7b, 9b, 11b, 13b; McLaughlin, 1997: 542, figs. 30a, c, 43e, f; Asakura, 2000: 74, figs. 2, 3.

Not *Pagurus zebra*: Edmondson, 1925: 29; Edmondson, 1933: 228; Edmondson, 1946: 263 [= *Pylopaguropsis keijii* McLaughlin & Haig, 1989].

Not *Pylopaguropsis zebra*– Eldredge et al, 1979: 18 [= *Pagurixus* sp.].

Not *Pylopaguropsis zebra*– Wooster, 1979: 173 [= *Pylopaguropsis fimbriata* McLaughlin & Haig, 1989].

Material examined.– Badiouzih Keelung, 3.6 m, 14 Jul 2005: 1 male (6.0 mm), (NTOU); Hepingdao Keelung, 28 Oct 1993: 1 male (4.6 mm), (NTOU).– 4 Nov 1993: 3 males (3.3-4.6 mm), (NTOU); CP116, 24°55.40'N, 122°00.39'E, 100 m, 21 May 2001: 1 ovig. female (2.9 mm), (NTOU).

Diagnosis.– Shield approximately as broad as long or slightly longer; rostrum prominent, acute, terminating in small spinule. Ocular peduncles moderately long; ocular acicles triangular, acute. Antennular peduncles overreaching distal corneal margins by more than half lengths of ultimate segments; antennal peduncles reaching beyond corneal bases and sometimes slightly exceeding margins. Right chela with dactyl dorsoventrally compressed, dorsomesial margin expanded and armed with row of spines, ventromesial surface distinctly concave; palm with irregular double row of low spines or spinulose tubercles on dorsomesial margin, dorsolateral margin with row of large tooth-like spines; dorsal surface with few low spinulose tubercles or small spines in mesial half and more irregular rows on lateral half, few to several extending onto fixed finger

as spinulose tubercles; carpus with scattered conical spines on dorsal surface mesially and rows of spines dorsolaterally, few strong spines on dorsodistal margin, mesial face strongly produced ventrally. Left cheliped with chela rotated counterclockwise approximately 45°; palm with low protuberances, some occasionally slightly spinulose; carpus with row of acute spines on dorsomesial margin, more regular row of slightly more conical blunt spines or spinules on dorsolateral margin. Ambulatory legs with third pereopods markedly dissimilar. Second and third left with dactyls longer than propodi, ventral margins each with row of prominent corneous spines; propodi with or without 2 corneous spinules at ventrodistal margin; third right pereopod with dactyl approximately twice as deep as left, laterally compressed, dorsal surface with transverse rows of long, stiff spine-like setae, lateral face with prominent longitudinal sulcus, ventral margin with row of prominent corneous spines; propodus with prominent dorsolateral margin, lateral face concave dorsally and with broad, flattened median ridge, ventromesial margin with row of corneous spines in distal half; carpi of both second and third pereopods each with small spine at dorsodistal margin. Telson with posterior lobes separated by shallow median cleft; terminal margins horizontal or slightly oblique, each with 3 or 4 large spines, lateral margins with narrow corneous plate.

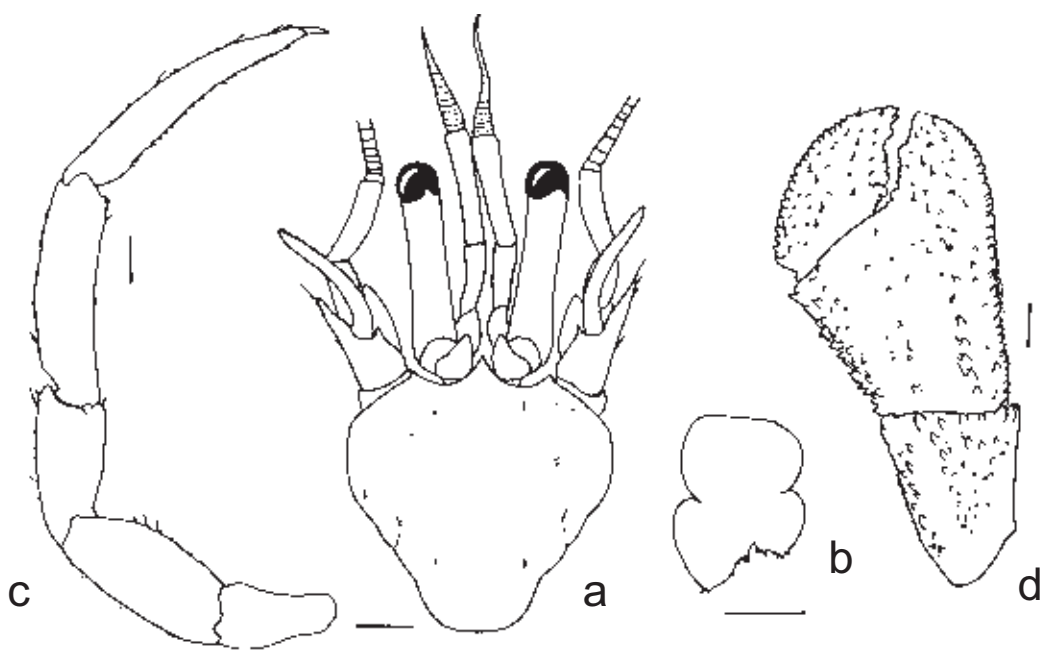
Size.– Maximum recorded shield length 6.0 mm.

Coloration.– Rostrum and ocular acicles yellow or orange, ocular peduncles purplish, each with yellow or orange band at base of cornea; lateral portions of shield and dorsal surfaces of antennal peduncles dark blood-red. Antennular flagella purplish while antennal flagella pale purple. Right cheliped with chela generally red or maroon, but often mottled red and white distally; carpus and merus of right cheliped, left cheliped and ambulatory legs all with red or orange and white stripes.

Habitat.– Gastropod shells.

Distribution.– South Africa, Sri Lanka, northern Australia, Korea Strait, East China Sea, Taiwan and southern Japan; 50-180 m.

Remarks.– Despite its broad distribution in the western Pacific, this is the first report of *Pylopaguropsis zebra* in Taiwanese waters.



Male (4.6 mm), Hepingdao, Keelung, 28 Oct 1993: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, right third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 1 mm.

Bathypaguropsis McLaughlin, 1994

The somewhat "boxing glove" shape of the right chela in species of this genus immediately distinguish them from most other pagurids. Of the seven described species, three have been reported from neighboring Japan (Komai & Takeda, 2006), thus it is probable that more than just *B. kuroshioensis* will be found in Taiwanese waters with further exploration.

Bathypaguropsis kuroshioensis (Miyake, 1978)

Gueishan Island, vent st. 7, 13 Jul 2005.

Pagurus kuroshioensis Miyake, 1978: 115, fig. 48; Baba, 1986: 203: fig. 150.

Bathypaguropsis rahayuae McLaughlin, 1997: 539, figs. 29a-h, 42c, d.

Bathypaguropsis kuroshioensis– de Saint Laurent & McLaughlin, 2000: 117; Komai & Lemaitre, 2002: 431, figs. 4-7.

Material examined.– Dasi fishing port, Yilan County, 25 May 1998: 1 female (3.4 mm), (NTOU).– no specific date: 2 females (3.9, 5.0 mm), (NTOU); Gueishan Island, vent st. 7, 24°52.171'N, 121°58.530'E, PCP, 247 m, 13 Jul 2005: 1 ovig. female (3.2 mm), (NTOU); Nanfang-ao, Yilan County, 23 Mar 1999: 1 male (4.3 mm), (NTOU); CP27, 22°13.3'N, 122°23.4'E, 329-377 m, 30 Jul 2000: 3 males (2.1-4.7 mm), 1 female (3.3 mm), (MNHN Pg 7657); DW37, 21°51.7'N, 120°35.8'E, 420-503 m, 31 Jul 2000: 1 male (4.0 mm), 1 female (4.4 mm), (MNHN); CP85, 24°00.55'N, 122°00.54'E, 255-390 m, 9 May 2001: 2 males (4.1, 4.3 mm), 1 female (4.0 mm), (MNHN Pg 7652); CP101, 24°48.16'N, 122°06.70'E, 248-257 m, 19 May 2001: 1 male (3.5 mm), (MNHN Pg 7653); CP107, 24°48.18'N, 122°11.31'E, 335-420 m, 20 May 2001: 2 males (3.7, 4.0 mm), (MNHN Pg 7654); CP109, 24°48.29'N, 122°83.98'E, 246-256 m, 20 May 2001: 1 male (3.7 mm), (MNHN Pg 7655); CP212, 24°36.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 male (3.8 mm), (NTOU); CP216, 24°34.71'N, 22°04.02'E, 209-280 m, 27 Aug 2003: 2 males (2.9 and 3.9 mm), 1 female (3.8 mm), (NTOU); CP270, 24°32.7'N, 122°02.26'E, 340-407 m, 2 Sep 2004: 1 male (4.8 mm), (MNHN Pg 7656); "TAIWAN 2001": 1 male (3.8 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum prominent, triangular, acute. Ocular peduncles slightly

more than half shield length; ocular acicles narrowly triangular, each with terminal spine. Antennular and antennal peduncles overreaching distal corneal margins. Right cheliped massive, operculate; dorsomesial distal angle of palm with blunt spine, dorsomesial margin with row of blunt or subacute tuberculate spines; convex dorsal surface covered with flattened granules and very low short ridges, 1 rather inconspicuous tubercle at proximal margin; carpus with row of subacute or blunt spines on dorsomesial margin, dorsal surface with scattered spinules or low blunt or spinulose tubercles, primarily in distal half. Left cheliped with propodal-carpal articulation approximately 35° counterclockwise from perpendicular; chela unarmed or with few minute spinules; carpus with few tubercles on dorsomesial surface. Ambulatory legs similar; ventral margins of dactyls each with row of 7-11 corneous spines; propodi each with 1 corneous spinule ventrodistally; carpi each with or without very small spine at dorsodistal angle. Telson with slightly asymmetrical posterior lobes separated by moderate median cleft; terminal margins each with row of small spinules.

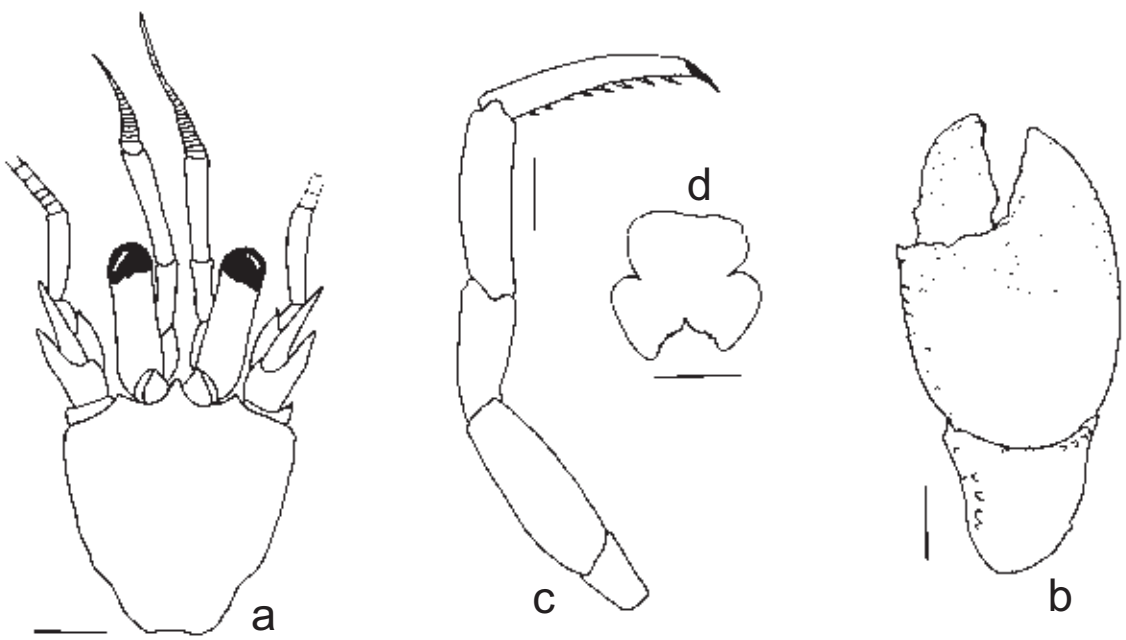
Size.– Maximum reported shield length 5.4 mm.

Coloration.– Shield, ocular and antennal peduncles, chelipeds and ambulatory legs all reddish-orange; ocular and antennal peduncles darker; antennular peduncles reddish-orange proximally, becoming colorless distally on ultimate segments.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japan from Sagami Bay to Tosa Bay, Taiwan, Kai Islands of Indonesia; 120-420 m, possibly to 503 m.

Remarks.– This is the first report of *Bathypaguropsis kuroshioensis* in Taiwanese waters though this species is widely distributed in Taiwan.



Female (3.4 mm), Dasi fishing port, Yilan County, 25 May 1998: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right second pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Tomopaguroides Balss, 1912

This monotypic genus was, until just recently, known from only two male specimens collected off the coast of Somalia during the German Tiefsee Expedition of the early 1900's. From MUSORSTOM and associated French cruises to the Philippine Islands, New Caledonia, Solomon and Fiji Islands, McLaughlin (2004d) redescribed the species and provided the first information on the female morphology. This genus is now reported from Taiwanese waters.

Tomopaguroides valdiviae (Balss, 1911)

CD138.

Parapagurus valdiviae Balss, 1911: 2, fig. 2.

Tomopaguroides valdiviae– Balss, 1912: 104, figs. 14, 15, pl. 9, fig. 1; McLaughlin, 2004d: 473, figs. 1, 2.

? *Tomopagurus valdiviae*– Provenzano, 1968; 641 (table).

Material examined.– CD138, 22°13.13'N, 120°20.17'E, 441-789 m, 23 Nov 2001: photograph, specimen not located.

Diagnosis.– Carapace slightly to considerably longer than broad. Rostrum triangular, acute, reaching to, but usually not overreaching level of lateral projections; lateral projections well developed, each with prominent marginal or submarginal spine, occasionally with both. Ocular peduncles short, approximately 0.4 length of shield, stout basally, tapering to reduced corneas, dorsal surfaces each with few tufts of setae; corneal diameter approximately 0.1 of peduncular length; ocular acicles moderately long, somewhat thickened, acutely triangular and dorsally slightly flattened. Antennular peduncles overreaching distal corneal margins by at least entire lengths of ultimate peduncular segments. Antennal peduncles overreaching distal corneal margins by more than lengths of fifth segments, antennal acicles more than twice lengths of ocular peduncles, each marginally unarmed, but with simple terminal spine. Right cheliped markedly longer and larger than left, operculate or nearly so. Dorsomesial margins of palm and carpus, distal margin of merus, and dorsolateral margin of palm all with small spines. Left cheliped with all segments unarmed but with sparse rows of long setae. Ambulatory legs generally similar, but proportionally dimorphic; slender; dactyls appreciably longer and slenderer in males; each with row of corneous spines on ventral margin; all segments with numerous setae

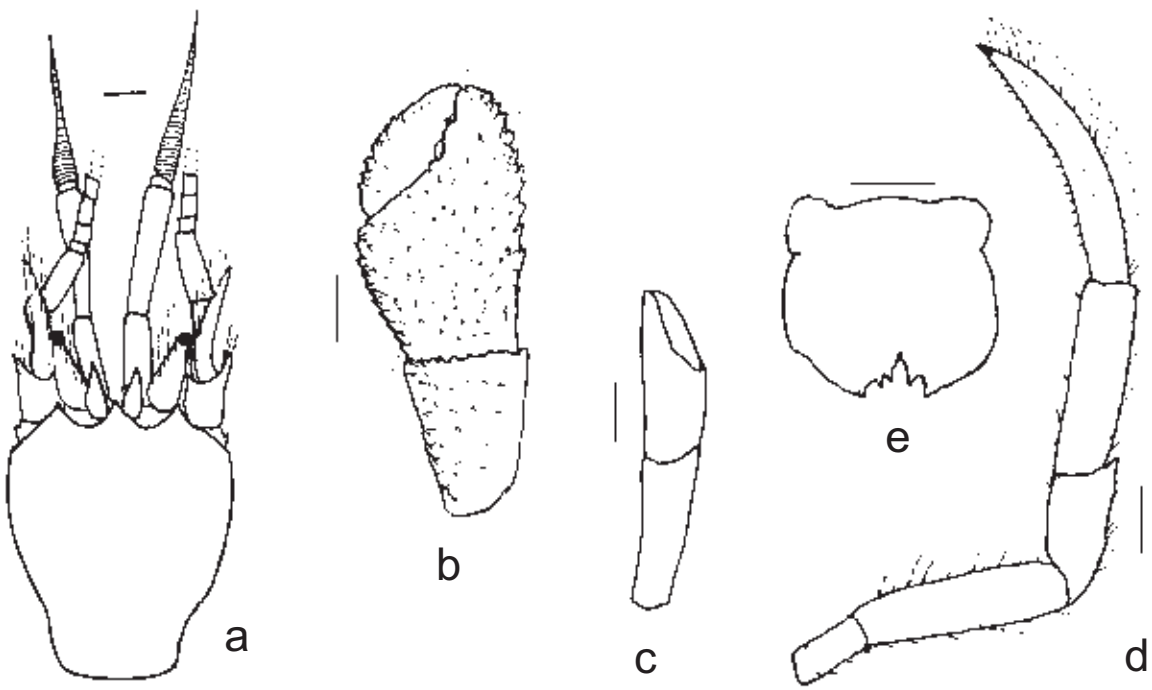
on dorsal and ventral margins; propodi and meri unarmed, carpi each with small dorsodistal spine and occasionally 1 or 2 small spines in proximal half. Propodal rasps of fourth pereopods each with 2 or 3 rows of corneous scales. Pleon (missing in Taiwan specimen) straight. Male with pair of sexual modified pleopods on second pleomere; unpaired markedly unequal, biramous pleopods on pleomeres 3-5. Females without paired, modified first pleopods; left biramous pleopods 2-4 with both rami well developed; pleopod 5 as in males. Uropods and telson symmetrical. (after McLaughlin, 2004d).

Color.– Shield white with bluish tinge; ocular antennular and antennal peduncles white, corneas light yellow; ocular acicles also white. Chelipeds and ambulatory legs entirely white.

Habitat.– Apparently exclusively shells of the scaphopod family Dentaliidae.

Distribution.– Somalia, New Caledonia, Philippine Islands, Solomon and Fiji Islands, and now Taiwan; 550-1079 m.

Remarks.– Although the specimen can not be located now, the photograph from CD138 clearly represents this unusual species. The pleon is missing from the Taiwan specimen, but the telson of the male lectotype from Somalia is included in the illustrations for its information value.



CP138, Drawn from photograph: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** carpus and chela of left cheliped; **d,** left second pereopod (lateral view); **e,** telson [of male lectotype, after McLaughlin (2004d)]. Scale equals 1 mm.

Catapaguroides A. Milne-Edwards & Bouvier, 1892

All of the 19 species presently assigned to *Catapaguroides* are very small and may easily be overlooked. Thus, size alone may account for the fact that the majority of species are known from relatively few specimens. Several are inhabitants of shallow, tropical habitats while others occupy the deep sea. Bathymetric distributions range 3 meters in Guam to 1900 meters in the eastern Atlantic. To date only one species has been found in Taiwanese waters.

Catapaguroides microps A. Milne Edwards & Bouvier, 1892

CP371.

Catapaguroides microps A. Milne-Edwards & Bouvier, 1892: 211; A. Milne-Edwards & Bouvier, 1900: 207, pl. 24, figs. 17-20; de Saint Laurent, 1968: 935, figs. 1, 3-7, 9, 11-14, 16, 17, 21-24.

Material examined.– CD139, 22°10.73'N, 120°14.1'E, 852-718 m, 23 Nov 2001: 1 male (1.5 mm), (NTOU); CD199, 24°25.38'N, 122°12.41'E, 1138-1187 m, 12 Sep 2002: 1 male (1.4 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 2 males (1.7, 2.0 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad to slightly broader than long; rostrum broadly rounded. Ocular peduncles slightly more than half shield length, subcylindrical, corneas reduced; ocular acicles small, each with blunt submarginal spine. Antennular and antennal peduncles considerably overreaching distal corneal margins; antennal acicle also appreciably longer than ocular peduncle. Crista dentata with 6-8 teeth, no accessory tooth. Right chela subovate, moderately slender; palm unarmed, carpus with few very low protuberances on rounded dorsomesial surface. Left cheliped with chela and carpus unarmed. Ambulatory legs with dactyls considerably longer than propodi, dorsal surfaces each with row of long stiff setae; propodi of second pereopods each with several moderately long, thick, spine-like bristles on ventrodistal margin; carpi unarmed. Fourth pereopods each with prominent preungual process at base of claw; propodal rasp consisting of 1 row of lanceolate scales. Male right sexual tube moderately to very long, left tube short and concealed by tuft of setae. Posterior lobes of telson triangular, inner margins unarmed or with 1 or 2 spines.

Size.– Maximum reported shield length approximately 2.5 mm.

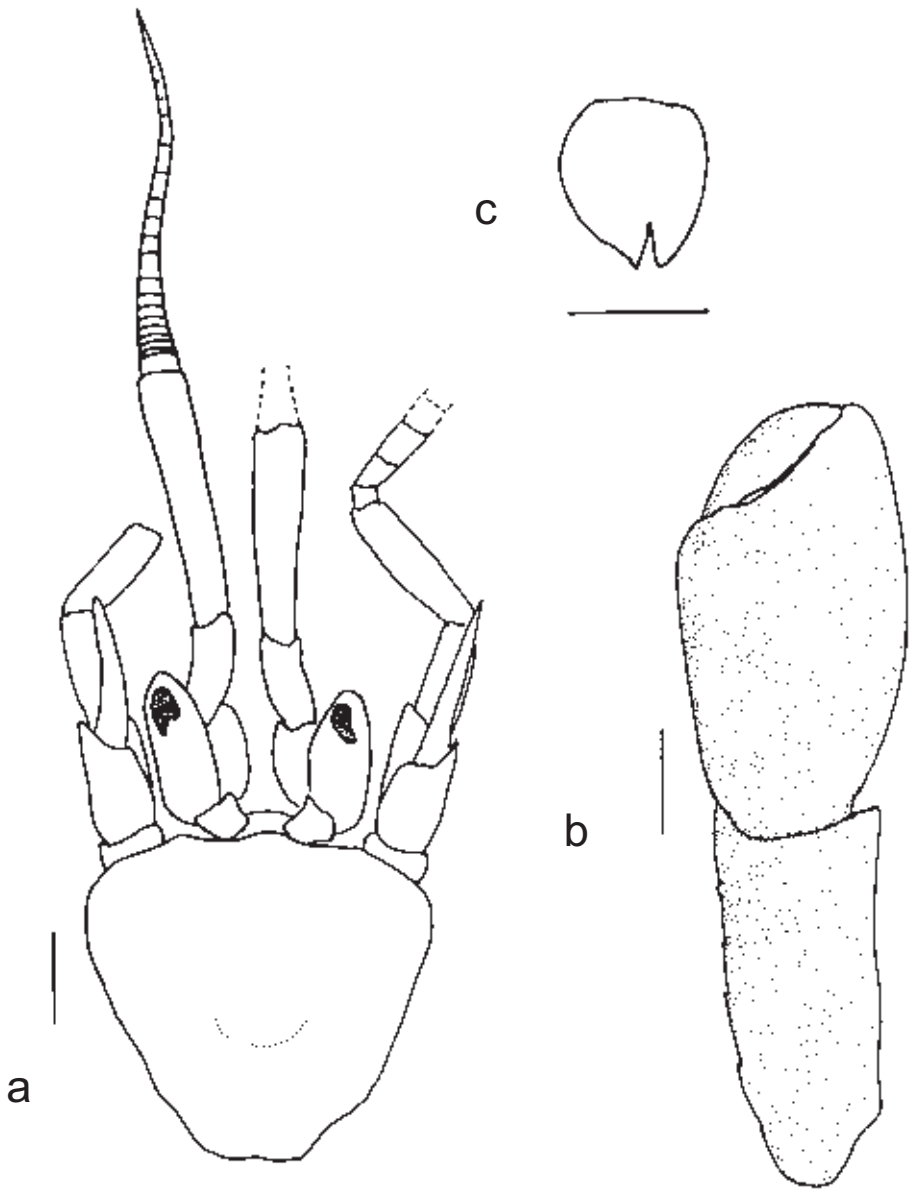
Coloration.– Generally rose colored with shield darker. Chela of right cheliped whitish with tint of rose.

Antennal flagella bluish-white. Dactyls and distal portions of propodi of ambulatory legs white to bluish-white, remainder light reddish-orange.

Habitat.– Muddy substrates, found occupying small gastropod shells.

Distribution.– Eastern Atlantic: Morocco, Azores and Canary Islands; Western Pacific: Indonesia and now Taiwan; 718-1900 m.

Remarks.– Although this species was originally described from the eastern Atlantic, the specimens from Taiwan agree well with the specimens reported by de Saint Laurent (1968) from Indonesia.



Male (1.5 mm), CD139: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, telson. Scales equal 0.5 mm.

Pagurodofleinia Asakura, 2005

One of 27 monotypic genera in the family Paguridae, this genus was very recently established to accommodate this very distinctive species that was known for more than a century under the name *Catapagurus doederleini* Doflein, 1902.

Pagurodofleinia doederleini (Doflein, 1902)

Dasi fishing port, Yilan County, 14 Dec 2006, male.

PCP348, ovig. female.

Catapagurus doederleini Doflein, 1902: 624, fig. c, pl. 6, figs. 4, 5; Balss, 1913: 68, fig. 41; Miyake, 1960: 90, pl. 45, fig. 1; Miyake, 1975: 256, pl. 116, 2 unnumbered figs.; Miyake, 1978, 142, pl. 1, fig. 4; Miyake, 1982: 122, pl. 41, fig. 6; Baba, 1986: 199, 302, fig. 147; Yu & Foo, 1991: 67, unnumbered fig.

Parapagurodes doederleini– Asakura, 2001: 885, figs. 45-47; McLaughlin & Asakura, 2004: 51, figs. 1H, 2I, J, 3H,4J, 5I.

Dofleinia doederleini– McLaughlin & Asakura, 2004: 55.

Pagurodofleinia doederleini– Asakura, 2005: 64; Komai & Takeda, 2006: 105, fig. 6.

Material examined.– Dasi fishing port, Yilan County, 1996: 2 males (8.1, 9.0 mm), (NTOU).– 18 Jan 1997: 1 male (5.6 mm), (NTOU).– 26 Jan 1997: 3 males (5.9-9.9 mm), (NTOU).– 28 Jan 1997: 1 male (6.4 mm), (NTOU).– 13 May 1997: 1 male (10.4 mm), (NTOU).– 20 May 1997: 1 ovig. female (6.7 mm), (NTOU).– 27 May 1997: 1 male (4.5 mm), 3 females (7.5-8.1 mm), 1 ovig. female (6.5 mm), (NTOU).– 13 Jun 1997: 1 male (7.7 mm), (NTOU).– 28 Sep 2003: 2 males (10.2, 11.1 mm), (NTOU).– 11 Feb 2004: 1 male (10.3 mm), 1 ovig. female (8.6 mm), (NTOU).– 5 Apr 2005: 8 males (6.8-12.5 mm), (NTOU).– 5 Jul 2005: 3 males (8.4-10.1 mm), 1 female (9.5 mm), (NTOU).– 5 Aug 2005: 1 male (7.4 mm), 1 female (5.8 mm), (NTOU).– 14 Feb 2006: 1 male (9.5 mm), (NTOU).– no date: 3 males (6.0-10.7 mm), 1 female (7.3 mm), (NTOU); Gueishan Island, normal st. 1, 24°50.699'N, 122°00.802'E, 350 m, PCP, 3 Jul 2005: 3 males (4.0-4.8 mm), (NTOU).– vent st. 1, 24°51.261'N, 121°59.093'E, PCP, 250 m, 12 Jul 2005: 2 females (6.7, 6.8 mm), (NTOU).– vent st. 2, 24°51.089'N, 121°59.727'E, PCP, 280 m, 12 Jul 2005: 1 male (5.9 mm), 1 female (6.6 mm), (NTOU).– vent st. 4, 24°49.210'N, 121°59.960'E, PCP, 355 m, 12 Jul 2005: 1 male (7.5 mm), (NTOU).– vent st. 7, 24°52.171'N, 121°58.530'E, PCP, 247 m, 13 Jul 2005: 1 female (5.2 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 16 Mar 1985: 1 male (10.6 mm), 1 ovig. female (7.0 mm), (NTOU).– 22 Apr 1985: 1 female (5.8 mm), (NTOU).– 18 Nov 1997: 1 ovig. female (10.0 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 3 Dec 1984: 1 male (9.6 mm), (NTOU).– 5 Jan 1985: 4 males (4.9-10.6 mm), 1 female (4.7 mm), (NTOU); Donggang fishing port, Pingtung County, 31 Oct 1984: 1 male (9.2 mm), (NTOU).– 9 Sep 1992: 1 male (12.0 mm), (NTOU).– 30 May 1997: 1 male (11.8 mm), (NTOU).– 25 Feb 1995: 1 male (6.6 mm), (NTOU).– 12 Apr 2002: 2 ovig. females (6.6, 9.8 mm), (NTOU); CP73, 24°52.86'N, 122°00.98'E, 220-330 m, 7 May 2001: 2 males (4.0, 6.2 mm), (NTOU); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 2 males (9.5, 11.2 mm), 1 ovig. female (6.4 mm), (MNHN Pg 7689); CP88, 24°51.28'N, 122°02.80'E, 650 m, 9 May 2001: 2 females (4.7, 12.7 mm), (MNHN Pg 7695); CP90, 24°53.60'N, 122°01.39'E, 300-330 m, 10 May 2001: 1 male (10.7 mm), (MNHN Pg 7890); CP102, 24°48.38'N, 122°07.97'E, 326-331 m, 19 May 2001: 3 males (7.4-10.0 mm), 5 females (8.1-9.2 mm), 1 ovig. female (5.9 mm), (MNHN Pg 7691); CP103, 24°48.83'N, 122°06.03'E, 367-424 m, 19 May 2001: 7 males (4.6-7.9 mm), 5 females (2.9-8.5 mm), 1 ovig. female (7.1 mm), (MNHN Pg 7692); CP107, 24°48.18'N, 12°11.31'E, 335-420 m, 20 May 2001: 2 males (8.4, 10.1 mm), 2 females (5,0, 8.2 mm), (MNHN Pg 7693); CP108, 24°48.23'N, 122°07.74'E, 295-337 m, 20 May 2001: 1 female (2.7 mm), (NTOU); CP109, 24°48.29'N, 122°83.98'E, 246-256 m, 20 May 2001: 5 males (4.3-10.8 mm), 1 female (7.7 mm), (MNHN Pg 7694); CP260, 24°30.69'N, 121°54.43'E, 207-175 m, 29 Aug 2004: 3 females (9.5-10.7 mm), (MNHN Pg 7696); CP261, 24°29.35'N, 121°53.68'E, 195-296 m, 29 Aug 2004: 1 male (8.4 mm), 1 female (8.9 mm), (MNHN Pg 7697); CP264, 24°28.07'N, 121°53.55'E, 330-297 m, 1 Sep 2004: 1 male (8.2 mm), female (10.2 mm), 1 ovig. female (10.3 mm), (MNHN Pg 7698); CP269, 24°30.55'N, 122°05.78'E, 399-397 m, 2 Sep 2004: 1 male (4.7 mm), (NTOU); CP274, 24°47.76'N, 121°00.32'E, 338-277 m, 13 Jun 2005: 1 female (5.2 mm), (NTOU); OCP287, 24°50.493'N, 122°05.293'E, 259-349 m, 8 Aug 2005: 2 males (6.9, 7.9 mm), 1 female (9.3 mm), (NTOU); OCP288, 24°56.303'N, 122°05.190'E, 263-352 m, 8 Aug 2005: 1 male (5.3 mm), 1 female (7.1

mm), (NTOU); CP290, 24°55.841'N, 122°04.290'E, 249-255 m, 8 Aug 2005: 1 male (6.2 mm), (NTOU); CP292, 24°57.140'N, 122°04.737'E, 271-236 m, 8 Aug 2005: 1 female (7.4 mm), (NTOU); OCP293, 24°57.719'N, 122°04.693'E, 262-232 m, 8 Aug 2005: 2 males (7.4, 7.5 mm), 1 female (7.3 mm), (NTOU); PCP347, 22°24.616'N, 120°12.760'E, 305-294 m, 9 Mar 2006: 1 male (5.0 mm), 2 females (4.6, 6.5 mm), 1 ovig. female (5.4 mm), (NTOU); PCP348, 22°21.645'N, 120°11.619'E, 430-334 m, 9 Mar 2006: 1 ovig. female (5.2 mm), (NTOU); no specific locality: 2 males (10.2, 10.6 mm), (NTOU).– 1 male (8.0 mm), (NTOU).– 22 May 1990: 1 male (6.8 mm), (NTOU).– 5 March 1991: 1 male (8.1 mm), (NTOU).

Diagnosis.– Gills biserial. Shield usually broader than long; rostrum triangular, terminally acute or with small spinule. Ocular peduncles moderately short and stout, ocular acicles ovate. Antennular peduncles overreach distal corneal margins by more than half lengths of ultimate peduncular segments; antennal peduncles reach to distal margins of corneas or slightly beyond. Chelipeds unequal, right appreciably larger, but not always much longer; right cheliped with dorsomesial margin of palm rounded, with 2 or 3 rows of small tubercles or tuberculate spines, dorsal surface slightly elevated in midline and with numerous very short, weakly crenulated, transverse ridges and tufts of sparse, short setae, dorsolateral margin with row of spines; carpus with row of acute spines on dorsomesial margin, dorsal surface with adjacent row of shorter, tuberculate spines separated from marginal row by moderately narrow, unarmed area, remaining dorsal surface with covering of small, tuberculate spines or tubercles. Left cheliped long, slender; dorsomesial margin of palm not delimited, dorsal surface with scattered small tubercles or spinulose protuberances, dorsolateral margin with row of spinules or small tubercles; carpus with row of prominent spines on dorsomesial margin, row of spines or spinulose tubercles on or adjacent to dorsolateral margin. Second and third pereopods with dactyls of second dissimilar; dactyls of second right and third with narrowly triangular dorsal surfaces, each with row of moderately long, stiff setae, second left pereopod broadly triangular, with row of closely-spaced stiff setae beginning at apex proximally and curving onto lateral face distally; mesial faces of second right and third pereopods with ventral margins unarmed; concave mesial face of second left pereopod with narrow longitudinal sulcus dorsally and row of tufts of sparse setae ventrally, ventral margin with row of short, closely-spaced corneous spines forming comb; dorsal surfaces of propodi each with row of prominent spines; carpi each with row of prominent spines and sparse setae on dorsal margin in distal 0.8. Male with short sexual tube produced from gonopore of right coxa; left coxa with papilla or very short tube. Female with paired gonopores; no paired first pleopods. Telson with weakly asymmetrical posterior lobes separated by shallow median cleft; terminal margins oblique, each with few spinules and 1 or 2 more prominent small spines at outer angles.

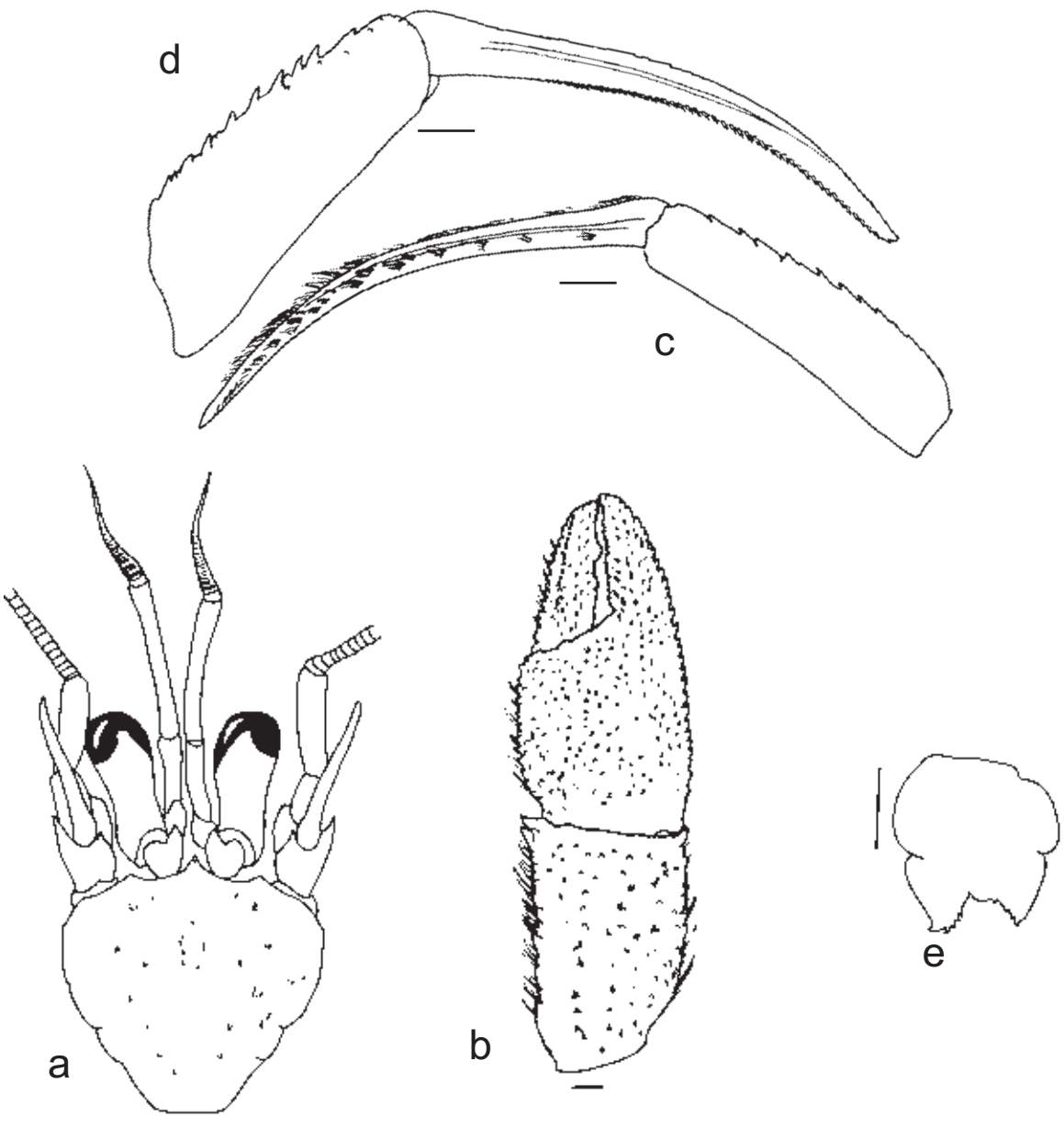
Size.– Maximum reported shield length 12.7 mm.

Coloration.– Shield and cephalic appendages generally orangish-red. Ocular peduncles orangish-red. Antennal flagella orangish-red. Chelipeds and ambulatory legs orangish-red. Eggs blackish-blue.

Habitat.– Muddy substrates, found in gastropod shells, very frequently with attached anemone.

Distribution.– Japan, Taiwan; 90-650 m.

Remarks.– This species, reported by Yu & Foo (1991) as *Catapagurus doederleini*, is one of the most common species found in Taiwanese waters at depths of 100 meters and greater.



Male (11.2 mm), Dasi fishing port, Yilan County, 5 Apr 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** dactyl and propodus of right second pereopod (mesial view); **d,** dactyl and propodus of left second pereopod (mesial view); **e,** telson. Scales equal 2 mm.

Alloeopagurodes Komai, 1998

A monotypic genus, but one that differs from all other genera of the family in having spinose antennal acicles, a character typically restricted to genera of the Parapaguridae.

Alloeopagurodes spiniacicula Komai, 1998

OCP293.

Alloeopagurodes spiniacicula Komai, 1998b: 72, figs. 1-4.

Material examined.– OCP287, 24°50.493'N, 122°05.293'E, 259-349 m, 8 Aug 2005: 1 male (2.8 mm), 1 ovig. female (2.0 mm), (NTOU); OCP293, 24°57.719'N, 122°04.693'E, 262-232 m, 8 Aug 2005: 7 males (1.8-2.5 mm), 9 females (1.4-1.8 mm, 5 ovig.), (NTOU).

Diagnosis.– Gills biserial or very weakly distally quadriserial. Shield longer than broad to slightly broader than long; rostrum triangular, terminally subacute or blunt. Ocular peduncles short, stout, less than half shield length, each with band of short, fine setae at midlength, corneas somewhat dilated; ocular acicles each with prominent submarginal terminal spine. Antennular and antennal peduncles overreaching distal corneal margins; antennular peduncles longer; antennal acicle with 1 to several marginal spines. Right cheliped with dorsomesial margin of palm not delimited, dorsal surface minutely spinulose or granular, dorsolateral margin with row of spinules; dorsomesial and dorsolateral margins of carpus each with double row of small spines or spinulose tubercles, dorsal surface with or without scattered small spines. Left cheliped with 2 or 3 irregular rows of small spines on elevated midline of palm, dorsomesial and dorsolateral margins each with row of small spines or spinulose tubercles; dorsomesial and dorsolateral margins of carpus each with row of small spines. Ambulatory legs long, slender, with dactyls slightly shorter to slightly longer than propodi, ventromesial faces each with row of 5-7 corneous spines; propodi each with row of spinulose protuberances and tufts of setae on dorsal surface; carpi each with single or double row of small spines on dorsal surface. Propodal rasps of fourth pereopods each with single (distally) or double (proximally) row of

corneous scales. Male right sexual tube of moderate length, relatively stout; left tube very short. Telson with posterior lobes separated by small median cleft; terminal margins each with few moderately large and small spines.

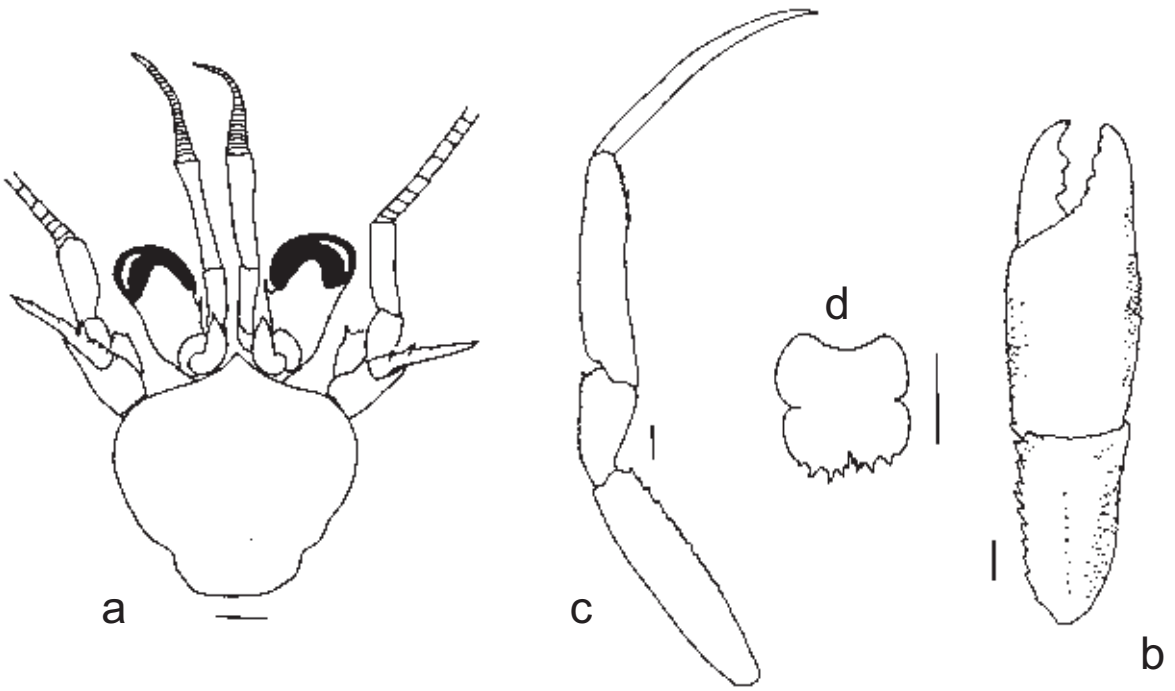
Size.– Maximum reported shield length 3.8 mm.

Coloration.– Shield mottled brown to brownish-red. Ocular and antennal peduncles light brown or reddish-brown. Chelipeds primarily brown or reddish-pink with whitish or cream dactyls and fixed fingers. Ambulatory legs with dactyls and propodi generally translucent, each with tint of blue; propodi each with band of brown or brownish-red at midlength and sometimes three brown stripes on lateral face; carpi with patches of brown or brownish-red; meri generally brown or indistinctly banded reddish-orange.

Habitat.– Found on substrates of coarse sand and shell fragments, occupying small gastropod shells occasionally covered by colonial hydroid.

Distribution.– Pacific coast of northeast Honshu mainland, Japan, Taiwan; 66-259 m, possibly to 349 m.

Remarks.– This is the first report of *Alloeopagurodes spiniacicula* in Taiwanese waters and represents both range and depth extensions.



Male (2.4 mm), OCP293: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Scales equal 0.5 mm.

Spiropagurus Stimpson, 1858

Alcock (1905) reported that the six species of *Spiropagurus*, one with three varieties, were sublittoral and circumtropical in their distributions. However, in a major review of pagurids in tropical waters of the "Americas", de Saint Laurent-Dechancé (1966) removed four of the six to her newly proposed *Iridopagurus* de Saint Laurent-Dechancé, 1966. Lewinsohn (1982c) described a new species from the Red Sea, and more recently, McLaughlin (2002a) elevated the three subspecies [Alcock's (1905) varieties] of *Spiropagurus spiriger* (De Haan, 1849) to specific rank. Two species are found in Taiwan.

Key to the Taiwanese species of *Spiropagurus*

1. Dorsal surfaces of ocular peduncles with several short transverse rows of setae ……*S. spiriger*
- Dorsal surfaces of ocular peduncles without short transverse rows of setae ……*S. profundorum*

Spiropagurus spiriger (De Haan, 1849)

Dasi fishing port, Yilan County, 4 Dec 1997.

Pagurus spiriger De Haan 1849: 206, pl. 49, fig. 2.

Spiropagurus spiriger– Stimpson 1858: 248; Alcock 1905: 118, pl. 13, fig. 1; Miyake, 1978: 137, fig. 54; Miyake, 1982: 122, pl. 41, fig. 5; Lewinsohn, 1982c: 216, fig. 2; Baba, 1986: 211, fig. 155; Wang, 1991: 257, fig. 218; Yu & Foo, 1991: 68, unnumbered fig.; Wang, 1992: 61 (list); McLaughlin, 2002a: 448, fig. 9A, B; Wang, 1995: 571 (list).

Material examined.– Dasi fishing port, Yilan County, 24 Nov 2005: 1 male (3.9 mm), (NTOU); Nanliao fishing port, Hsinchu, 4 Jul 1984: 1 male (7.4 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 28 Aug 1986: 1 male (7.8 mm), 2 females (7.0, 7.3 mm), (NTOU); no specific locality: 1 female (6.5 mm), (NTOU).

Diagnosis.– Shield broader than long; rostrum broadly subtriangular. Ocular peduncles very short, stout, dorsal surfaces with transverse rows of short setae; corneas dilated; ocular acicles broadly subovate. Antennal peduncles nearly as long as antennular peduncles and much longer than ocular peduncles; antennal acicle slender, nearly as long to distinctly longer than ocular peduncle. Chelipeds slender, similar, of equal length or right slightly larger; chela with marginal fringe of long setae; dorsal surface of palm with numerous, short, transverse, setose squamae; carpus with transverse, setose squamae on dorsal surface, dorsomesial margin with longitudinal row of spines and second partial row laterally. Dactyls of ambulatory legs each with row of long setae on dorsal margin; meri, carpi, and propodi laterally compressed, all surfaces with squamiform setose ridges; propodi each with row of setae long setae dorsally and ventrally almost entirely obscuring row of

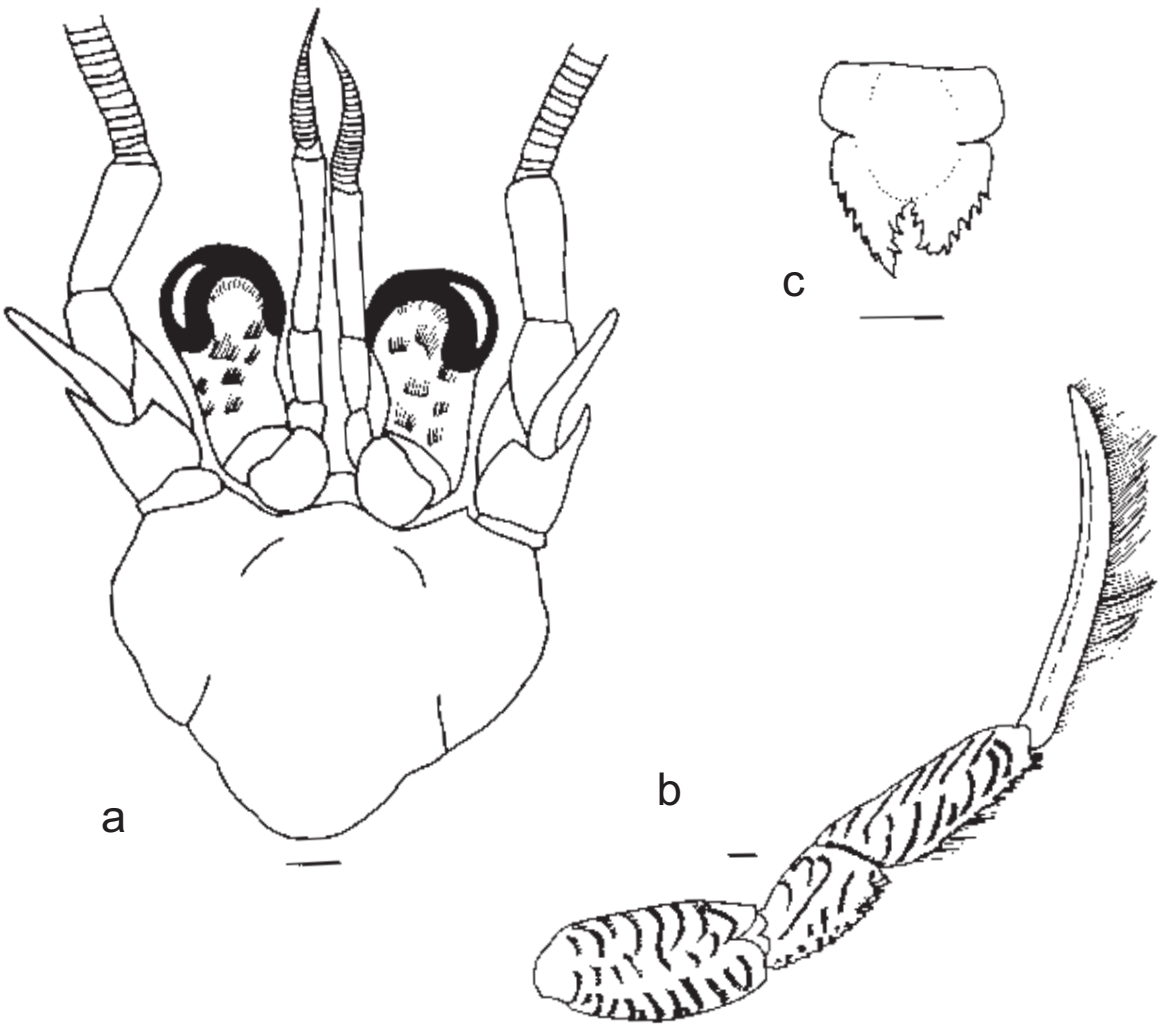
widely-spaced, dorsal spines; carpi each with row of spines on dorsal surface, partially obscured by fringe of long setae. Male left sexual tube stout, long, coiled (partially visible on left anterior side of pleon in photo). Triangularly spiniform posterior lobes of telson separated by deep median cleft; mesial and lateral margins each with few prominent spines.

Size.– Maximum reported shield length 7.8 mm.

Coloration.– Overall brownish-orange, darker on shield, on portions of palms and on ambulatory legs giving quasi striped appearance.

Habitat.– Muddy or sandy substrates, frequently occupying shells of *Polinices*.

Distribution.– Bay of Bengal, Andaman Sea, Gulf of Thailand, northern Australia, Singapore, Maylasia, Hong Kong, East China Sea, Taiwan, Japan; 10-90 m.



Female (6.5 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left third pereopod (lateral view); **c,** telson. Setae partially omitted. Scales equal 1 mm.

Spiropagurus profundorum Alcock, 1905

Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984.

Spiropagurus spiriger var. *profundorum* Alcock, 1905: 120, pl. 13, fig. 5.
Spiropagurus profundorum– McLaughlin, 2002a: 449, fig. 9C, D.

Material examined.– Dasi fishing port, Yilan County, 17 Dec 2004: 2 males (6.1, 6.7 mm), 1 female (4.7 mm), (NTOU).– 18 Mar 2005: 1 male (7.8 mm), (NTOU).– no date: 1 female (6.5 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: 1 ovig. female (8.7 mm), (NTOU); Penghu County: 2 ovig, females (6.4, 6.6 mm), (NTOU).

Diagnosis.– Shield broader than long; rostrum broadly subtriangular. Ocular peduncles short, stout, dorsal surface glabrous; corneas prominently dilated; ocular acicles broadly subovate. Antennular peduncles equal to or only slightly longer than antennal peduncles, both distinctly overreaching distal margins of corneas. Chelipeds slender, similar; right often slightly longer; chela with marginal fringe of long setae; dorsal surface of palm with 2 rows of broad, marginally setose squamae, extending onto fixed finger; carpus with short transverse setose, sometimes spinulose squamae on dorsal surface, dorsomesial and dorsolateral margins each with row of spines usually extending to proximal 0.3, sometimes almost full length of segment. Dactyls of ambulatory legs each with row of long setae on dorsal margin; meri, carpi, and propodi all with squamiform sometimes denticulate lateral surfaces, particularly on carpi; propodi, carpi, and distal halves of meri each with row of prominent spines on dorsal surface partially obscured by long setae; ventral margins of propodi also usually with 2-4 strong spines distally partially concealed by long setae. Male left sexual tube stout, long, coiled. Posterior lobes of telson separated by deep median cleft; each lobe with prominent,

central, often corneous-tipped, spine-like projection with spinose or corneous-toothed mesial margin, lateral margins each usually with 2 or 3 well-developed, often corneous-tipped spines, but much more weakly developed in small individuals.

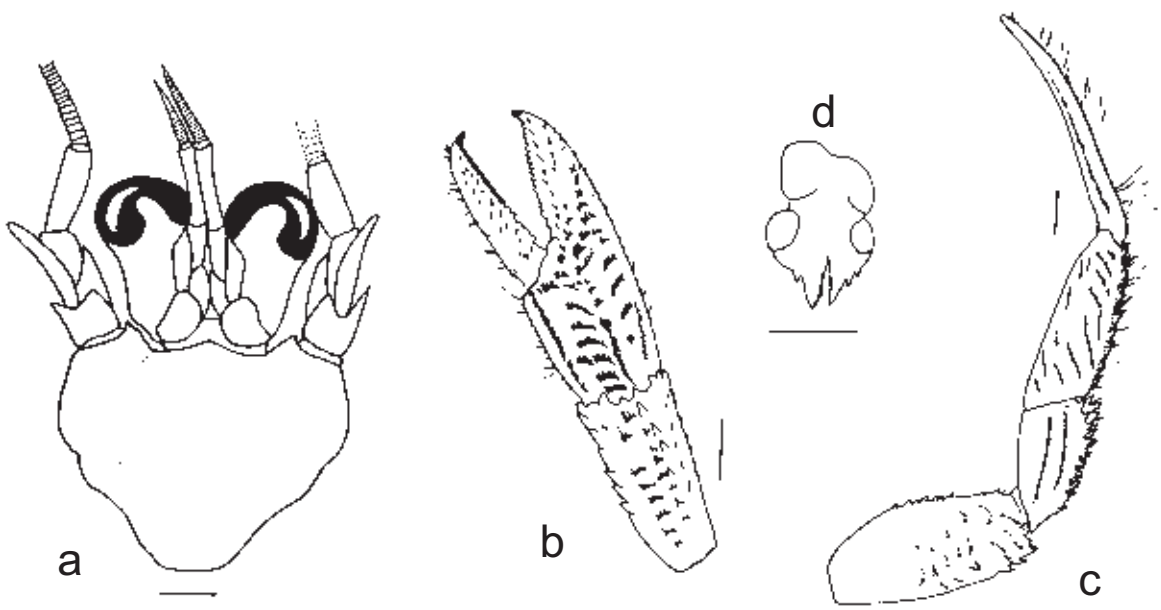
Size.– Maximum reported shield length 8.7 mm.

Coloration.– Generally orangish-pink. Chelae and ambulatory legs with pale orange-brown longitudinal stripes on white background.

Habitat.– Gastropod shells.

Distribution.– Red Sea; Indian Ocean between Maldives and Cape Comorin, Andaman Sea, Gulf of Thailand, Indonesia, Taiwan; 5-82 m, but reportedly 1500 m at Indian Ocean site.

Remarks.– This is the first report of *Spiropagurus profundorum* in Taiwanese waters.



Ovig. female (8.7 mm), Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Icelopagurus McLaughlin, 1997

The two species assigned to *Icelopagurus* are distinct from other genera and species of the family in having the telsons armed with corneous spinules or spiniform bristles rather than calcareous spines. This telsonal armament is typically restricted to genera and species of the Parapaguridae.

Icelopagurus crosnieri McLaughlin, 1997

CD231.

Icelopagurus crosnieri McLaughlin, 1997: 488, figs. 15a-c, e-j, 38a-d; Asakura, 1999: 389, fig. 1I, J.

Material examined.– CP20, 22°21.0'N, 120°04.3'E, 720-766 m, 29 Jul 2000: 1 ovig. female (3.9 mm), (NTOU); CP30, 22°10.0'N, 120°15.9'E, 794-850 m, 30 Jul 2000: 1 ovig. female (3.8 mm), (NTOU); CD134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 female (4.2 mm), 1 ovig. female (4.7 mm), (NTOU); CD231, 22°14.32'N, 119°58.78'E, 951-1062 m, 31 Aug 2003: 1 ovig. female (4.6 mm), (NTOU); CP300, 22°14.555'N, 119°58,719'E, 960-972 m, 11 Aug 2005: 2 males (5.0, 5.5 mm), 2 females (4.2, 5.3 mm), 3 ovig. females (4.2-4.9 mm), (NTOU); PCP332, 22°13.975'N, 120°00,224'E, 961-1026 m, 05 Oct 2005: 3 males (3.9-4.8 mm), 3 females (4.3-4.8 mm), 2 ovig. females (4.1, 4.4 mm), (NTOU); PCP333, 22°13.612'N, 120°01.917'E,889-1037 m, 05 Oct 2005: 2 males (4.2, 4.5 mm), 1 female (3.7 mm), 1 ovig. female (4.4 mm), (NTOU); PCP343, 22°15.699'N, 120°02.131'E, 945-1059 m, 8 Mar 2006: 3 males (3.6-4.8 mm), 2 females (3.3, 3.8 mm), 2 ovig. females (3.7, 3.9 mm), (NTOU); PCP357, 22°08.952'N, 121°04.166'E, 1253-1260 m, 3 Jun 2006: 1 male (5.1 mm), (NTOU); CP362, 22°15.594'N, 120°02.156'E, 945-1052 m, 23 Aug 2006: 3 males (4.0-5.4 mm), 1 ovig. female (5.1 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 1 male (4.5 mm), (NTOU).

Diagnosis.– Shield broader than long, well calcified, slightly vaulted; rostrum triangular, terminally subacute or acute. Ocular peduncles very short and stout, corneas 0.2 to 0.3 lengths of peduncles; ocular acicles slender, elongate, terminating acutely or with distinct spine. Antennular peduncles overreaching ocular peduncles by slightly less to slightly more than entire combined lengths of ultimate and penultimate

peduncular segments; antennal peduncles overreaching ocular peduncles by more than lengths of ultimate segments. Chelipeds subequal; right usually slightly longer and stouter; palm of right cheliped somewhat dorsoventrally compressed, dorsomesial and dorsolateral margins not well defined; surfaces all covered with very small spinules or tubercles; carpus with dorsomesial and dorsolateral margins each armed with irregular double row of small spines or spinulose tubercles; dorsal surface with numerous small spines. Palm of left cheliped with dorsomesial and dorsolateral margins not delimited; all surfaces spinulose or tuberculate; carpus with dorsal surface covered with small spines. Ambulatory legs similar, slender and very long; dactyls longer than propodi, dorsal surfaces each with row of low protuberances and long stiff setae; propodi each with irregular double row of small spines and short setae on dorsal surface; carpi each with single or double row of small spines on dorsal surface. Male coxae of fifth pereopods with right short and basally moderately thick sexual tube, curving posteriorly and externally; small papilla on left. Female with paired gonopores, no paired first pleopods, unpaired left pleopods 2-5. Telson with prominent transverse indentations; margins of U-shaped median cleft slightly oblique and armed with 0 to 3 spines, posterior lobes obliquely rounded, chitinous terminal plate-like margins each armed with 4 to 6 long corneous spines.

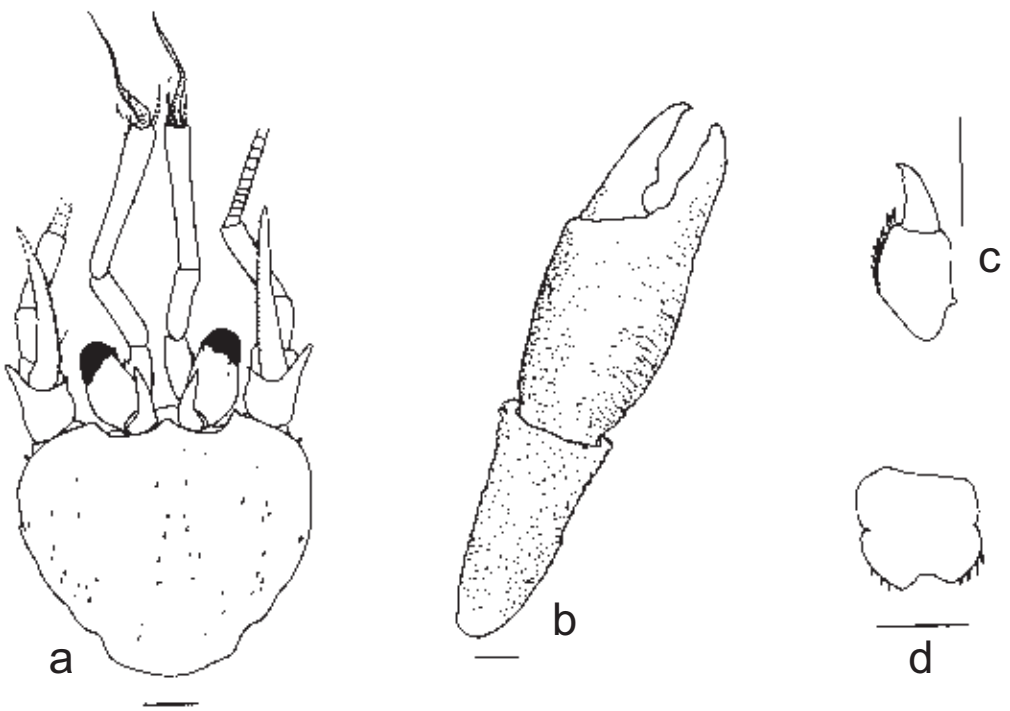
Size.– Maximum recorded shield length 5.9 mm.

Coloration.– Body and appendages overall light pink to reddish-orange.

Habitat.– Gastropod shells.

Distribution.– Tanimbar Islands, Indonesia, Taiwan; 613-1253 m, possibly to 582-1260 m.

Remarks.– This is the first report of *Icelopagurus crosnieri* from Taiwanese waters.



Ovig. female (4.7 mm), CD134: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, dactyl and propodus of left fourth perpopod (lateral view); **d**, telson. Scales equal 1 mm.

Michelopagurus McLaughlin, 1997

Two species of *Michelopagurus* are known from the Atlantic and two from the western Pacific. Of the Pacific species, *M. limatulus* is the deeper of the two, with a maximum depth of 1414 meters reported off the Philippine Islands.

Michelopagurus limatulus (Henderson, 1888)

CP300.

Pagurodes limatulus Henderson, 1888: 97, pl. 10, fig. 6; Alcock, 1905: 107, pl. 12, fig. 6.
Pagurodes sp. ? *limatulus*– Alcock, 1901: 225.
Michelopagurus limatulus– McLaughlin, 1997: 482, figs. 13a-d, 36a-f.

Material examined.– CP35, 22°01.8'N, 120°36.5'E, 228-222 m, 31 Jul 2000: 1 female (3.8 mm), (NTOU); CP47, 22°56.1'N, 121°25.6'E, 497-614 m, 2 Aug 2000: 1 male (2.1 mm), (NTOU); CP55, 24°26.9'N, 122°18.1'E, 638-824 m, 4 Aug 2000: 1 female (3.8 mm), (NTOU); CD134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 ovig. female (4.0 mm), (NTOU); CP136, 22°07.75'N, 120°00.87'E, 1211-998 m, 23 Nov 2001: 2 males (3.9, 4.4 mm), (NTOU); CP216, 24°34.71'N, 120°04.02'E, 209-280 m, 27 Aug 2003: 1 ovig. female (2.8 mm), (NTOU); OCP288, 24°56.303'N, 120°05.190'E, 263-352 m, 8 Aug 2005: 1 specimen not sexed (1.9 mm), (NTOU); CP300, 22°14.555'N, 119°58.719'E, 960-972 m, 11 Aug 2005: 2 male (3.3, 4.6 mm), 3 ovig. females (3.2-4.4 mm), 1 specimen not sexed (2.2 mm), (NTOU); CP332, 22°13.975'N, 120°00.224'E, 961-1026 m, 5 Oct 2005: 1 male (3.8 mm), (NTOU); PCP334, 22°14.167'N, 119°59.259'E, 994-975 m, 5 Oct 2005: 3 males (3.3-3.8 mm), 2 ovig. females (3.2, 3.8 mm), (NTOU); PCP342, 22°16.648'N, 119°59.960'E, 988-1010 m, 8 Mar 2006: 5 males (2.2-3.7 mm), 2 females (2.6, 3.3 mm), 2 ovig. females (3.0, 3.5 mm), (NTOU); PCP343, 22°15.699'N, 120°02.131'E, 945-1059 m, 8 Mar 2006: 1 male (3.8 mm), (NTOU); PCP344, 22°15.952'N, 120°00.110'E, 995-1073 m, 8 Mar 2006: 1 female (3.6 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 1 male (2.5 mm), (NTOU).

Diagnosis.– Shield broader than long; rostrum broadly rounded. Ocular peduncles very short and stout, less than half length of shield; corneas 0.2 to 0.3 length of peduncles, dilated little if at all; ocular acicles triangular, each with submarginal spine. Antennular peduncles overreaching distal corneal margins by more than lengths of ultimate segments; antennal peduncles shorter than antennular peduncles, but still considerably overreaching ocular peduncles. Right cheliped appreciably larger, but not necessarily longer than left; palm narrow, somewhat compressed dorsoventrally; dorsomesial margin tuberculate and with 2 or 3 prominent spines at proximal margin, convex dorsal surface with short transverse sometimes tuberculate ridges and rows of setae; carpus with row spines on dorsomesial margin, dorsal surface often with short transverse rows of tubercles and slightly oblique row of small spines, dorsolateral margin with irregular row of small spines. Left cheliped with palm elevated in midline and armed with 1 or 2 double rows of small spinules or tubercles, dorsal surface spinulose or tuberculate; carpus with row of spines on both dorsolateral and dorsomesial margins. Second and third pereopods similar; dactyls longer than propodi, dorsal margins each with row of stiff setae, ventral margins each with row of 11 to 19 corneous spines; propodi with low protuberances and tufts of setae on dorsal surfaces; carpi each with dorsodistal spine. Males usually with short, almost transparent, sexual tube developed from both right and left coxa of fifth pereopods, sometimes from only one, and occasionally only papillae. Females with paired gonopores and first pleopods, unpaired pleopods 2-5. Telson with prominent median cleft; rounded terminal margins each with 3 to 7 prominent spines often interspersed with smaller spines.

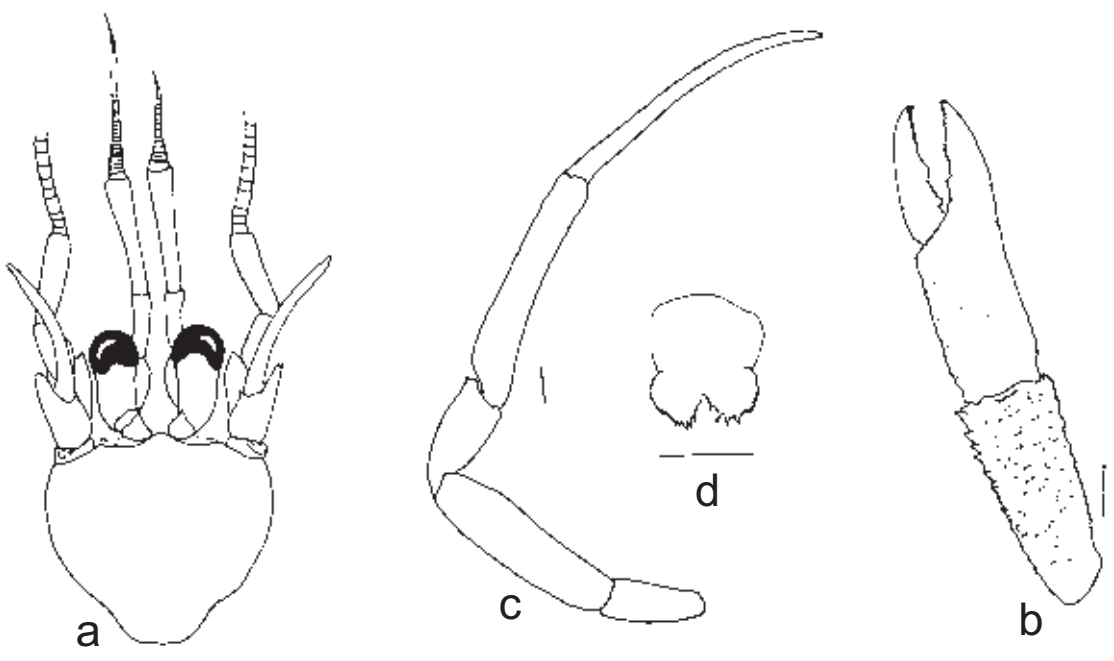
Size.– Maximum recorded shield length 4.6 mm.

Coloration.– Body and appendages entirely moderately intense orangish-pink.

Habitat.– Gastropod shells sometimes encased in bryozoans.

Distribution.– Indonesia, south of Philippine Islands, Taiwan, and possibly Travancore coast of India; 209-1414 m.

Remarks.– This is the first record of *Michelopagurus limatulus* in Taiwanese waters.



Female (3.8 mm), CP35: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Scales equal 0.5 mm.

Nematopagurus A. Milne-Edwards & Bouvier, 1892

Nematopagurus was established by A. Milne-Edwards & Bouvier (1892) for a species collected in 1882 by the crew of the French research vessel *Travailleur* in the eastern Atlantic. *Nematopagurus longicornis* A. Milne-Edwards & Bouvier, 1892 has remained the only Atlantic representative of the genus, but in a recent review of the genus, McLaughlin (2004b) reported a total of 26 species in the genus. Of the non-Atlantic taxa, three were described from the Red Sea, but only one appeared to be endemic to that region. Two species are known from the eastern Pacific as far east as the Hawaiian Islands and French Polynesia. Seven species are described from the South African-Madagascar fauna, of which only two have not also been found elsewhere. The remainder are found in the tropical waters of the western Pacific. Most species have been collected between depths of 100 to 2600 meters, although four species have reported depth distributions of 9 to 99 meters. Eight species are now known from Taiwan.

Key to the Taiwanese species of *Nematopagurus*

1. Dorsal surfaces of chelae marked by, or at least with appearance of broad, flat, squamiform tubercles or scutes ……*N. lepidochirus*
- Dorsal surfaces of chelae neither marked by, nor with appearance of broad, flat, squamiform tubercles or scutes ……2
2. Spines on dorsal surfaces of chelae and carpi of both chelipeds commonly with tear-drop shaped sensory structures ……*N. spinulosensoris*
- Spines on dorsal surfaces of chelae and carpi of both chelipeds without tear-drop shaped sensory structures ……3
3. Dorsal surface of palm of right cheliped with mesial and lateral longitudinal scalloped keels ……*N. tricarinatus*
- Dorsal surface of palm of right cheliped without mesial and lateral longitudinal scalloped keels ……4
4. Dactyls of chelae unarmed or with no more than 1-3 spines on or near dorsomesial margin proximally …5
- Dactyls of chelae each with cluster or row of spines on or near dorsomesial margin ……6
5. Dorsomesial margin of dactyl of right chela with distinct, usually slightly elevated keel, dorsolateral margin of palm with row of prominent acute or subacute spines ……*N. spongioparticeps*
- Dorsomesial margin of dactyl of right chela rounded, dorsolateral margin of palm with row of tiny spinules ……*N. kosiensis*
6. Dactyl of left third pereopod distinctly more than 1.5 length of propodus, prominently curved ventrally and twisted, spines on ventral margin not clearly visible in lateral view ……*N. australis*
- Dactyl of left third pereopod slightly less to slightly more than 1.5 length of propodus, straight or weakly curved ventrally, spines on ventral margin clearly visible in lateral view ……7
7. Setation of dorsal surfaces of chelae as moderate to dense covering of moderate to long, straight setae, at least partly obscuring armature ……*N. meiringae*
- Setation of dorsal surfaces of chelae as sparse to moderately covering of usually short to moderately short, often distally curved or curled setae, not obscuring armature ……*N. ostlingochirus*

Nematopagurus lepidochirus (Doflein, 1902)

Donggang fishing port, Pingtung County, 2 Jun 1999.

Eupagurus lepidochirus Doflein, 1902: 623.

Pagurus lepidochirus– Miyake, 1978: 110.

Nematopagurus squamichelis– Miyake, 1978: 129 (key); Baba, 1986: 201, 303, fig. 148; Huang, 1989: 254, fig. 215 [not *Nematopagurus squamichelis* Alcock, 1905].

Nematopagurus lepidochirus– Komai & McLaughlin, 2001: 83, figs. 1-4; McLaughlin, 2004b: 165, fig. 4.

Material examined.– Donggang fishing port, Pingtung County, 2 Jun 1999: 1 female (4.6 mm), (NTOU).– no date: 1 female (5.1 mm), (NTOU); CP11, 22°18.6'N, 119°14.8'E, 263-276, 28 Jul 2000: 1 ovig. female (5.0 mm), (MNHN Pg 7659).

Diagnosis.– Shield slightly longer than broad to slightly broader than long; rostrum broadly rounded or broadly subtriangular. Ocular peduncles more than half shield length, corneas dilated; ocular acicles each with small submarginal terminal spine. Antennular and antennal peduncles overreaching distal margins of corneas. Chelipeds subequal, right somewhat stronger, but sometimes shorter; carpi and chelae with stiff, iridescent setae; right chela with dorsomesial and dorsolateral margins of palm creased by series of short transverse scutes each frequently with small spine and fringe of stiff setae; dorsal surface weakly convex, with 9-13 irregular transverse rows of short scutes, each with marginal row of short stiff setae; carpus with row of moderately strong spines on dorsomesial margin, dorsal surface medially with shallow depression somewhat proximal to dorsodistal margin, and with irregular transverse rows of 3-6 scutes provided marginally with short stiff setae. Left cheliped moderately slender; palm with dorsomesial margin not clearly delimited, but

with 3 or 4 small spines proximally; dorsal surface, like right, with 7-11 irregular, transverse rows of short scutes, each provided with marginal row of short stiff setae and also with small spine or tubercle, dorsolateral margin with row of small spines; dorsomesial margin of carpus with row of moderately large spines, partially obscured by long stiff setae, dorsal surface with irregular transverse rows of short, marginally setiferous scutes. Ambulatory legs with dactyls longer than propodi; dorsal surfaces each with single row of long spiniform setae and irregular rows of shorter spiniform setae or corneous spines, ventral surfaces each with 6-14 corneous spines (not usually visible in lateral view); propodi each with row of short transverse ridges set with short stiff setae on dorsal surface; carpi each with dorsodistal spine, second spine frequently also proximally on dorsal surface. Males with right sexual tube typical for genus; very short sexual tube on left coxa. Telson with posterior lobes separated by deep median cleft; terminal margins generally rounded, each with row of long spines interspersed with smaller spines and extending onto lateral margins, often with 1 or 2 submarginal rows of spinules on dorsal surface.

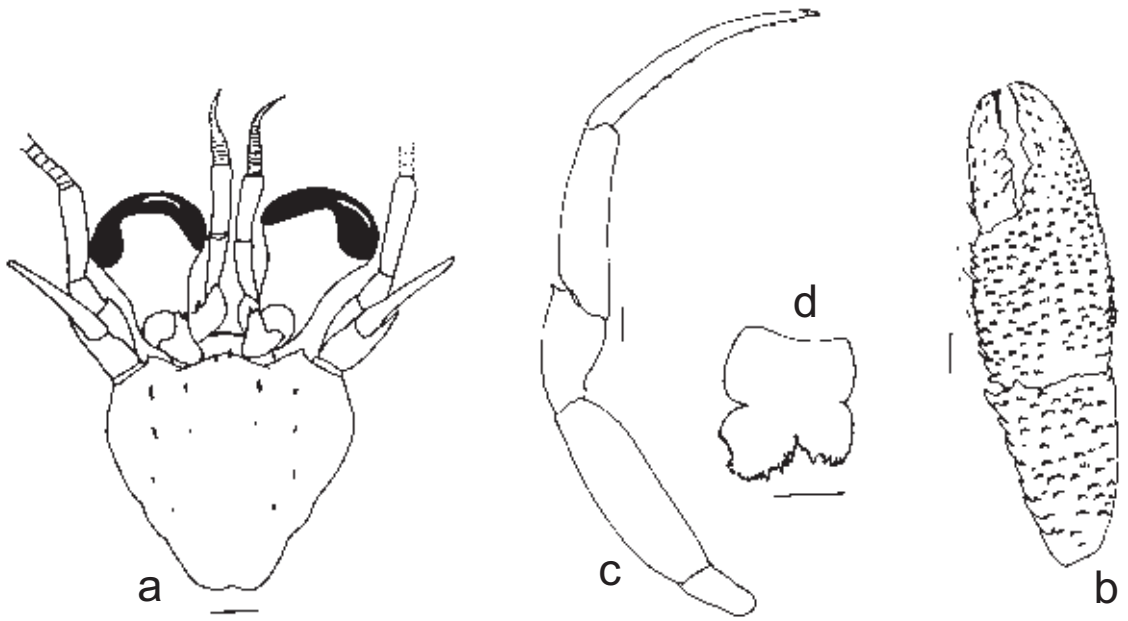
Size.– Maximum reported shield length 9.0 mm.

Coloration.– Body and appendages generally light reddish-brown. Ocular peduncles light reddish-brown. Scutes on chelipeds sometimes with red tinge.

Habitat.– Sand and mud substrates.

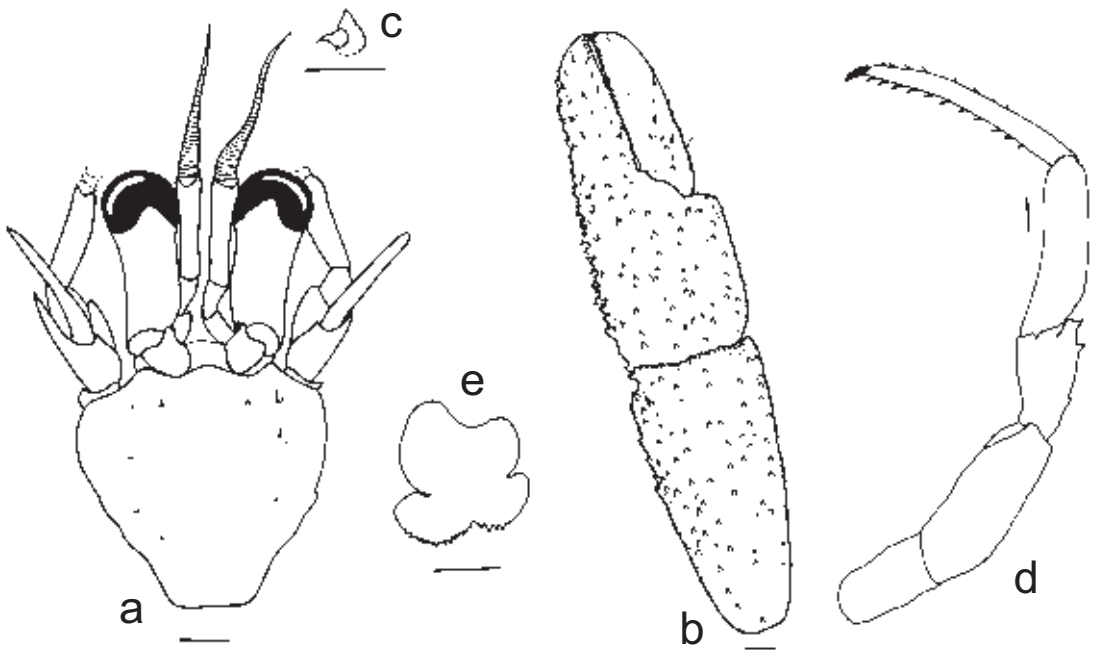
Distribution.– Pacific coast of Japan from Sagami Bay to Kyushu, Taiwan, East and South China Seas, Indonesia, New Caledonia, Vanuatu; 78-567 m.

Remarks.– This is the first record of *Nematopagurus lepidochirus* in Taiwanese waters.



Female (4.6 mm), Donggang fishing port, Pingtung County, 2 Jun 1999: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third perepod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Nematopagurus spinulosensoris McLaughlin & Brock, 1974



Male (4.5 mm), CP99: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of left cheliped; **c,** enlarged spine showing sensory modification; **d,** left third pereopod (lateral view); **e,** telson. Some setae omitted. Scales equal 1 mm (a, b, d, e) and 0.5 mm (c).

Nematopagurus spinulosensoris McLaughlin & Brock, 1974: 246, figs. 1-3; McLaughlin & Lane, 1975: 520, pls. 1-3; McLaughlin, 1997: 510, figs. 20d, h, 41a, b; McLaughlin, 1998: 335, fig. 7A-D; McLaughlin, 2004b: 201, fig. 19.

Nematopagurus spinulosensorius– Türkay, 1986: 139 (misspelling).

Nematopagurus cf. *spinulosensoris*– Poupin, 1996: pl. 8, fig. F; Poupin, 1998: 38; Komai & Takeda, 2006: 101, fig. 14B.

Nematopagurus muricatus– Thompson, 1943: 424; Miyake, 1978: 129 [not *Nematopagurus muricatus* (Henderson, 1896)].

Material examined.– CP99, 24°53.21'N, 122°04.04'E, 506-680 m, 18 May 2001: 1 male (4.5 mm), (MNHN Pg 7630); CP119, 24°56.60'N, 122°01.71'E, 123-140 m, 31 Jul 2001: 1 female (4.3 mm), (MNHN Pg 7658).

Diagnosis.– Shield varying from slightly longer than broad to broader than long; rostrum usually broadly rounded, occasionally obtusely triangular. Ocular peduncles more than half length of shield, corneas only slightly dilated; ocular acicles each with prominent submarginal spine. Antennular and antennal peduncles overreaching distal margins of corneas. Chelipeds subequal, right usually somewhat larger; setation varying from sparse to rather dense long simple setae on all segments; chelae and carpi of both chelipeds with numerous sensory-modified spines on dorsal surfaces; additionally, dorsomesial margin of dactyl of right cheliped usually with irregular longitudinal row of unmodified small spines or tubercles, occasionally

unarmed; palm with irregular single or double row of usually unmodified, small to very prominent spines on dorsomesial margin; carpus usually, but not always, with row of moderately small to very prominent, unmodified spines on dorsomesial margin. Left cheliped often with short row of small, unmodified spines or spinulose tubercles in dorsal midline of dactyl, dorsomesial margin with or without row of unmodified small spines; palm often with row of small unmodified spines or tubercles on fixed finger; carpus with row of commonly unmodified spines on dorsomesial margin. Ambulatory legs with long slender dactyls, dorsal surfaces each with row of corneous spinules or spines often at least partially obscured by moderate to long setae, ventral surfaces each with row of 10-15 prominent corneous spines; dorsal surfaces of propodi with low transverse ridges and tufts of setae; carpi usually each with row of strong spines on dorsal surface, occasionally only few spines on third pereopods. Males with sexual tube on coxa of right fifth pereopod typical for genus; coxa of left usually with slight papilla. Telson with posterior lobes separated by very shallow to moderately deep median cleft; terminal and usually also lateral margins weakly calcified, former each with numerous small calcareous spines marginally and several stronger calcareous acute or blunt spines submarginally; lateral margins occasionally each with row of small calcareous spines or spinules.

Size.– Maximum reported shield length 9.1 mm.

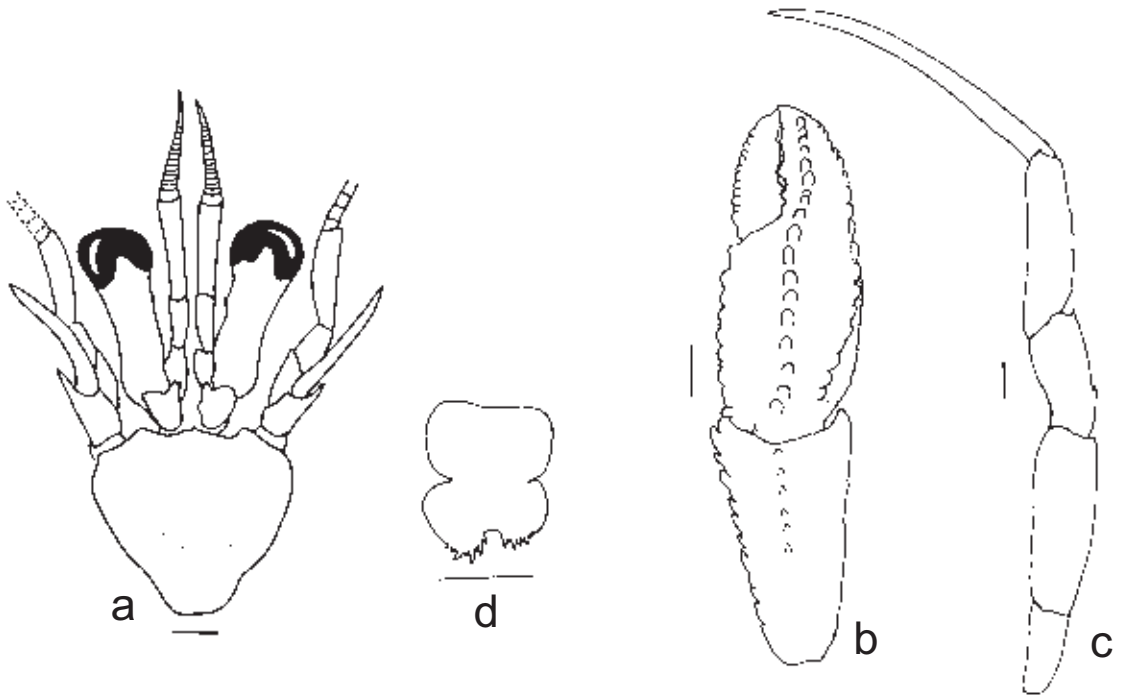
Coloration.– Ocular peduncles each with broad red band, antennal flagella bright yellow. Chelipeds and ambulatory legs generally vivid salmon-pink, bordering on iridescent (McLaughlin & Brock, 1974). Carapace generally pale reddish-brown. Ocular peduncles pale reddish or yellowish-brown, with transverse red band proximally. Antennular and antennal peduncles almost colorless; antennal flagella banded reddish-brown and white. Chelipeds and ambulatory legs generally light brown or tan, basal parts of carpi each with red tint (Komai & Takeda, 2006).

Habitat.– Coral rubble.

Distribution.– Southeast Africa, Seychelles, Maldives, Western Australia, Japan, Taiwan, East China Sea, Indonesia, Vanuatu and New Caledonia, Hawaiian Islands, French Polynesia; 110-540 m, possibly to 950 m.

Remarks.– This is the first report of *Nematopagurus spinulosensoris* in Taiwanese waters. Komai & Takeda (2006), based on differences in color patterns of their Japanese specimens and the patterns reported by McLaughlin & Brock (1974) and illustrated by Poupin (1997), suggested that two or three species might be confounded under the specific name *spinulosensoris*. Given the variations in color patterns seen in numerous hermit crab species, it is equally as possible that the morphological variability in this species reported by McLaughlin (2004b) may extend to variations in color as well.

Nematopagurus tricarinatus (Stimpson, 1858)



Female (3.6 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Eupagurus tricarinatus Stimpson, 1858: 251.

Pagurus tricarinatus– Rathbun, 1907: 228 (footnote); McLaughlin & Gunn 1992: 90.

Ceratopagurus tricarinatus– McLaughlin, 1992: 795, figs. 1, 2.

Nematopagurus indicus– Miyake, 1961: 12 [not *Nematopagurus indicus* Alcock, 1905].

Nematopagurus vallatus– Miyake, 1978: 131, fig. 52; Miyake & Imafuku, 1980b: 63, pl. 2, fig. 8; Miyake, 1982: 121, pl. 41, fig. 4 [not *Nematopagurus vallatus* (Melin, 1939)].

Nematopagurus tricarinatus– McLaughlin & Sandberg, 1995: 579; McLaughlin & Wang, 2002: 750; McLaughlin, 2004b: 182, fig. 11.

Not *Pagurus tricarinatus* Norman, 1869: 264 [= *Pagurus alatus* Fabricius, 1775].

Not *Pagurus tricarinatus*– Balss, 1913: 52, 58 [= *Pagurus nipponensis* (Yokoya, 1933)].

Not *Pagurus tricarinatus*– Miyake, 1982: 197 [= *Lophopagurus (Australeremus) triserratus* (Ortmann, 1892)].

Material examined.– No specific locality: 1 female (3.6 mm), (NTOU).– 17 Dec 2004: 1 male (3.8 mm), (NTOU).

Diagnosis.– Shield broader than long to slightly longer than broad; rostrum obsolete or broadly rounded. Ocular peduncles slightly shorter to slightly longer than shield, corneas somewhat dilated; ocular acicles each with prominent submarginal spine. Antennular peduncles overreaching distal margins of corneas; antennal peduncles reaching beyond bases of corneas, but usually not beyond distal margins. Chelipeds subequal; dorsomesial margin of dactyl of right cheliped with elevated keel; palm with dorsomesial and dorsolateral

margins each elevated into prominent crenulated or scalloped keel, dorsal midline also with prominently elevated, crenulated or scalloped keel or row of prominent tubercles, dorsal surface between keels concave, unarmed; carpus with row of moderate to large acute spines on dorsomesial margin, second irregular row of much smaller spines traversing dorsal surface from laterad of midline distally to dorsolateral margin proximally and often partially to entirely concealed by long, stiff setae. Palm of left cheliped with dorsomesial margin elevated into prominent crenulated keel, dorsal midline and dorsolateral margin each with prominent, elevated and crenulated keel extending onto fixed finger and becoming more spiniform; carpus with row of moderate to small spines on dorsomesial margin, dorsolateral margin with shorter row of somewhat smaller spines, practically obscured by tufts of long setae. Ambulatory legs with dactyls somewhat longer than propodi; dorsal surfaces each with row of long stiff bristles becoming spiniform in distal half and accompanied by short corneous spines, ventral margins proximally each with row of corneous spines becoming ventromesial distally (usually not visible in lateral view); carpi each with spine at dorsodistal angle and 1 smaller spine on dorsal surface proximally. Males with right sexual tube typical for genus; left tube very short. Telson with posterior lobes separated by prominent median cleft; terminal margins each with row of 3 or 4 moderately large spines interspersed with smaller spines, frequently extending onto lateral margins.

Size.– Maximum reported shield length 4.9 mm.

Coloration.– Chelipeds white or brown and white. Ambulatory legs banded with reddish and olive, superimposed on longitudinal dark stripes (Stimpson, 1858; Miyake, 1978).

Habitat.– Found in gastropod shells on sand and mud substrates.

Distribution.– Southern Japan, Taiwan, South China Sea, Indonesia: 9-72 m.

Remarks.– This is the first record of *Nematopagurus tricarinatus* from Taiwan. The Taiwanese material examined differs from those from the South China Sea in having a row of prominent tubercles in the dorsal midline of the right chela rather than an elevated and generally continuous keel.

Nematopagurus spongioparticeps McLaughlin, 2004

DW150.

Nematopagurus spongioparticeps McLaughlin, 2004b: 189, fig. 14.

Material examined.– DW5, 22°40.5'N, 119°56.5'E, 213-236 m, 27 Jul 2000: 1 ovig. female (3.3 mm), (NTOU); DW150, 22°16.03'N, 121°28.81'E, 553-690 m, 10 May 2002: 1 ovig. female (2.9 mm), (NTOU).

Diagnosis.– Shield very slightly broader than long to slightly longer than broad; rostrum very broadly rounded. Ocular peduncles slightly shorter than length of shield; corneas slightly dilated; ocular acicles terminating acutely or subacutely, each with prominent submarginal spine. Antennular and antennal peduncles overreaching distal margins of corneas; antennal acicle long, often reaching nearly to distal margin of cornea and distal half of ultimate peduncular segment: antennal flagellum very long, with 1 or 2 minute setae every several articles proximally. Chelipeds subequal, right slightly longer and broader; dorsomesial margin of dactyl with distinct, usually slightly elevated keel, dorsal surface unarmed; palm with dorsomesial margin somewhat elevated and armed with row of small to moderately large spines, dorsal surface weakly concave between dorsomesial margin and elevated dorsal midline, latter with longitudinal row of spines extending entire length of palm, dorsal surface laterad of midline also weakly concave; elevated dorsolateral margin with row of acute or subacute spines; dorsomesial and dorsolateral margins of carpus each with row of moderate to small spines, dorsal surface unarmed. Left cheliped with row of quite small to moderately large spines on poorly delineated dorsomesial margin of palm, dorsal surface with longitudinal row of spines on prominently elevated midline, dorsolateral margin slightly elevated to form low keel, armed with row of small or moderately small spines; dorsomesial and dorsolateral margins of carpus each with row of spines.

Ambulatory legs similar; dactyls equaling or exceeding length of propodi, ventral margins each with row of 9-15 corneous spines; dorsal surfaces of propodi each with row of widely-spaced low protuberances and sparse tufts of setae; carpi each often with dorsodistal spine, often also dorsoproximal spine on second. Right coxa of male fifth pereopod with long, distally curled sexual tube; sexual tube of left coxa slightly if at all developed. Telson with posterior lobes separated by distinct median cleft; terminal margins each with few moderately strong calcareous spines interspersed with smaller spines.

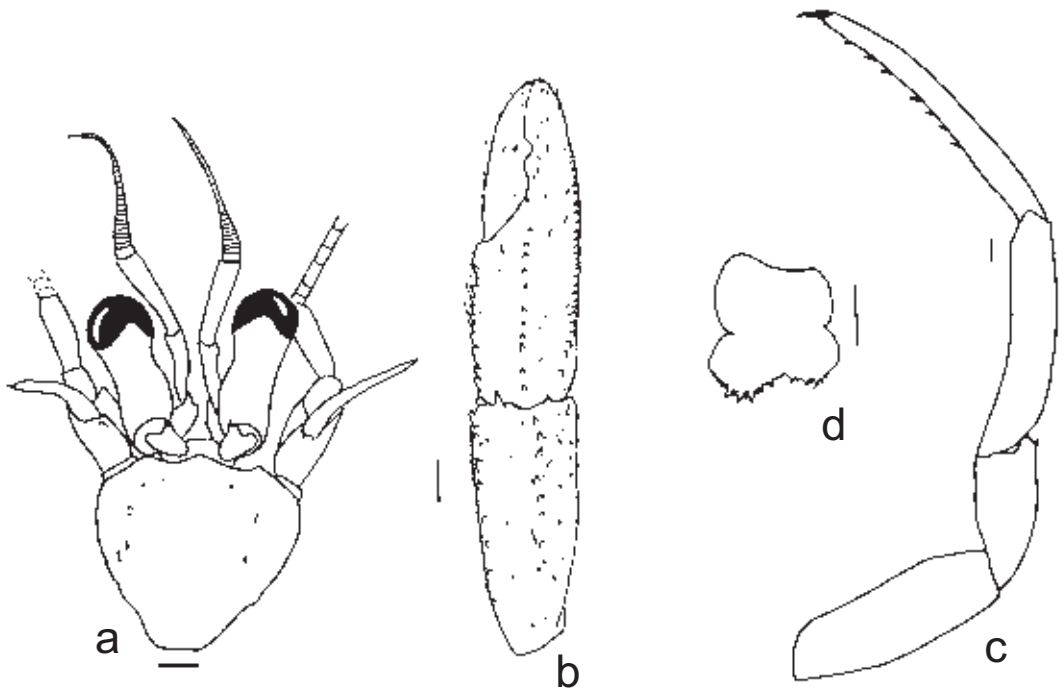
Size.– Maximum reported shield length 4.2 mm.

Coloration.– Shield light whitish-tan. Ocular peduncles slightly darker tan. Antennal flagella banded with red and white. Chelipeds and ambulatory legs whitish-tan, each with reddish-brown stripes on all segments.

Habitat.– Often associated with sponges.

Distribution.– New Caledonia, Taiwan; 213-700 m.

Remarks.– This is the first record of *Nematopagurus spongioparticeps* outside the environs of New Caledonia. One of the Taiwanese specimens was collected at a considerably shallower depth than previously recorded.



Ovig. female (2.9 mm), DW150: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, left third pereopod (lateral view); **d**, telson. Setae partially omitted. Scales equal 0.5 mm.

Nematopagurus kosiensis McLaughlin, 1998

CP212.

Nematopagurus kosiensis McLaughlin, 1998: 329, fig. 5; McLaughlin, 2004b: 196, fig. 17.
Nematopagurus shinnyoae Komai, 1999: 36, figs. 19-22.

Material examined.– DW5, 20°40.5'N, 119°56.5'E, 213-236 m, 27 July 2000: 1 female (3.2 mm), (MNHN Pg 7640); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 ovig. female (5.0 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad to slightly broader than long; rostrum obtusely and roundly triangular or simply broadly rounded. Ocular peduncles nearly as long as shield; corneas not dilated; ocular acicles each with prominent submarginal spine. Antennular and antennal peduncles overreaching distal margins of corneas. Chelipeds subequal, right slightly longer and stronger; dactyl with scattered sparse tufts of moderately long setae on convex dorsal surface and dorsomesial margin; palm with row of small spines on dorsomesial margin, dorsal midline with longitudinal row of spines at least proximally, sometimes extending nearly entire length of palm, dorsolateral margin with row of tiny spinules; dorsomesial and dorsolateral margins of carpus each with row of slender acute spines and long moderately stiff setae, dorsomesial margin of palm of left cheliped with row of quite small spines, dorsal surface with short longitudinal row of small spines in slightly elevated midline, dorsolateral margin with row of very small spinules; dorsomesial and dorsolateral margins of carpus each with row of spines. Ambulatory legs with dactyls slightly longer than propodi, ventral margins each with row of 10-13 corneous spines; dorsal surfaces of propodi each with row of widely-spaced low protuberances and sparse tufts of setae, row of widely-spaced small corneous spinules on

each ventral surface; carpi each with dorsodistal and dorsoproximal spine and row of tufts of sparse setae. Male with right sexual tube typical for genus, left very short. Telson with posterior lobes separated by distinct median cleft; terminal margins each with few moderately large calcareous spines, often interspersed with smaller spines, sometimes extending onto lateral margins.

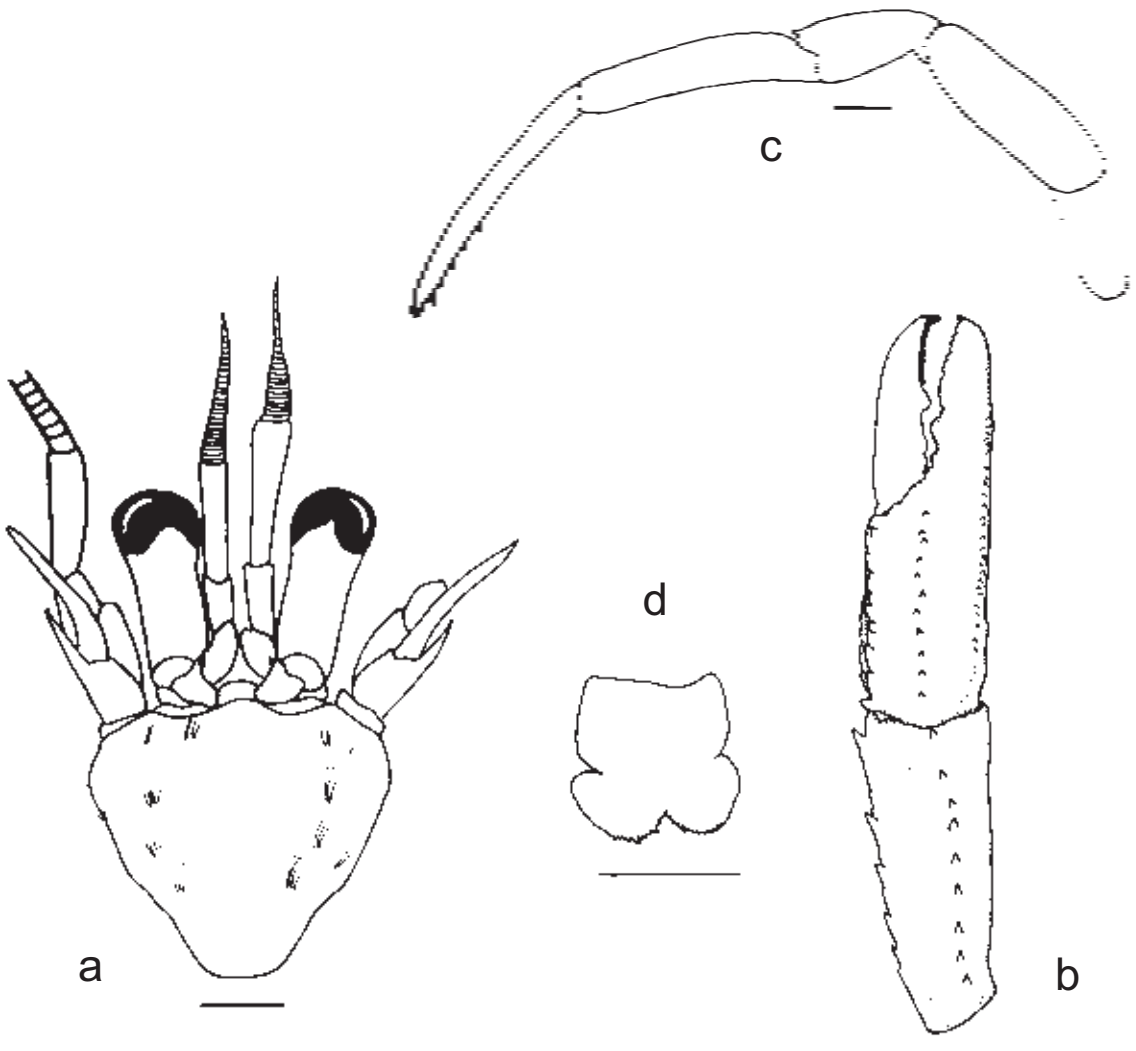
Size.– Maximum recorded shield length 5.0 mm.

Coloration.– Shield and ocular peduncles generally pale yellowish-brown. Chelipeds and ambulatory legs reddish-brown proximally and more or less whitish distally.

Habitat.– Collected from sandstone rubble substrates with glass sponges, at least in South Africa.

Distribution.– Eastern South Africa, Ogasawara Islands, Japan, Taiwan, Philippine Islands, Tuamotu Archipelago, New Caledonia, Hawaii, 82-490 m, possibly to 500 m.

Remarks.– This is the first record of *Nematopagurus kosiensis* in Taiwanese waters.



Ovig. female (5.0 mm), CP212: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, left third pereopod (lateral view); **d**, telson. Some setae omitted. Scales equal 1 mm.

Nematopagurus australis (Henderson, 1888)

Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984.

Catapagurus australis Henderson, 1888: 76, pl. 8, fig. 1.

Nematopagurus gardineri– Haig & Ball, 1988: 185 [not *Nematopagurus gardineri* Alcock, 1905].

Nematopagurus vallatus– Yu & Foo, 1991: 69, not unnumberbered photo [not *Nematopagurus vallatus* (Melin, 1939)].

Nematopagurus muricatus– Rahayu, 1996: 350 [not *Nematopagurus muricatus* (Henderson, 1896)].

Nematopagurus australis– McLaughlin, 1997: 505; McLaughlin, 2004b: 221, fig. 26.

Nematopagurus cf. *australis*– McLaughlin, 2002a: 436, fig. 7F-H.

Material examined.– Donggang, Pingtung County, commercial trawler, st. 2: 1 male (2.1 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: 1 male (3.3 mm), 1 female (3.2 mm), (NTOU).

Diagnosis.– Shield slightly broader than long to slightly longer than broad; rostrum broadly rounded. Ocular peduncles slightly shorter to slightly longer than shield; corneas somewhat dilated; ocular acicles each with prominent submarginal spine. Antennular peduncles slightly overreaching distal margins of corneas; antennal peduncles reaching nearly to bases of corneas or slightly beyond. Right cheliped with row of spines and tufts of stiff setae on dorsomesial margin of dactyl; palm with single or irregularly double row of spines on dorsomesial margin, single row on dorsolateral margin, dorsal midline with single or double row of usually smaller spines, dorsal surface usually also with numerous smaller spines or spinules; surfaces all usually covered with short or very short, moderate to dense setae, frequently obscuring armature; carpus with row of prominent spines on dorsomesial margin, dorsal surface laterad of midline with row of smaller spines and long

setae. Left cheliped with row of small spines on dorsomesial margin of dactyl; dorsolateral margin of palm with row of small spines and moderate to long setae, dorsal midline unarmed or with row of spinules or small spines, dorsomesial margin with row of small spines, dorsal surface usually with covering of very short dense setae; carpus with row of slender acute spines on both dorsomesial and on dorsolateral margins. Ambulatory legs with dactyls much longer than propodi, ventromesial margins each with 8-12 corneous spines, generally not visible in lateral view; dorsal margins each with row of long bristle-like setae; propodi each with short low ridges and setae on dorsal surface; carpi each with dorsodistal spine, second pereopods often also with 1-3 spines in proximal half, occasionally with weak row of small spines; third frequently with small proximal spine. Males with right sexual tube typical for genus; left tube very short, sometimes only simple papilla. Telson with moderately broad, and usually shallow median cleft; terminal margins each with 2-4 large spines and several much smaller spines, occasionally also with 1 or 2 large spines and several spinules laterally.

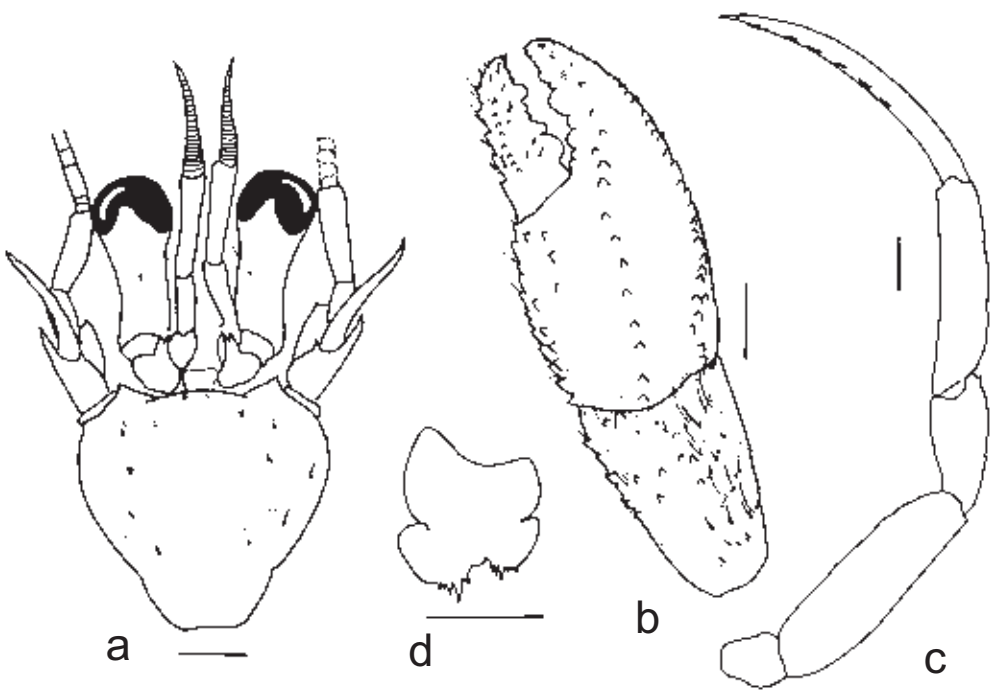
Size.– Maximum reported shield length 4.9 mm.

Coloration.– Carapace with scattered red and white chromatophores on semi-transparent background. Antennules light reddish-brown distally; antennae reddish-brown. Chelipeds pinkish-brown. Carpi, propodi, and dactyls of ambulatory legs with reddish-brown longitudinal stripes on semi-transparent background.

Habitat.– Mud substrates and reefs.

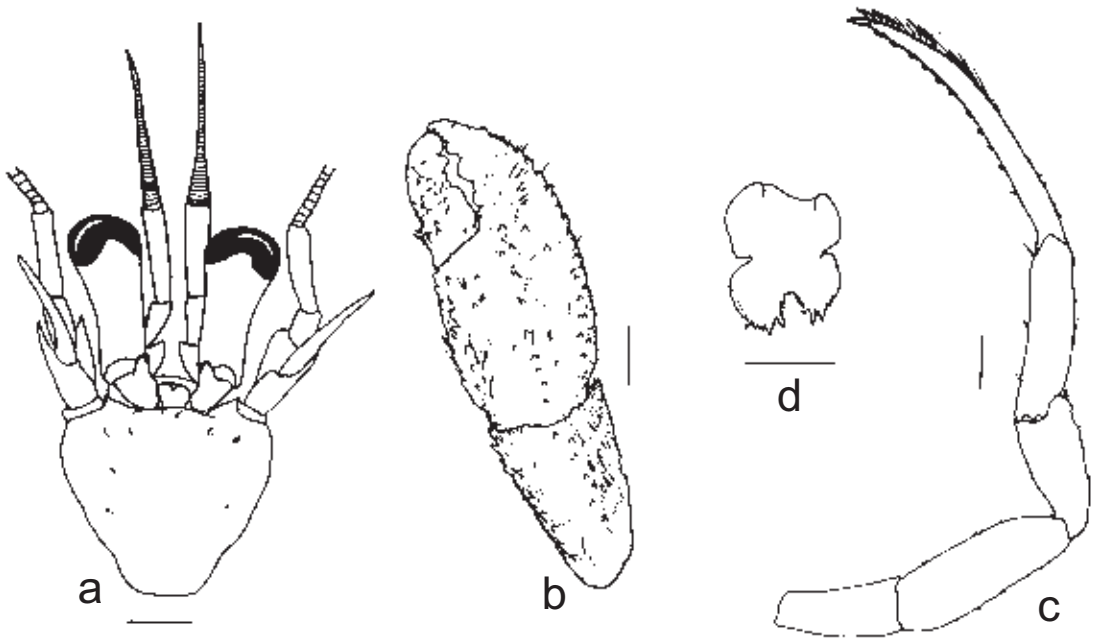
Distribution.– Taiwan, South China Sea, Malaysia, Indonesia, New Caledonia, Fiji; subtidal to 292 m, possibly to 417 m.

Remarks.– Reexamination of the specimens identified by Yu and Foo (1991) as *Nematopagurus vallatus* showed that they actually represented *N. australis*. Yu and Foo's published photo, taken from Miyake (1982) was misidentified by the latter author as *N. vallatus*, but is instead of *N. tricarinatus*.



Female (3.2 mm), Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, right third pereopod (mesial view); **d**, telson. Scales equal 0.5 mm.

Nematopagurus meiringae McLaughlin, 1998



Male (3.0 mm), CH158: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Some setae omitted. Scales equal 1 mm.

Nematopagurus meiringae McLaughlin, 1998: 332, fig. 6; McLaughlin, 2004b: 218, fig. 25.

Nematopagurus gardineri– Kensley, 1969: 163, fig. 6e-h [not *Nematopagurus gardineri* Alcock, 1905].

Material examined.– CP158, 22°16.46'N, 120°26.38'E, 123 m, 23 May 2002: 1 male (3.0 mm), (MNHN Pg 7629).

Diagnosis.– Shield usually very slightly broader than long; rostrum nearly obsolete to broadly rounded. Ocular peduncles nearly as long as shield; acicles each with small submarginal spine. Antennular peduncles slightly overreaching distal margins of corneas; antennal peduncles reaching to or nearly to distal margins. Chelipeds generally similar, right cheliped slightly stouter and distinctly longer; dactyl with row of small spines on or adjacent to dorsomesial margin; palm with irregular row of prominent spines on dorsomesial margin, dorsal midline slightly elevated and armed with row of slightly smaller spines, dorsolateral margin also with row of moderately prominent spines; dorsal surface otherwise unarmed or with scattered or clustered small spines distomesially and partially concealed by long, moderately dense setae; carpus with row of spines and long stiff setae on dorsomesial margin, dorsal surface with few low protuberances or spinules, dorsolateral margin not distinctly delimited, but with row of much smaller spines and transverse rows of long very stiff setae extending onto lateral face. Left cheliped with short row of small spines on or adjacent to dorsomesial margin of dactyl; palm with long setae on dorsomesial margin not concealing row of moderately prominent spines; dorsolateral margin with dense long, often plumose setae at least partially concealing row of spines, dorsal midline with row of spines; carpus with row of spines and long setae on dorsomesial margin,

dorsolateral margin also with long setae partially concealing short row of smaller spines. Ambulatory legs with dactyls slightly longer than propodi, dorsal margins each with row of long corneous bristles in distal half, ventral margins each with 8-13 corneous spines, clearly visible in lateral view; propodi each with low protuberances and stiff setae on dorsal surface; carpi each with dorsodistal spine, second usually also with 1 or 2 small spines in proximal half. Males with right sexual tube typical of genus, left short. Telson posterior lobes separated by shallow median cleft, terminal margins each with 2-4 prominent spines and usually few smaller spines.

Size.– Maximum reported shield length 4.3 mm.

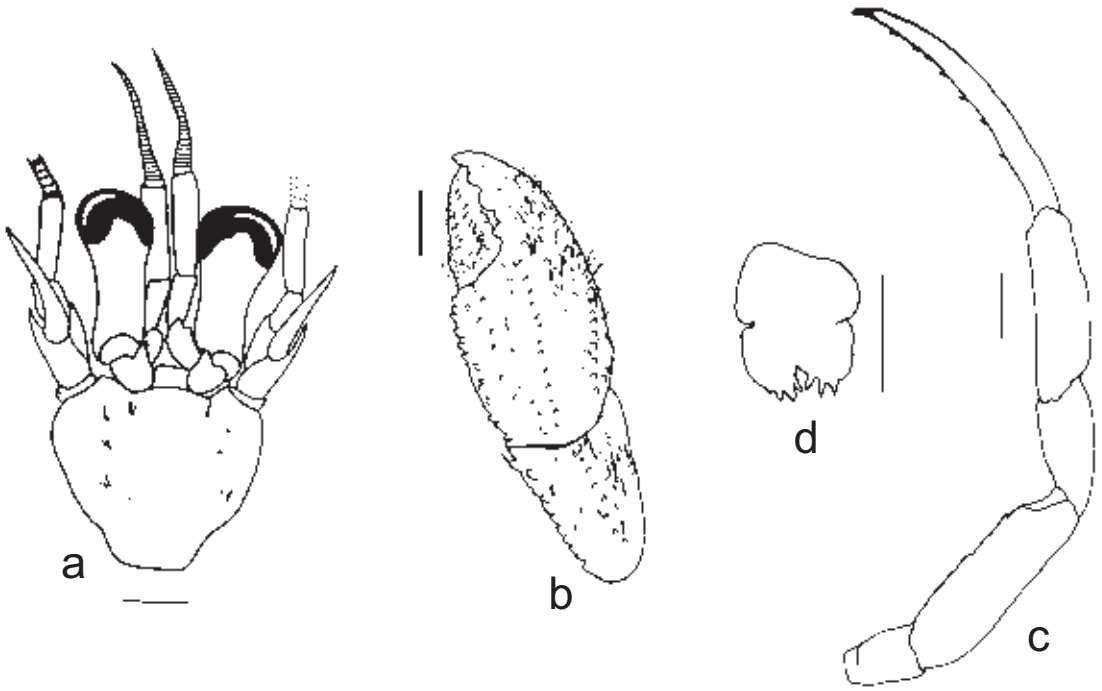
Coloration.– In preservative, ambulatory legs each with band of color proximally and median stripe on mesial and lateral face of dactyl; propodus with 3 stripes on lateral face (McLaughlin, 1998).

Habitat.– Sand and rubble substrates.

Distribution.– Southeastern South Africa, Western Australia, Japan, Taiwan, East and South China Seas, Philippine Islands, Indonesia, and New Caledonia; 12-461 m.

Remarks.– This is the first record of *Nematopagurus meiringae* in Taiwanese waters.

Nematopagurus ostlingochirus McLaughlin, 1997



Male (2.8 mm), CP83: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Some setae omitted. Scales equal 1 mm.

Nematopagurus ostlingochirus McLaughlin, 1997: 515, fig. 22a-d; McLaughlin, 2004b: 216, fig. 24; McLaughlin, in press: 000, fig. 2.

Material examined.– CP83, 24°51.44'N, 121°57.44'E, 75-110 m, 8 May 2001: 1 male (2.8 mm), (MNHN Pg 7628).

Diagnosis.– Shield longer than broad to nearly as broad as long; rostrum broadly rounded, not overreaching lateral projections. Ocular peduncles slightly more than half to 0.9 length of shield; acicles each with small to prominent submarginal spine. Antennular peduncles slightly overreaching distal margins of corneas; antennal peduncles not reaching distal corneal margins. Chelipeds subequal; right slightly longer and stronger, similar in armament; dactyl with few spines or spinules proximally on dorsal surface, becoming median row of spines not extending to tip in larger specimens and several moderately short, sometimes distally curved or curled setae, longer simple setae distally, dorsomesial margin with few small spines at least in proximal half; palm with row of spines on dorsomesial margin; dorsal midline with row of spines extending to distal half of fixed finger, dorsal surface with scattered spinules, particularly near junction of fixed finger with dactyl and moderately short, often curved or curled setae, longer setae marginally but not obscuring armature; dorsolateral margin with row of spines; carpus with row of spines on dorsomesial margin and row of smaller spines approximating dorsolateral margin. Dactyl of left cheliped with few to several small spines and few short setae in proximal half of dorsal surface, becoming well defined row in larger specimens; palm with row of spines on dorsomesial margin, dorsal surface with row of small spines on slightly raised midline, extending

half length of fixed finger, dorsolateral margin with row of spines and sparse short to moderate, frequently curled or curved setae, not obscuring armature; dorsomesial and dorsolateral margins of carpus each with row of spines, strongest mesially. Dactyls of ambulatory legs slightly longer than propodi, straight or weakly curved ventrally, ventral margins each with row of 5-12 corneous spines, clearly visible in lateral view; dorsal surfaces of propodi each with few setae; dorsal surfaces of carpi of second pereopods each with dorsodistal spine and 1 or 2 spines in proximal half, third each with only small dorsodistal spine. Male with long right sexual tube typical of genus, left tube stout, moderately short. Telson with posterior lobes separated by moderately deep median cleft; terminal margins straight, both with 3 or 4 large spines, left with additional smaller spines.

Size.– Maximum recorded shield length 2.8 mm.

Coloration.– Not known.

Habitat.– Substrates of coarse sand, gravel and rock.

Distribution.– Tanimbar Islands, Indonesia, Dampier Archipelago, Western Australia, Taiwan; 32-75 m, possibly to 110 m.

Remarks.– This is the first report of *Nematopagurus ostlingochirus* in Taiwanese waters and represents major extensions in the geographic range and in the depth of this species.

Cestopagurus Bouvier, 1897

Until very recently, this genus was known only from two Atlantic taxa. A third species, the first Pacific representative, was described from off the Izu Islands of Japan. This species has now been found in Taiwanese waters as well.

Cestopagurus puniceus Komai & Takeda, 2005

CP371.

Cestopagurus puniceus Komai & Takeda, 2005: 94, figs. 1-6.

Material examined.– CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 1 female (1.5 mm) (NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum rounded, overreaching weakly produced lateral projections. Ocular peduncles about 0.7 length of shield, corneas slightly tapered distally; ocular acicles triangular, terminating acutely, submarginal terminal spine prominent. Antennular peduncles overreaching distal corneal margins by nearly full lengths of ultimate segments, each ultimate segment elongate, with tuft of setae distolaterally. Antennal peduncles overreaching distal corneal margins by 0.7 lengths of ultimate segments; antennal acicles moderately long, reaching distal corneal margins. Chelipeds unequal, right larger; palm of right with small tubercles on slightly convex dorsal surface, dorsomesial margin rounded, dorsolateral margin sharply delimited by row of tubercles; dorsomesial margin of carpus with row of small spines or tubercles, dorsolateral margin with row of smaller tubercles; mesial face of carpus concave. Palm of left cheliped with distinctly elevated midline, but not forming distinct ridge or crest, with short median row of small tubercles; dorsolateral margin rounded; carpus moderately narrow, dorsolateral margin with row of small spines or tubercles, dorsomesial margin with row of small tubercles in distal half. Ambulatory legs long, slender, generally similar; dactyls about 1.2 times longer than propodi, ventral margins each with 9 or 10 corneous spines; carpi each with 1 tiny spine at dorsodistal angle. Propodal rasp of fourth pereopod formed of single row of corneous scales. Telson with terminal margins oblique, each armed with 4 small spines.

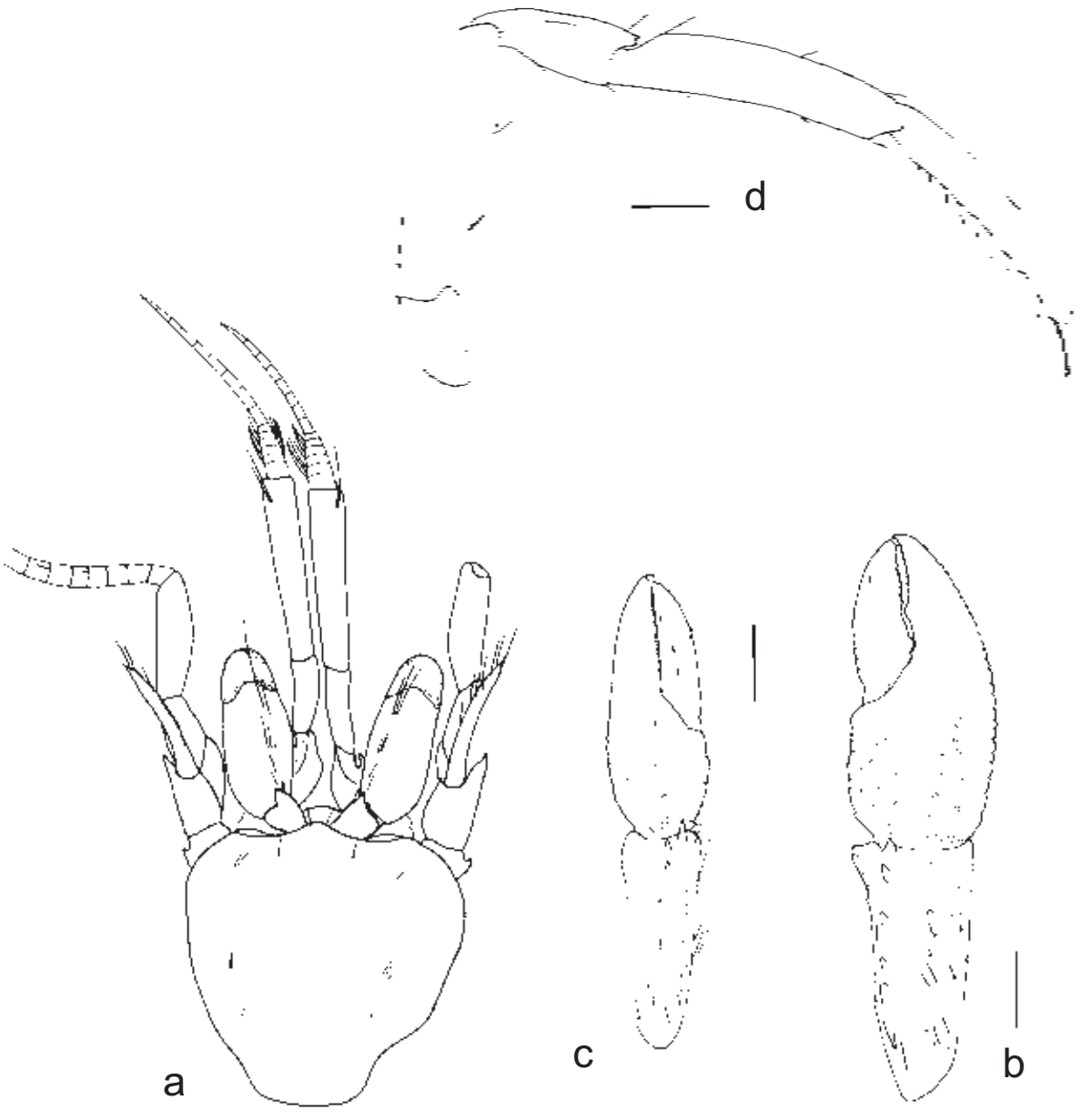
Size.– Maximum reported shield length 2.2 mm.

Coloration.– Entirely pink with flagella and ambulatory legs lighter in color, without conspicuous markings on appendages.

Habitat.– Occupies gastropod shells.

Distribution.– Sagami Sea, Japan, and now Taiwan; 171-582 m, possibly to 613 m.

Remarks.– This is a new record for Taiwan.



Female (1.5 mm), CP371: **a,** shield and cephalic appendages **b,** chela and carpus of right cheliped; **c,** chela and carpus of left cheliped; **d,** right second pereopod (lateral view). Scale equals 0.5 mm.

Catapagurus A. Milne-Edwards, 1880

Twenty-one species have been described in this genus, but of the 19 Pacific and Indo-Pacific species, only one has been found in Taiwan. Yu & Foo (1991) included *Catapagurus doederleini* Doflein, 1902 in their catalog; however, this species was transferred first to *Parapagurodes* McLaughlin & Haig, 1973 by Asakura (2001) and subsequently the new genus *Dofleinia* McLaughlin & Asakura, 2004 was established for it. When *Dofleinia* proved to be a primary homonym, Asakura (2005) proposed the replacement name *Pagurodofleinia* and that is where the taxon is found in this catalog.

Miyake (1978) and Wang (1992, 1995) reported *Catapagurus misakiensis* Terao, 1914, as *Cestopagurus misakiensis* (Terao, 1914), from northern Taiwan. Asakura (2001) determined that all of the specimens that Miyake (1978) identified as Terao's taxon were actually *Catapagurus japonicus* Yokoya, 1933, a species he transferred to the resurrected genus *Hemipagurus* Smith, 1882. Asakura (2001) considered Terao's (1914) *Catapagurus misakiensis*, incerta sedis because the holotype and only known specimen apparently was no longer extant. Subsequently, McLaughlin (2004a) once again placed *Hemipagurus* in synonymy with *Catapagurus* and returned all of Asakura's taxa assigned to the former genus to *Catapagurus*, but left the status of *C. misakiensis* as incerta sedis. Following a detailed study, Komai & Takeda (2006) selected a neotype for *Catapagurus misakiensis*, redescribed the species and placed *C. japonicus* in synonymy with it. *Catapagurus misakiensis* is the only representative of the genus presently known to occur in Taiwanese waters.

Catapagurus misakiensis Terao, 1914

CP216.

Catapagurus misakiensis Terao, 1914: 470, unnumbered text fig.; Asakura, 2001: 872; Komai & Takeda, 2006: 85, figs. 1, 2, 13E.

Catapagurus japonicus Yokoya, 1933: 91, fig. 35; Miyake, 1947: 736, fig. 2129; Miyake, 1965: 648, fig. 1097; Miyake, 1978: 144, fig. 56; Wang, 1991: 258, fig. 217.

Cestopagurus misakiensis– Miyake, 1978: 146, fig. 57; Wang, 1992: 61 (list); Wang, 1995: 571 (list).

Hemipagurus japonicus– Asakura, 2001: 872, figs. 13, 18B, 20A, B, 21O, P, 27I-L, 30A, 33A-D, 35A, 37A, 39A, 41A-C, 43A, B, 44H, 51.

Catapagurus misakiensis, incerta sedis– Asakura, 2001: 875; McLaughlin, 2004a: 14.

Material examined.– CP35, 22°01.8'N, 120°36.5'E, 228-222 m, 31 Jul 2000: 1 male (1.7 mm), (MNHN Pg 7632); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 10 males (1.9-3.3 mm), 4 females (1.6-2.8 mm), 1 ovig. female (2.7 mm), (NTOU); DW117, 24°59.04'N, 122°02.85'E, 153-126 m, 31 Jul 2001: 1 male (2.5 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 mm 27 Aug 2003: 1 ovig. female (3.0 mm), (NTOU); OCP293, 24°57.719'N, 122°4.693'E, 262-232 m, 8 Aug 2005: 14 specimens not sexed (1.8-3.0 mm, 1 ovig.), (NTOU).

Diagnosis.– Shield slightly broader than long; rostrum broadly triangular. Ocular peduncles moderately short and stout, about half length of shield, corneas dilated; ocular acicles narrowly triangular, slender, terminating acutely. Antennular and antennal peduncles overreaching corneas by almost entire lengths of ultimate segments. Chelipeds subequal in length, but right much stouter; palm of right cheliped with convex

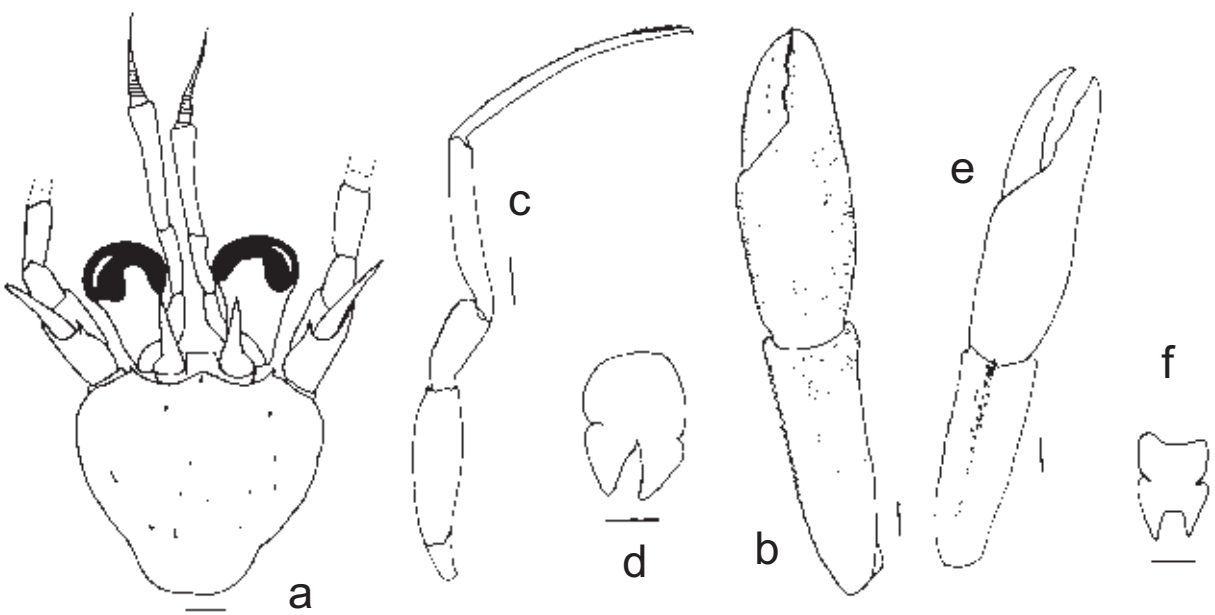
dorsal surface minutely granular laterally and mesially, dorsolateral and dorsomesial margins not delimited; dorsomesial and dorsolateral margins of carpus each with row of small spines, dorsal surface with scattered spinules and very short setae. Left cheliped with dorsolateral and dorsomesial margins of palm not delimited; dorsal surface with scattered short setae; dorsomesial and dorsolateral margins of carpus each with row of small, closely-spaced spines; dorsal surface with few spinules distally and short spiniform setae proximally. Dactyls of ambulatory legs slender, not blade-shaped, dorsal margins minutely denticulate, each with row of spiniform setae, mesial faces each with shallow median sulcus and ventral row of 10-38 corneous spinules; dorsal surfaces of propodi each with row of small denticles and row of short, spiniform setae; carpi each with row of small or very small spines; meri each with or without small spine at dorsodistal margin, 2 or 3 small spines on dorsal margin subdistally, occasionally low protuberances, ventral margins each with few to row of small spines or spinules. Telson with separation of triangular posterior lobes varying from broad subrectangular cleft through U-shaped to V-shaped median cleft, each usually terminating in sharp corneous spine, occasionally terminally subacute; oblique terminal margins each often with very short spiniform setae.

Size.– Maximum reported shield length 4.4 mm.

Coloration.– Shield pale pinkish-brown, with tint of red anterolaterally. Ocular peduncles pale reddish-brown; ocular acicles red. Antennular peduncles with ultimate segments pale brown; penultimate and basal segments pinkish. Antennal peduncles pale brown. Chelae light pinkish or bluish-tan; carpi also pale tan; meri generally pinkish-white, each with patches of brown dorsally. Dactyls of ambulatory legs light tan or pinkish; propodi each with one dorsal and two lateral tan stripes on pinkish-white background; carpi each with pinkish-white background and two tan stripes on lateral surface; meri generally pinkish-white, with brown patches distally and medially.

Habitat.– Coarse sand or sandy mud substrates; using various gastropod shells.

Distribution.– Japanese Pacific coast southward from Sagami Sea, southern part of Sea of Japan, and northeastern Taiwan, 57-403 m.

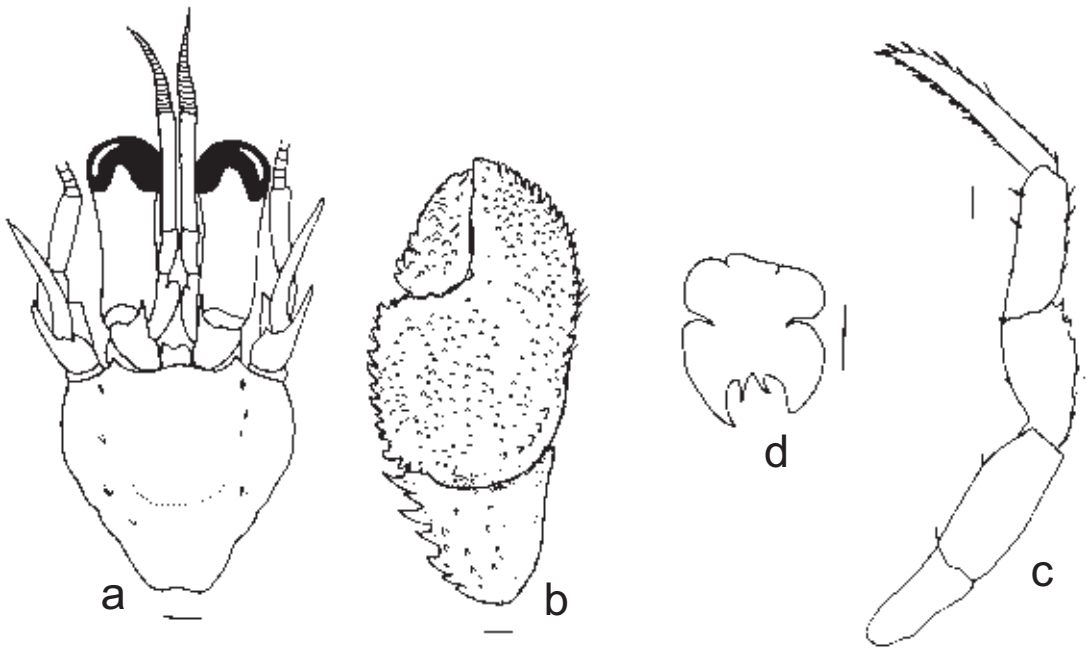


(**a-d**), ovig. female (3.0 mm), CP216; (**e-f**) male (3.3 mm), CP58: **a,** shield and cephalic appendages (aesthetascs omitted); **b, e,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d, f,** telson. Scales equal 0.5 mm.

Diacanthurus McLaughlin & Forest, 1997

Diacanthurus is one of the few pagurid genera with a confirmed fossil as well as Recent species. Of the latter five, only *D. ophthalmicus* has been reported from the northern hemisphere. Members of the genus are immediately distinguished from other hermit crabs by their very distinctively shaped telsons.

Diacanthurus ophthalmicus (Ortmann, 1892)



Ovig. female (4.5 mm), CP162: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c**, left third pereopod (lateral view); **d**, telson. Some setae omitted. Scales equal 1 mm.

Eupagurus ophthalmicus Ortmann, 1892: 314, pl. 12, fig. 19.

Pagurus ophthalmicus– Miyake, 1975: 319, pl. 116, fig. 1; Miyake, 1978: 107, fig. 42; Miyake, 1982: 127, pl. 43, fig. 3; Baba, 1986: 209, 305, fig. 153.

? *Pagurus rubricatus* (Henderson, 1988)– Wang, 1991: 247, fig. 207 (see remarks).

Diacanthurus ophthalmicus– McLaughlin & Forest, 1997: 244, figs. 1, 2b, 4.

Material examined.– CP162, 22°09.64'N, 120°37.86'E, 190-200 m, 24 May, 2002: 1 ovig. female (4.5 mm), (MNHN Pg 7627).

Diagnosis.– Shield slightly longer than broad; rostrum obsolete to broadly rounded. Ocular peduncles only slightly shorter than shield; corneas slightly dilated; ocular acicles each with prominent submarginal spine. Antennular peduncles somewhat longer than ocular peduncles; antennal peduncles not reaching distal corneal margins. Chelipeds markedly unequal, dorsal surfaces of both chelae with covering of very short, dense setae; right cheliped with maximum breadth of palm slightly greater than length of dorsomesial margin, dorsal surface of dactyl with closely-spaced blunt tubercles, dorsal surface of palm and fixed finger with numerous, but not densely packed small tubercles, dorsomesial and dorsolateral margins each with row of moderately short spines and long setae; carpus with row of widely-spaced spines on dorsomesial margin and adjacent shorter row in distal half, additional single or double row of spines laterad of midline. Left cheliped with longitudinal row of tubercles on dorsal midline of dactyl; dorsal surface of palm with spinules and tubercles, dorsolateral margin with row of prominent spines; carpus with 2 rows of spines on dorsal surface and prominent dorsodistal spine. Ambulatory legs with dactyls longer than propodi, ventral margins each with row of corneous spines; propodi each with tufts of setae dorsally and ventrally; carpi each with row of spines

on dorsal surface. Telson with posterior lobes of telson almost symmetrical, with moderately wide, deep median cleft; terminal margins each drawn out into prominent spine, strongly concave inner margins each with 1 prominent spine adjacent to cleft, 1 to several tufts of short setae, sometimes accompanied by spinule in distal half.

Size.– Maximum reported shield length 8.5 mm.

Coloration.– Shield orange, laterally tinged with purple. Ocular peduncles reddish-purple. Antennular and antennal peduncles orange; flagella banded red and white. Chelipeds light reddish-orange; carpi and meri each with two broad dark purple bands. Ambulatory legs orange, meri, carpi and propodi each with broad purplish-red band (after Miyake, 1978).

Habitat.– Gastropod shells.

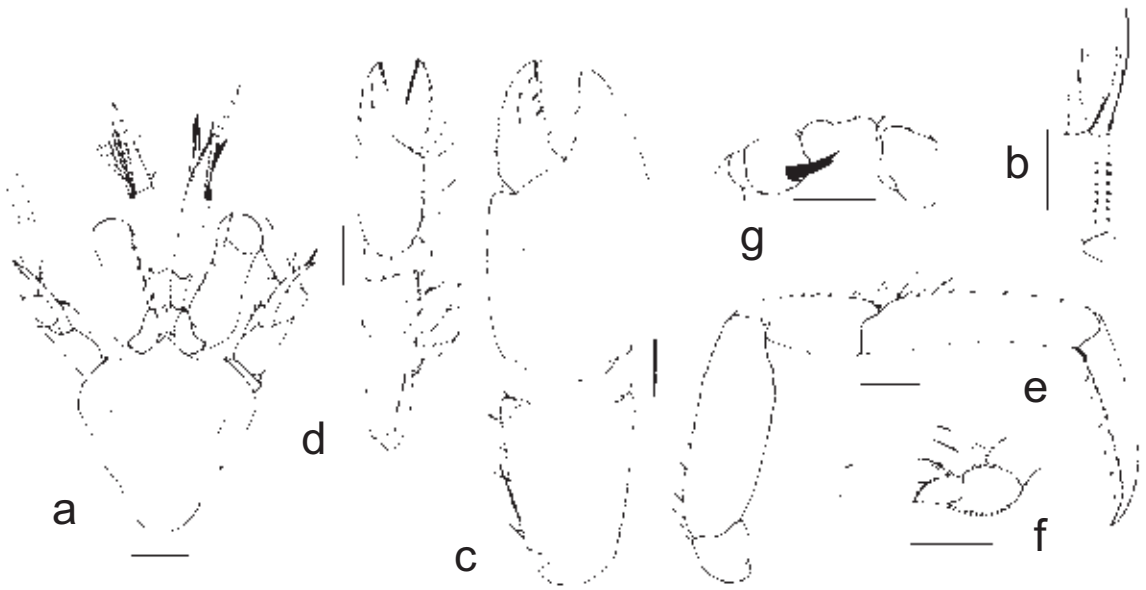
Distribution.– Sea of Japan and Pacific coast of Japan from Sagami Bay southward to Kyushu, Taiwan; 65-400 m.

Remarks.– This is the first report of *Diacanthurus ophthalmicus* in Taiwanese waters. Wang's (1991) report of "*Pagurus rubricatus* Henderson" from Zhejiang is clearly a misidentification. Henderson's (1888) taxon, known only from New Zealand (McLaughlin & Forest, 1997; Forest & McLaughlin, 2000), was transferred to *Diacanthurus* together with *Pagurus ophthalmicus* and *P. spinulimanus* (Miers, 1876), another New Zealand species. Wang's (1991) brief description and illustration suggest that he was referring to *D. ophthalmicus*; however, without voucher specimens available for reexamination, Wang's taxon is included only questionably in the synonymy.

Pagurixus Melin, 1939

The genus, at one time known from only a very few representatives of seven or eight species, is now recognized as one of the most species-rich genera in the family that is widely distributed throughout the Indo-West Pacific, including the Hawaiian Islands, Australia and New Zealand. Explorations of subtidal tropical reefs by SCUBA divers have provided a source of material not accessible to standard collecting methods. As a result, 21species have been described in the genus, with additional studies still in progress. At present, only one species has been found in Taiwan, but that is surely to increase as the Taiwanese reefs are carefully explored.

Pagurixus ruber Komai & Osawa, 2006



Male (1.7 mm), Siangjiaowan, Kending, Pingtung County, 29 Oct 2000: **a,** shield and cephalic appendages; **b,** ultimate segment of right antennular peduncle, including ventral flagellum (ventrolateral view); **c,** chela and carpus of right cheliped; **d,** chela and carpus of left cheliped; **e,** right second pereopod (lateral view); **f,** dactyl and propodus of left fourth pereopod (lateral view); **g,** coxae of fifth pereopods and thoracic sternite. Scales equal 0.5 mm.

Pagurixus boninensis– McLaughlin & Haig, 1984: 124 (in part), fig. 1a, c, d, f, g; Paulay et al., 2003: 490.
Pagurixus ruber Komai & Osawa, 2006: 92, figs. 40-43, 46B, 48.

Material examined.– Siangjiaowan, Kending, Pingtung County, 3-8 m, 29 Oct 2000: 1 male (1.7 mm), (UF 3768, transferred to NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum triangular, distinctly overreaching weakly produced lateral projections. Ocular peduncles about 0.8 length of shield, corneas dilated; ocular acicles subovate. Antennular peduncles overreaching distal corneal margins, each ultimate segment with tuft of long setae at distolateral angle and 2 rows of tufts of short setae on ventral surface. Antennal peduncles reaching distal corneal margins; antennal acicle moderately long. Chelipeds grossly unequal, right larger; palm with covering of granules, but devoid of conspicuous spines; dorsomesial margin of palm rounded, dorsal surface convex; dorsomesial margin of carpus without conspicuous spines, but with few long spiniform setae, dorsolateral margin also unarmed, rounded. Palm of left cheliped with dorsal surface convex and sparsely granular; dorsolateral margin unarmed; carpus moderately narrow, dorsolateral margin with row of small spines or tubercles, dorsomesial margin with row of small tubercles in distal half. Ambulatory legs moderately long and slender, similar; dactyls subequal in length to propodi, ventral margins each with 7 or 8 corneous spines; carpi each with 1 spine at dorsodistal angle. Propodal rasp of fourth pereopod formed of single row of corneous scales; dactyl of right with prominent tuft of long setae. Coxa of right fifth pereopod with prominent tuft of setae directed toward left; left coxa lacking gonopore. Telson missing in examined

specimen.

Size.– Maximum reported shield length 2.4 mm.

Coloration.– Shield light pink or purplish-red anteriorly and whitish posteriorly, occasionally showing striped pattern anteriorly. Ocular peduncles generally white, with tinge of purplish-red distally and proximally. Antennular peduncles with ultimate segments light purplish-red; flagella also light purplish-red. Antennal peduncles purplish-red; flagella banded with purplish-red and white. Chelipeds and ambulatory legs generally purplish-red; distal parts of dactyls and propodi of ambulatory legs white (after Komai & Osawa, 2006).

Habitat.– Occupies gastropod shells.

Distribution.– Southern Japan (Ryukyu Islands and Izu Islands), Taiwan, Guam, Society Islands, Tuamotu Archipelago and Maldives; subtidal to 8 m.

Remarks.– The present species can be immediately recognized by its vivid coloration in life. Morphologically, it is easily distinguished from other local pagurid species by the possession of two rows of tufts of short setae on the ventral surface of the ultimate segment of the antennular peduncle.

Pagurus Fabricius, 1775

Pagurus is a polyphyletic conglomerate of species that are united, not by synapomorphies, but by the lack of them. The heterogeneity of *Pagurus* has long been recognized, however, with 168 species considered valid taxa, but less than a dozen agreeing morphologically with the type species, *Pagurus bernhardus* (Linnaeus, 1758), it is not yet possible to accurately assess the phylogenetic relationships among the majority. Consequently, *Pagurus* remains the "catch-all" for hermit crabs lacking the suites of characters applicable to the other 76 genera of the family.

The true identity of the species included by Maki & Tuschayi (1923) as *Pagurus samuelis* was the most difficult to trace. Schmitt identified a single male as *P. samuelis* and that specimen was returned to Taiwan. Stimpson (1857) described *P. samuelis* from Tamales Bay, California, but Stimpson (1858) included Japan in the distribution of that species. McLaughlin (1974) restricted the distribution of *P. samuelis* sensu stricto to the western coast of Vancouver Island, Canada in the north to the northwest coast of Baja California, Mexico in the south, and indicated that a description of the Japanese species was in press. Subsequently, *Pagurus geminus* McLaughlin, 1976 replaced *P. samuelis* in the Japanese fauna. Miyake (1978) included Taiwan in the distribution of *P. geminus*, citing Maki & Tuschayi's (1923) record of Keelung. Wang (1991, 1992, 1995) reported the occurrence of *Pagurus geminus* in Chinese waters and Taiwan, but only in his first paper was any diagnostic information or an illustration provided, and both were too generalized to be informative. It is probable that Wang's (1991, 1992, 1995) records for Taiwan were, like Miyake's (1978), based on the earlier account of Maki & Tuschayi (1923). Sandberg & McLaughlin (1993) found *P. geminus* to be a junior synonym of *P. filholi* (Hess, 1865). Neither *P. geminus* nor *P. filholi* has been reported from Taiwan. Neither is this species in the collections of NTOU or NMNS. However, several specimens in the NTOU collections identified as *P. samuelis* have been reexamined and found to represent *P. angustus* (Stimpson, 1858). It is most probable that Maki & Tuschiya's *P. samuelis* is a misidentification of *P. angustus*, a species that Schmitt undoubtedly was not familiar with at the time.

Key to the Taiwanese species of *Pagurus*

1. Ventral surfaces of the carpi of the chelipeds each with pin-hole foramen ..... *P. conformis*
- Ventral surfaces of carpi of chelipeds lacking pin-hole foramens 2
2. Ventromesial margins of carpus and merus of right cheliped produced into rounded wing-like projections 3
- Ventromesial margins of carpus and merus of right cheliped not produced into rounded wing-like projections 4
3. Dorsal surfaces of palms of both chelipeds with prominent median protuberances separated by smooth area; setae abundant and usually plumose ..... *P. pitagsaleei*
- Dorsal surfaces of palms of both chelipeds without median protuberances; setae sparse and usually simple ..... *P. kulkarnii*
4. Ultimate segments of antennal peduncles each with 1 very long, stiff seta at distal margin reaching almost to tip of upper antennular flagellum and provided with paired long setules ..... *P. imafukui*
- Ultimate segments of antennular peduncles without 1 very long, stiff seta at each distal margin 5
5. Dorsal surface of left chela flattened, palm with dorsolateral and dorsomesial margins slightly raised ..... *P. nipponensis*
- Dorsal surface of left chela elevated, palm with dorsolateral surface oblique or convex 6
6. Right and/or left chelae with at least some spines of dorsal and lateral surfaces capsulate 7

- Right and/or left chelae with no spines of dorsal and lateral surfaces capsulate ……8

7. Rostrum acutely triangular and prominently produced; dactyls of ambulatory legs shorter to only very slightly longer than propodi ……*P. japonicus*
- Rostrum obtusely triangular or broadly rounded, not prominently produced; dactyls of ambulatory legs distinctly longer than propodi ……*P. similis*
8. Meri of chelipeds each with 1 very prominent tubercle or subacute spine on ventral surface proximally …9
- Meri of chelipeds each without very prominent tubercle or subacute spine on ventral surface proximally 10
9. Dactyls of ambulatory legs longer than propodi, ventral margins each with row of 9-20 corneous spines; propodus of left third pereopod without irregular ventral row of calcareous tubercles on lateral face ……*P. minutus*
- Dactyls of ambulatory legs shorter than propodi, ventral margins each with row of 6-9 corneous spines; propodus of left third pereopod with irregular ventral row of calcareous tubercles on lateral face ……*P. angustus*
10. Dactyls and propodi of third pereopods similar in armature ……11
- Dactyls and propodi of third pereopods dissimilar in armature ……*P. nigrivittatus*
11. Mesial faces of palms of both chelipeds and mesial face of dactyl of left all with numerous small tubercles ……*P. luticola*
- Mesial faces of palms of both chelipeds and mesial face of dactyls of left all without numerous small tubercles ……*P. confusus*

Pagurus conformis De Haan, 1849

Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984.

Pagurus conformis De Haan, 1849: 204; Yamaguchi & Baba, 1993: 280, fig. 79; Komai, 2004a: 322, figs. 1-4.
Eupagurus megalops Stimpson, 1858: 248; Stimpson, 1907: 216.
Pagurus megalops– Miyake, 1978: 84, fig. 31; Miyake 1982: 128, pl. 43, fig. 4.

Material examined.– Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: 1 male (5.1 mm), (NTOU).

Diagnosis.– Shield slightly broader than long; rostral lobe broadly rounded, not reaching moderately produced lateral projections. Ocular peduncles about 0.8 length of shield, stout, corneas strongly dilated; ocular acicles subovate. Antennular peduncles overreaching distal corneal margins by half lengths of ultimate segments. Antennal peduncles reaching distal corneal margins; antennal acicles moderately long. Chelipeds grossly unequal, right larger; chela with long plumose setae on mesial and lateral margins; dactyl with row of small spines or tubercles on dorsal surface adjacent to dorsomesial row of spines; palm with several irregular rows of small spines or spinulose tubercles on weakly convex dorsal surface, partially obscured by mat of short plumose setae; dorsomesial and dorsolateral margins of palm each delimited by row of small spines; dorsal surface of carpus with scattered small spines or spinulose tubercles, each bearing tuft of short plumose setae anteriorly, dorsomesial margin delimited by row of small spines, dorsolateral margin not delimited, ventral surface with deep pin-hole foramen medially. Chela of left cheliped also with long plumose setae on lateral and mesial margins; palm with dorsal surface weakly convex, but not forming crest, with irregular rows of small spines or tubercles; dorsolateral margin delimited by row of small spines; carpus with dorsal row of

spines, ventral surface with deep pin-hole foramen. Ambulatory legs moderately long and moderately stout, similar; dactyls 1.6-1.8 times longer than propodi, each with spinulose dorsal margin and with row of slender corneous spinules on ventromesial margin; propodi and carpi each with dorsal row of small spines. Propodal rasp of fourth pereopod composed of 3 or 4 rows of corneous scales. Anterior lobe of sternite of third pereopods triangular. Telson missing in examined specimen.

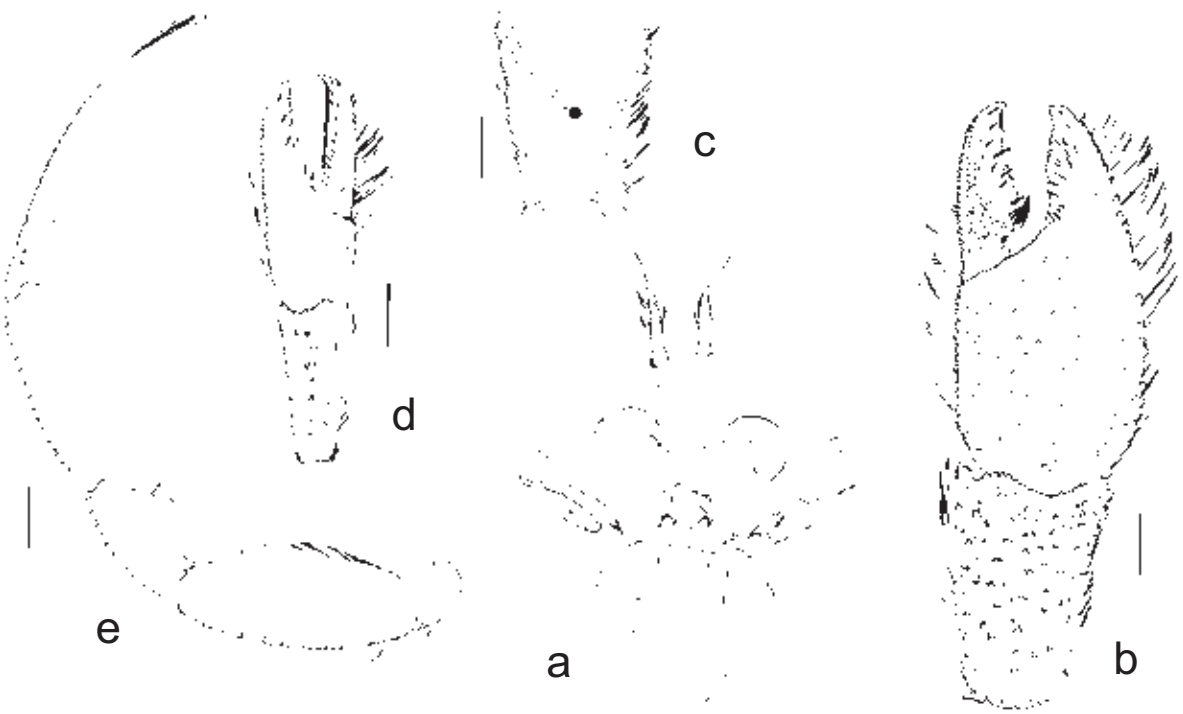
Size.– Maximum reported shield length 6.7 mm.

Coloration.– Body and appendages generally brown. Shield with row of white spots on either side of paler median part. Ocular peduncles and antennae without distinct markings, such as bands or stripes; corneas dark gray. Chela of right cheliped whitish. Propodi of ambulatory legs each with broad whitish band at midlength; meri each with somewhat darker distal part.

Habitat.– Occupies gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kyushu, southern part of the Sea of Japan, East China Sea, and Taiwan; 5-190 m.

Remarks.– Komai (2004a) showed that *Pagurus conformis* De Haan, 1849 was the senior synonym of *Pagurus megalops* (Stimpson, 1858). This species is easily recognized by the possession of a pinhole-like foramen on the ventral surface of the carpus of each cheliped.



Male (5.1 mm), Singda Harbor fishing port, Kaohsiung County, 1 Dec 1984: **a**, shield and cephalic appendages; **b**, chela and carpus of right cheliped; **c**, carpus of right cheliped, (ventral view); **d**, chela and carpus of left cheliped; **e**, right second pereopod (lateral view). Setae partially omitted. Scales equal 2 mm.

Pagurus pitagsaleei McLaughlin, 2002

Haikou, Kending, Pingtung County, 8 Sep 2005.

Pagurus cf. *boriaustraliensis*– Rahayu & Komai, 2000: 30, figs. 4-8 [not *Pagurus boriaustraliensis* Morgan, 1990].

Pagurus pitagsaleei McLaughlin, 2002a: 444.

Material examined.– Haikou, Kending, Pingtung County, 8 Sep 2005: 1 male (4.1 mm), 1 ovig. female (4.3 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum broadly rounded. Ocular peduncles slightly to distinctly more than half shield length, corneas not noticeably dilated; ocular acicles each with moderately prominent submarginal spine. Antennular and antennal peduncles reaching to or slightly beyond distal margins of corneas. Right cheliped larger, but not necessarily longer than left, both with abundance of plumose setae, sometimes obscuring armature; dorsal surface of dactyl with longitudinal, tubercular median ridge, dorsomesial margin with row of small, closely-spaced spines; dorsomesial margin of palm with irregular single or double row of tuberculate spines, dorsal midline with proximal protuberance, separated by glabrous space from tuberculate and setose ridge, dorsolateral margin with row of small spines; carpus with row of prominent spines on dorsomesial margin, dorsal surface with scattered low tubercles and protuberances, dorsolateral margin with row of small spines, ventromesial margin produced into wing-like projection; ventromesial margin of merus subtriangular, with very pronounced wing-like projection. Left cheliped slightly shorter or slightly longer than right; dorsomesial margin of palm with 3 or 4 moderately well developed spines, dorsal midline with 2 tuberculate protuberances followed distally by longitudinal row of

small subacute tubercles, dorsolateral margin with row of spines; carpus with flattened dorsal surface, dorsomesial margin with row of 3 large spines, dorsolateral margin with row of 3 or 4 somewhat smaller spines. Ambulatory legs similar; all segments with sparse tufts of plumose setae; dactyls shorter than propodi, ventral margins each with 5 or 6 corneous spines; propodi each with 1 or more corneous spines on ventral surface; carpi each with dorsodistal spine. Fourth pereopods with single row of scales in propodal rasp. Telson with posterior lobes separated by moderately deep median cleft; terminal and lateral margins with several long, slender spines interspersed with smaller spines.

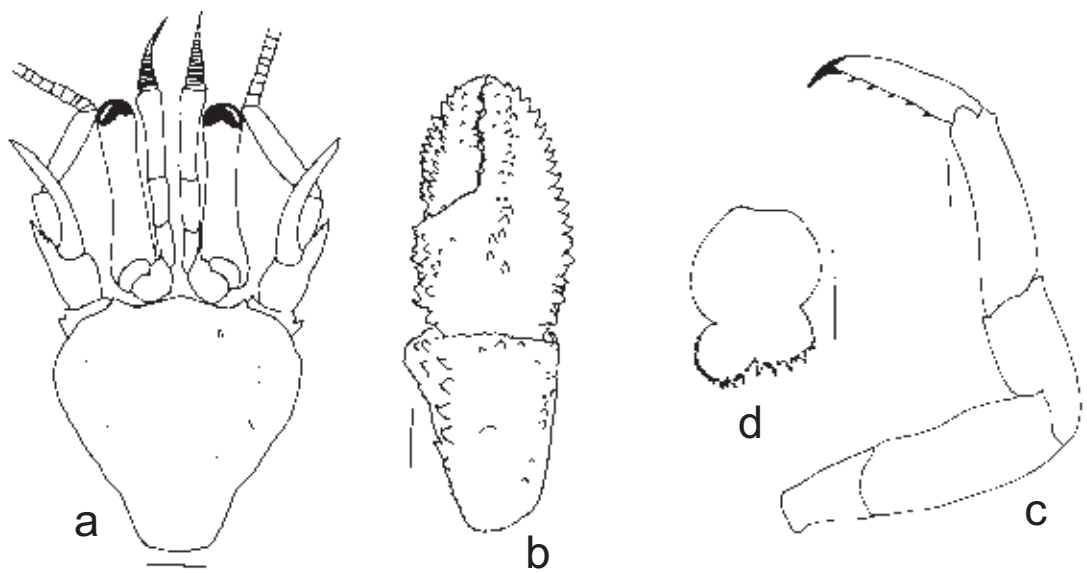
Size.– Maximum reported shield length 4.3 mm.

Coloration.– Ocular peduncles grayish-white with short longitudinal stripes of reddish-black proximally and one continuous longitudinal stripe laterally; ocular acicles each with subcircular reddish-black patch. Antennular peduncles with penultimate and basal segments grayish-white with blackish-red stripes and patches; ultimate segments orange distally and with blackish-red stripes. Antennal peduncles grayish-white with black stripes, flagella banded with grayish-white and reddish-black. Chelipeds with palms mottled grayish-white and black; carpi and meri each with several short black stripes. Ambulatory legs grayish-white with interrupted short reddish-black stripes, each with faint blackish colored band proximally and subdistally on dactyls; propodi, carpi, and meri each with faint median blackish band.

Habitats.– Shallow sublittoral areas of sand and coral and under stones on muddy sand beaches.

Distribution.– Phuket, Thailand, northeast Taiwan; intertidal and shallow subtidal.

Remarks.– The presence of *Pagurus pitagsaleei* in northeastern Taiwan represents a major range extension for the species, as well as a new record for Taiwan.



Male (4.1 mm), Haikou, Kending, Pingtung County, 8 Sep 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Pagurus kulkarnii Sankolli, 1962

Fulong, Taupei County, 12 Aug 2006.

Pagurus kulkarnii Sankolli, 1962: 136, figs. 1, 2; Tirmizi & Siddiqui, 1982: 89, figs. 44, 45; McLaughlin, 2002a: 446.

Not *Pagurus kulkarnii*– Morgan, 1987: 182; Morgan, 1990: 27 [= *Pagurus hedleyi* Grant & McCulloch, 1906].

Material examined.– Danhai, Taipei County, 19 Oct 1989: 1 female (2.9 mm), (NTOU); Fulong, Taipei County, 12 Aug 2006: 1 female (3.0 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum rounded. Ocular peduncles moderately long, but overreached by both antennular and antennal peduncles, corneas not noticeably dilated; ocular acicles each with terminal spinule. Chelipeds unequal, right longer and stouter; dactyl of right cheliped with small conical tubercles on upper surface; palm with tuberculate or granular upper surface, dorsomesial and dorsolateral margins each with row of small spines or tubercles; carpus with weakly tuberculate or spinulose dorsal surface, dorsomesial margin with row of spines, dorsolateral margin spinulose; ventromesial margin developed obliquely into wing-like projection; merus with ventromesial and distomesial margins developed into wing-like subsemicircular protuberance. Left cheliped with dorsomesial margin of dactyl spinulose, dorsal surface granular; palm with conical granular tubercles covering dorsal surface, dorsolateral margin with small spines or tubercles, dorsomesial margin spinulose; carpus with distally spinulose dorsomesial margin, dorsodistal margin with prominent spine. Ambulatory legs with dactyls shorter than propodi, ventral margins each with 5 or 6 corneous spines; propodi with transverse rows of minute ridges on dorsal surfaces, ventrodistal margins each with few corneous spinules; carpi each with dorsodistal spine. Fourth pereopods with single row of

corneous scales in propodal rasp. Telson with posterior lobes separated by moderately deep median cleft, terminal margins each with row of irregularly-sized, usually blunt spines, extending onto lateral margins.

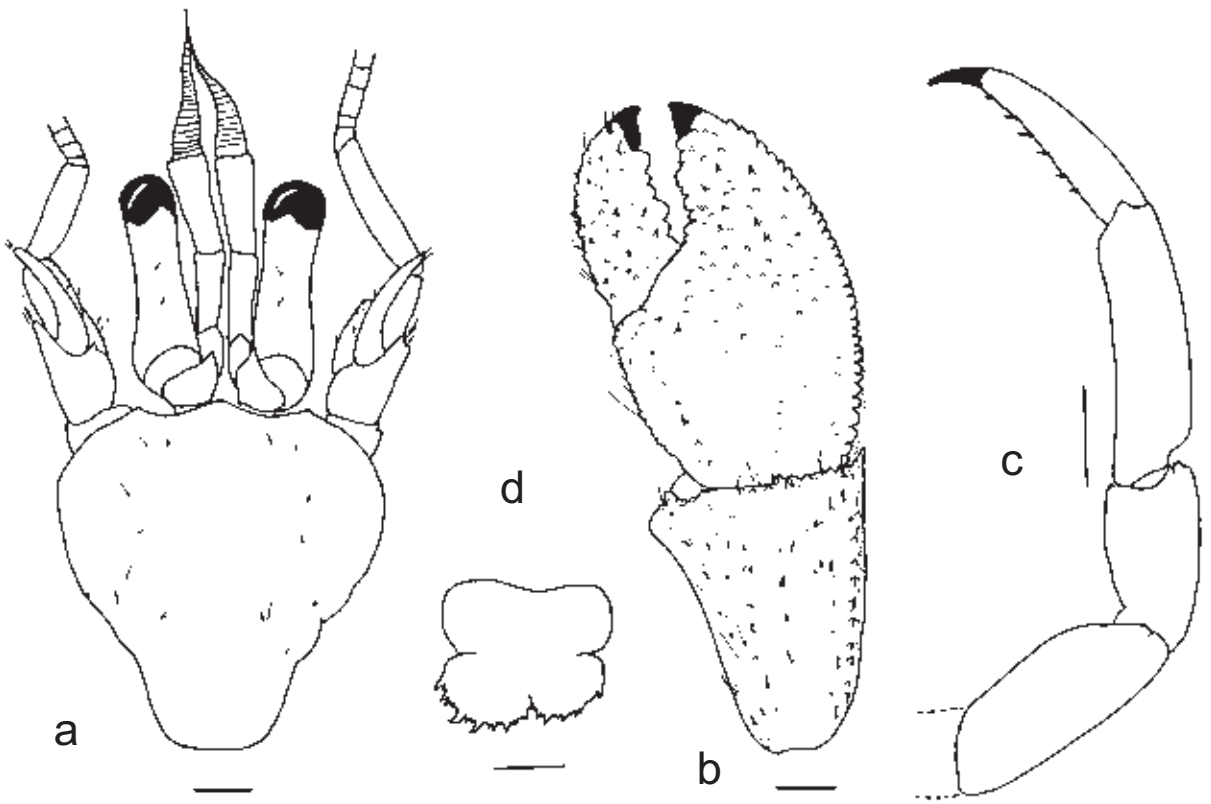
Size.– Maximum reported shield length 5.8 mm.

Coloration.– Shield light pinkish-tan with few darker patches. Ocular peduncles orange proximally and distally, separated by broad gray or light brown band; ocular acicles reddish-brown proximally. Antennal flagella banded with gray and reddish-brown. General color of chelipeds and ambulatory legs white to light brown or brownish-rose with longitudinal stripes of chocolate-brown to bluish-black on all segments.

Habitat.– Gastropod shells.

Distribution.– Bombay, India, Karachi, Pakistan, Gulf of Thailand, Taiwan; intertidal.

Remarks.– This is the first record of *Pagurus kulkarnii* in Taiwanese waters and a significant extension of the range of this species.



Female (2.9 mm), Danhai, Taipei County, 19 Oct 1989: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view), **d,** telson. Setae partially omitted. Scales equal 1 mm.

Pagurus imafukui McLaughlin & Konishi, 1994

CP371.

Pagurus imafukui McLaughlin & Konishi, 1994: 212, figs. 1-3; Komai & Takeda, 2006: 110, fig. 13F.

Material examined.– OCP293, 24°57.719'N, 122°04.693'E, 262-232 m, 8 Aug 2005: 13 males (1.0-1.9 mm), 2 females (1.0, 1.5 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 4 males (1.2-2.0 mm), (NTOU).

Diagnosis.– Shield slightly to considerably longer than broad; rostrum broadly triangular. Ocular peduncles shorter than shield, corneas not dilated; ocular acicles narrowly triangular, terminating subacutely. Antennular peduncles overreaching distal corneal margins, ultimate segments of each with 1 very long, stiff seta at distal margin, reaching almost to tip of upper antennular flagellum and provided with paired long setules. Chelipeds grossly unequal, right larger; dorsomesial margin of palm rounded and armed with only few minute spinules or tubercles, or angular and armed with 2 or 3 irregular longitudinal rows of small spines, dorsal surface convex and unarmed or generally flattened and with numerous small spines, spinules or tubercles sometimes forming irregular rows, dorsolateral margin with row of small spines; dorsomesial margin of carpus with row of small to moderately large spines, dorsolateral margin with 1 or 2 irregular rows of usually smaller spines. Palm of left cheliped with dorsal surface elevated in midline, sometimes forming distinct ridge or crest, and armed with 1 or 2 irregular rows of moderately small spines or tubercles; dorsolateral margin with row of small spines or spinules; dorsolateral margin of carpus with row of acute or subacute spines, dorsomesial margin with row of protuberances, tubercles or spines. Ambulatory legs similar; dactyls slightly longer than propodi, ventral surfaces each with 7-10 corneous spines; carpi each usually with 1

spine at dorsodistal angle, second pereopods, and often also third, frequently with 1 or more additional spinulose protuberances or small spines on dorsal surface proximally. Propodal rasp of fourth pereopod formed of single row of corneous scales. Telson with posterior lobes separated by moderately well developed median cleft; terminal margins oblique or nearly perpendicular, with 3 or 4 small to large spines, occasionally all spines markedly reduced or obsolete.

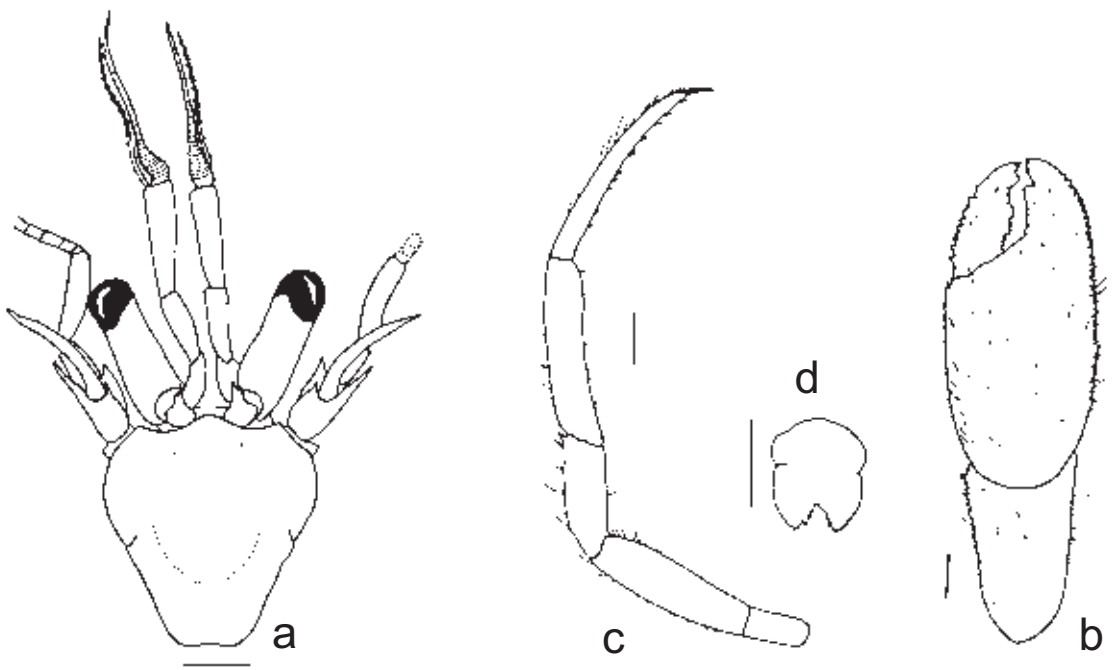
Size.– Maximum reported shield length 2.4 mm.

Coloration.– Carapace orange to reddish or pinkish-orange. Ocular peduncles white or bluish-white. Antennules and antennae bluish-white to light orange. Chelipeds with dactyls and palms white, white tinged with pink, or light reddish-brown; carpi and meri orange, whitish-orange or light reddish-brown. Ambulatory legs with dactyls transparent or white and occasionally with light orange or light reddish-brown proximally; propodi white or bluish-white, each with wide light orange band medially or light reddish-brown with bluish-white distally; carpi orange with white or bluish-white proximally and distally, or light reddish-brown; meri white or bluish-white, each with narrow light orange band near distal end and wide band extending from middle to proximal end, or light reddish-brown, with white distally.

Habitat.– Typically occupies *Dentalium* shells.

Distribution.– Shizuoka and Mie Prefectures and Sagami Bay, Japan, Taiwan; 126-613 m.

Remarks.– This is the first report of *Pagurus imafukui* in Taiwanese waters and a significant extension of the range of this species. Apparently color varies with locality, as the colors reported by Komai & Takeda (2006) differ appreciably from those reported by McLaughlin & Konishi (1994) and those seen in the present photograph.



Male (1.7 mm), OCP293: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Pagurus nipponensis (Yokoya, 1933)

Dasi fishing port, Yilan County, 22 Nov 1997.

Eupagurus gracilipes– Doflein, 1902: 647, pl. 6, figs. 6-8 [not *Eupagurus gracilipes* Stimpson, 1858].

Eupagurus tricarinatus– Balss, 1913: 58 [not *Eupagurus tricarinatus* Stimpson, 1858].

Eupagurus nipponensis Yokoya, 1933: 87 (? in part), fig. 32.

Pagurus gracilipes– Makarov, 1938: 184 (in part); Vinogradov, 1950: 227 (in part), fig. 117; Miyake, 1965: 647 (in part), fig. 1093; Miyake, 1975: 286 (in part), pl. 226, fig. 5; Miyake, 1982: 126 (in part), pl. 42, fig. 5.

Pagurus gracilipes– Miyake, 1978: 85, fig. 33; Miyake & Imafuku, 1980b: 59; Baba, 1986: 201, 303, fig. 149 [not *Pagurus gracilipes* (Stimpson, 1858)].

Parapagurodes nipponensis– Komai, 1998a: 275, figs. 1B, 6, 7; McLaughlin & Asakura, 2004: 49, figs. 1E, 2E, 3E, 4G, 5E.

Pagurus nipponensis– McLaughlin & Asakura, 2004: 54.

Material examined.– Dasi fishing port, Yilan County, 20 Sep 1990: 1 female (6.4 mm), (NTOU).– 2 Oct 1997: 1 female (4.7 mm), (NTOU).– 22 Nov 1997: 1 male (8.0 mm), (NTOU).– 17 Dec 2000: 1 male (4.8 mm). (NTOU).– 17 Dec 2004: 1 male (4.9 mm), (NTOU).– 22 Dec 2006: 1 male (7.9 mm), (NTOU); Gueishan Island, Yilan County, vent st. 4, 24°49.210'N, 121°59.960'E, PCP, 335 m, 12 Jul 2005: 1 male (7.8 mm), (NTOU).

Diagnosis.– Shield slightly broader than long to slightly longer than broad; rostrum triangular, moderately well developed, acute. Ocular peduncles not much more than half shield length; corneas

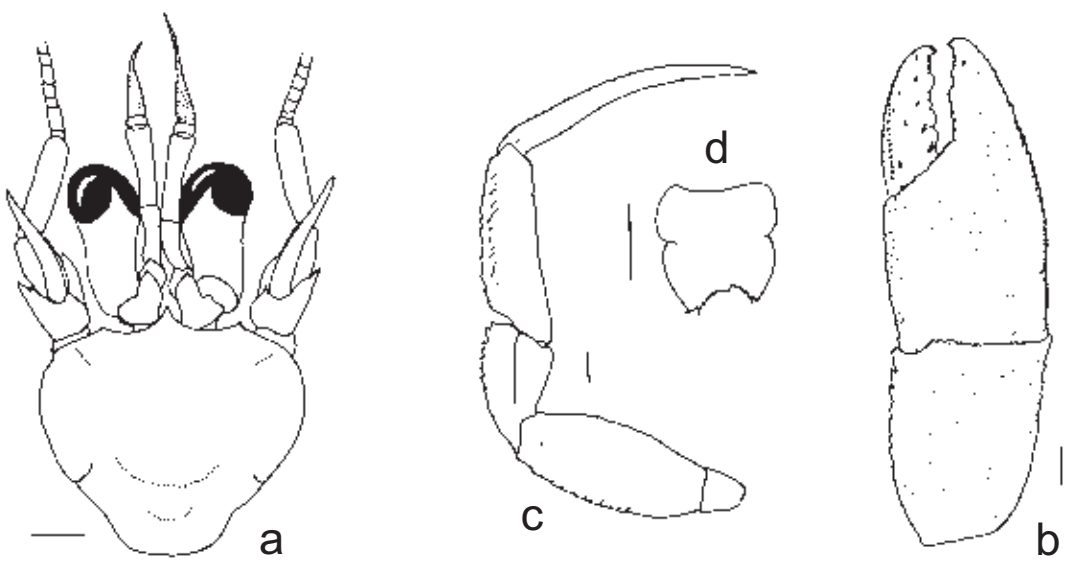
somewhat dilated; ocular acicles each with submarginal spine. Antennular and antennal peduncles both overreaching distal corneal margins. Chelipeds unequal, right somewhat to considerably larger than left; dorsomesial margin of palm not clearly delineated, but area weakly elevated, dorsal surface with scattered granules or spinulose tubercles, dorsolateral margin with row of moderately prominent spines; carpus with row of prominent spines on dorsomesial margin, dorsal surface with numerous spines or spinose tubercles, frequently bi- or multifid. Left cheliped with dorsal surface of palm generally flattened, dorsomesial and dorsolateral margins somewhat elevated, latter with row of small spines, dorsal surface with few irregular rows of small spines; carpus with row spines on dorsomesial margin, dorsolateral surface with row of small spines laterad of midline. Ambulatory legs with dactyls considerably longer than propodi, strongly twisted, ventral margins each with 37-62 corneous spines; propodi with spinulose or spinose dorsal margins; carpi each with spinose dorsal margin and granular lateral ridge. Fourth pereopods each with several rows of corneous scales in propodal rasp. Coxa of right fifth pereopod in males with very short sexual tube. Telson without distinct median cleft separating posterior lobes, oblique terminal margins each with 8 or 9 small spines and 1 larger spine at exterior apex.

Size.– Maximum reported shield length 13.2 mm.

Coloration.– Shield generally brown or reddish-brown. Ocular peduncles with base color grayish-brown or reddish-tan, reticulated basally. Chelae and carpi of chelipeds generally brown or reddish-tan, meri pale yellowish-brown or pinkish-tan becoming darker distally, segments prominently iridescent. Dactyls of ambulatory legs each with three dark gray and two cream stripes or three narrow cream and two broader reddish-brown stripes on lateral face; propodi each with three cream and two brown or reddish-brown stripes on lateral face; carpi each with one median reddish-brown stripe on lateral face; meri each mottled or reticulated with yellowish or reddish-brown or tan, sometimes with spots of dark brown, on lateral face; carpi and meri with prominent iridescence.

Habitat.– Sandy or sandy mud substrates, often mixed with shell fragments, inhabiting gastropod shells, usually with one or more anthozoan polyps attached.

Distribution.– Pacific coast of Japan from Kashima, Ibaraki, southward to Kagohiima, Goto Islands, Taiwan; 30-335 m.



Male (4.8 mm), Dasi fishing port, Yilan County, 17 Dec 2000: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right second pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Pagurus japonicus (Stimpson, 1858)

Fulong, Taipei County, 4 Mar 2006.

Eupagurus japonicus Stimpson, 1858: 250; Stimpson, 1907: 226, pl. 25, fig. 2; Nakazawa 1927: 203, fig. 1045; Kamita, 1955: 34, fig. 13.

Eupagurus barbatus Ortmann, 1892: 311.

Pagurus japonicus– Miyake 1960: 90, pl. 45, fig. 4; Kim 1963: 300, fig. 18; Miyake, 1965: 648, fig. 1096; Suzuki 1971: 97, pl. 34, fig. 3; Kim, 1973: 239, fig. 58, pl. 71, fig. 38; Miyake, 1975: 323, pl. 115, figs. 7, 10; Miyake, 1978: 94 (in part), fig. 35, pl. 2, fig. 2; Miyake, 1982: 125, pl. 42, fig. 1; Takeda, 1982: 68, fig. 202; Takeda, 1986: 124, unnumbered fig.; Yu & Foo, 1991: 64, unnumbered fig.; Takeda, 1994a: 228, fig. 3; Asakura, 1995: 362, pl. 97, fig. 3; Kobayashi, 2000: 186, unnumbered fig.; Minemizu, 2000: 149, unnumbered fig.; Park & Choi, 2001: 138, unnumbered fig.; Komai, 2003b: 379, figs. 1-5.

Pagurus barbatus– Miyake, 1978: 105, fig. 41.

Not *Eupagurus japonicus* ? – Miers, 1880: 375, pl. 14, figs. 6, 7 [= *Pagurus hirtimanus* Miers, 1880].

Not *Eupagurus barbatus*– Balss, 1913: 55 [= *Pagurus similis* (Ortmann, 1892)].

Not *Eupagurus japonicus*– Ortmann, 1892: 309, pl. 12. fig. 16 [= *Pagurus rubrior* Komai, 2003b].

Material examined.– Fulong, Taipei County, 4 Mar 2006: 1 ovig. female (9.3 mm), (NTOU); Longdong, Taipei County, 6 Sep 1988: 1 male (11.9 mm), 1 female (8.2 mm), (NTOU); Magang, Taipei County, 14 Jul 1984: 10 males (5.7-6.7 mm), 7 females (5.6-6.8 mm), (NTOU).– Jul 1984: 2 males (9.0, 9.8 mm), (NTOU).– 21 Oct 2006: 4 males (5.7-8.1 mm), 3 females (4.6-8.6 mm), (NTOU); Mao-ao, Taipei County, 17 Aug 2006: 5 males (6.1-9.2 mm), 4 juveniles (3.0-3.9 mm), (NTOU); Shen-ao, Taipei County, 13 Jul 1997: 2 males (8.4,

10.4 mm), 1 female (10.4 mm), (NTOU).– 3 Aug 1997: 2 males (8.9, 10.8 mm), 1 female (8.5 mm), (NTOU); Dasi fishing port, Yilan County, 4 Oct 1984: 1 male (10.5 mm), (NTOU).– 29 Mar 1988: 1 male (9.8 mm), (NTOU); no specific locality, 4 Oct 1983: 1 male (10.4 mm), (NTOU).

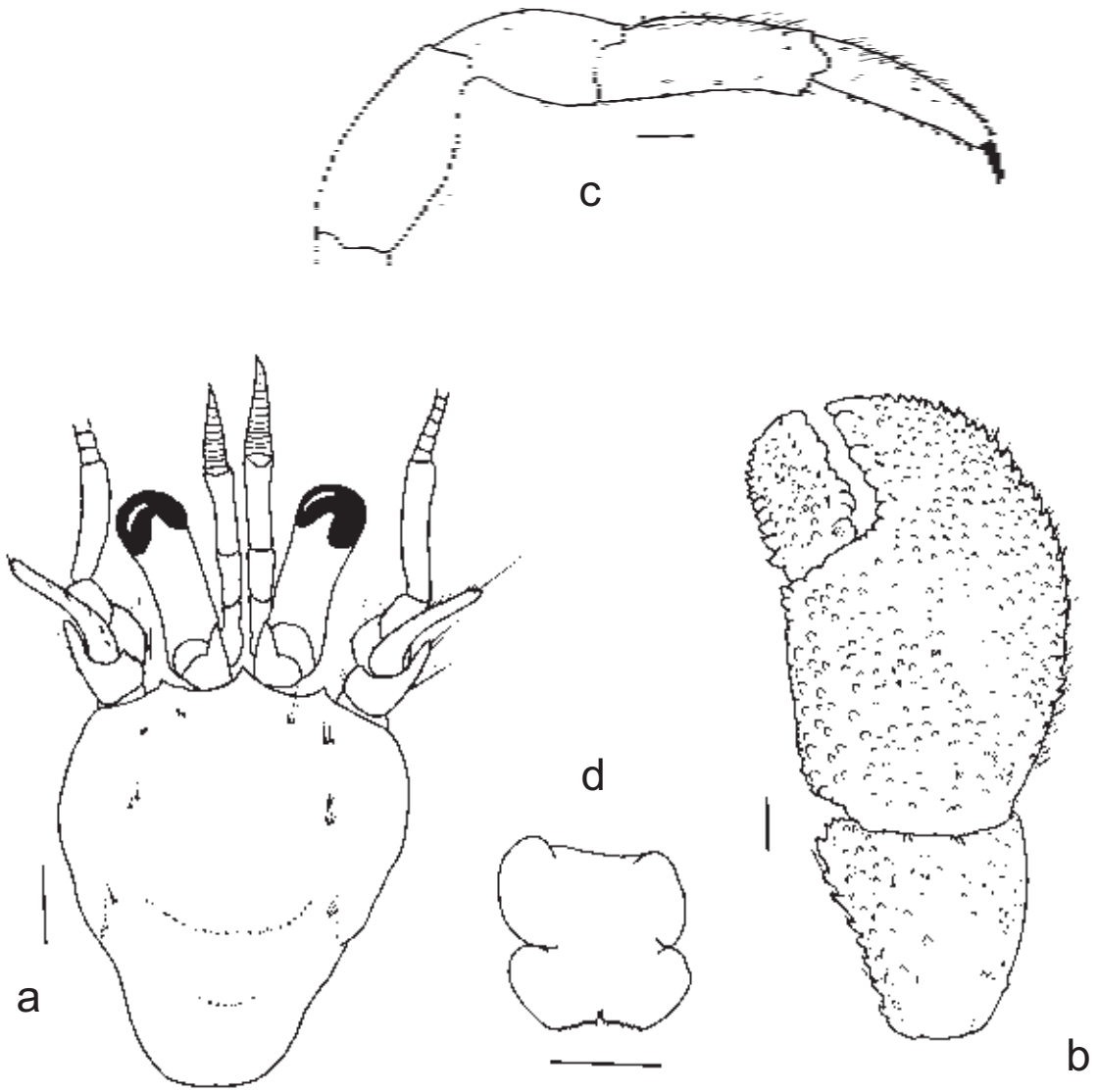
Diagnosis.– Shield longer than broad; rostrum triangular. Ocular peduncles half shield length or slightly less, corneas only faintly dilated; ocular acicles each with small submarginal spine. Antennular and antennal peduncles overreaching distal corneal margins. Chelipeds grossly unequal, both provided with numerous tufts of short or moderately short setae, often concealing armature, palms and carpi also with numerous capsulate spines on dorsal and lateral surfaces; dorsomesial and dorsolateral margins of palm of right cheliped each with row of small spines, dorsal surface with scattered small, often capsulate spines, 1 more prominent in midline; carpus with row of prominent spines on dorsomesial margin, dorsal surface with scattered capsulate tubercles and small spines, dorsolateral margin not delimited. Left cheliped with chela elevated in midline but not forming distinct ridge, but armed with row of moderately large spines extending onto proximal half of fixed finger, dorsolateral surface with numerous capsulate tubercles, dorsomesial surface with scattered small spines; dorsomesial margin of carpus with row of large spines, dorsolateral margin only weakly delimited by few small spines. Ambulatory legs similar; dactyls very slightly shorter to somewhat longer than propodi, ventral margins each with row of 7-10 prominent corneous spines; propodi unarmed but with transverse rows of long setae; carpi each with dorsodistal spine and tufts of long plumose setae. Telson with posterior lobes separated by small median cleft; terminal margins almost straight to very slightly concave, each with row of small spines, interspersed with minute spinules.

Size.– Maximum reported shield length 16.0 mm.

Coloration.– Shield mottled brown or reddish-brown and blue-gray. Ocular peduncles generally white or bluish-white with broad dark reddish-brown band at midlength and dark brown patch and tinge of blue at base of cornea. Distal two segments of antennular peduncles each with broad band of reddish-brown and tinge of blue distally. Fifth segments of antennal peduncles transparent with brown mesial and lateral stripe. Chelipeds generally brown or brownish-maroon with capsulate tubercles varying from gray or bluish-gray to brownish-maroon and spines brown or yellowish-brown to brownish-maroon; meri brown with spots of bluish-gray mottled brownish-maroon and bluish-white. Ambulatory legs with dactyls brown proximally, white distally or reddish-brown with white tips; propodi mostly reddish-brown, bluish-gray or blue distally; carpi brown to deep reddish-brown, spotted with bluish-gray; meri each brown proximally with large dorsal white or bluish-white patch and bluish-gray distally with large dorsal brown or reddish-brown patch.

Habitat.– Rocky substrates.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kyushu, Sea of Japan from Honshu mainland to Kyushu, northern China, northeast Taiwan, Korea; subtidal to 30 m.



Male (10.5 mm), Dasi fishing port, Yilan County, 4 Oct 1984: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 2 mm.

Pagurus similis (Ortmann, 1892)

Dasi fishing port, Yilan County, 4 Dec 1997.

Eupagurus similis Ortmann, 1892: 310.

Eupagurus barbatus– Balss, 1913: 55 [not *Eupagurus barbatus* Ortmann, 1892].

Pagurus similis– Miyake, 1960: 90 (in part), not pl. 45, fig. 5; Miyake, 1978: 103 (in part), not fig. 40, pl. 2, fig. 3; Miyake & Imafuku, 1980b: 60 (in part); Miyake, 1982: 125 (in part), not pl. 42, fig. 2; Takeda, 1982: 67 (in part); Yu & Foo, 1991: 66, unnumbered fig.; Komai, 2003b: 391, figs. 6A, 7-11.

? *Pagurus similis*– Kim, 1973: 240 (in part), fig. 59, not pl. 7, fig. 39.

Not *Eupagurus similis*– Doflein, 1902: 646 [= *Pagurus minutus* (Hess, 1865)].

Not *Pagurus similis*– Suzuki, 1971: 97, pl. 34, fig. 4; Miyake, 1975: 323, pl. 115, figs. 6, 9; Takeda, 1986: 124, unnumbered fig.; Takeda, 1994a: 228, fig. 5; Asakura, 1995: 362, pl. 97, fig. 4; Kobayashi, 2000: 149, unnumbered fig.; Minemizu, 2000: 149, unnumbered fig.; Park & Choi, 2001: 139, unnumbered fig. [= *Pagurus rubrior* Komai. 2003b].

Material examined.– Hepingdao, Keelung, 1 female (5.0 mm), (NTOU); Dasi fishing port, Yilan County, 4 Dec 1997: 1 female (9.8 mm), (NTOU).– 28 Oct 2004: 1 male (10.5 mm), (NTOU).– 7 Dec 2004: 1 male (9.9 mm), (NTOU).– 18 Apr 2005: 1 male (7.8 mm), (NTOU); no specific locality: 1 male (8.4 mm), (NTOU).– 20 Aug 2004: 1 male (9.7 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum obtusely triangular or rounded. Ocular peduncles somewhat more than half shield length, corneas weakly dilated; ocular acicles each usually with slender submarginal spine. Antennular and antennal peduncles both overreaching distal corneal margins. Chelipeds grossly unequal, dorsal surfaces of both palms, particularly, with numerous capsulate spines or tubercles

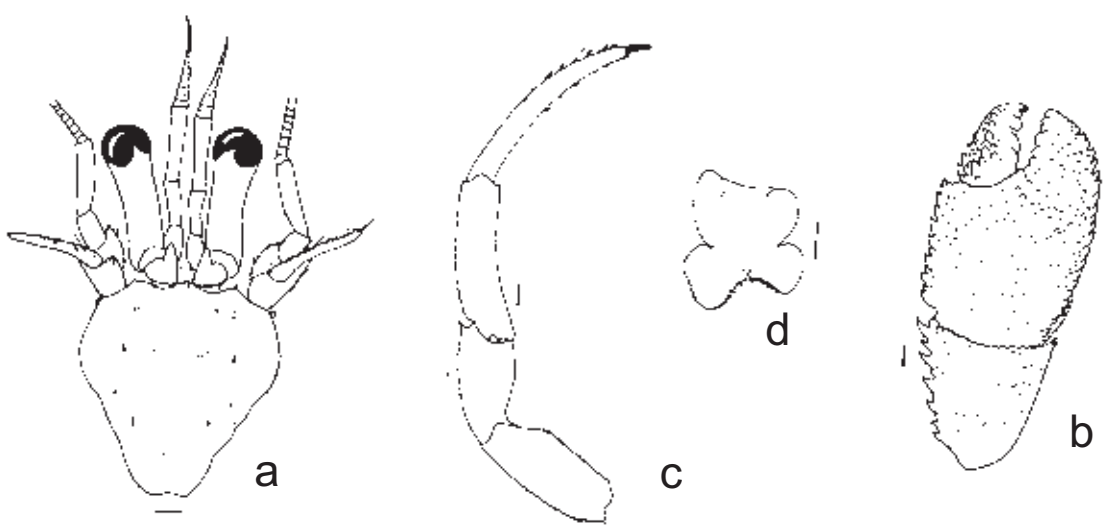
accompanied by short setae; dorsomesial margin of palm of right cheliped with single or double row of small spines, dorsal surface with numerous small spines, often many capsulate, at least in larger specimens, dorsolateral margin also with row of small spines; carpus with row of large spines on dorsomesial margin, dorsal surface with scattered small spines, sometimes capsulate, dorsolateral margin not delimited. Left cheliped with palm elevated in midline and armed with median row of spines, but not forming crest or keel, dorsolateral face with covering of short spines, often capsulate, extending onto fixed finger proximally, dorsomesial margin not delimited. Ambulatory legs similar in armature and setation; dactyls longer than propodi, ventral margins each with row of 7-12 corneous spines; propodi with few corneous spines on ventral surfaces; carpi each with dorsodistal spine, second also with 1 dorsoproximal spine. Fourth pereopods with propodal rasps each consisting of 6 or 7 rows of corneous scales. Telson with posterior lobes separated by small median cleft, terminal margins weakly concave, each with several small marginal and few submarginal spines, usually not extending full length of margins, lateral margins often denticulate.

Size.– Maximum reported shield length 14.7 mm.

Coloration.– General coloration light orange or tan. Shield with blotches of brownish-orange or orange and large purple patches laterally. Ocular peduncles white, each with orange or brownish-orange band at midlength and frequently orange patch at base of cornea, or white proximally, light blue distally. Antennal flagella banded with brownish-orange and white or light blue. Right cheliped with dark red spot centrally on mesial face of palm, dorsal surface generally tan to light brownish-orange. Chelipeds each with patch of purple dorsally, proximally on carpus and distally on merus. Ambulatory legs generally dark orange to moderately light brownish-orange; dactyls each with white patch or band medianly or in distal half, with thin reddish-brown or red stripe on lateral and mesial face; propodi each with dark orange or reddish-brown patch dorsally and ventrally, lateral face with short brown stripe distally and short red, obliquely transverse ridges or simply faint mottling; carpi each with large orange and red or purple and reddish-brown spots on lateral and ventral surfaces, respectively; meri each with white stripe on lateral face adjacent to dorsal margin or partially banded light purple and tan.

Habitat.– Rocky or coarse sand substrates, found occupying a variety of gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula southward to Ohsumi Islands, Sea of Japan in southern part of Honshu mainland, Korea, Taiwan; 30-200 m.



Male (7.8 mm), Dasi fishing port, Yilan County, 18 Apr. 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Pagurus minutus Hess, 1865

Sinbao, Changhua County, 28 Mar 1997.

Datong, Changhua County, 30 Nov 1996.

Pagurus minutus Hess, 1865: 180 (in part); Sandberg & McLaughlin, 1993: 219, figs. 2, 4; Komai & Mishima, 2003: 16, figs. 1-6 (see for complete synonymy).

Eupagurus minutus– De Man, 1887: 705, fig. 2.

Eupagurus dubius Ortmann, 1892: 309 (in part), pl. 12, figs. 12, 14k.

Eupagurus similis– Doflein, 1902: 646 [not *Eupagurus similis* Ortmann, 1892].

Pagurus dubius– Kim, 1963: 300, fig. 17; Kim, 1973: 227, fig. 51, pl. 70, fig. 1a, b; Miyake, 1975: 326, pl. 115, fig. 4; Miyake, 1978: 99, fig. 38, pl. 1, fig. 6; Miyake, 1982: 127, pl. 43, fig. 2; Takeda, 1982: 67, fig. 200; Asakura, 1995: 363, pl. 97, fig. 10.

Not *Pagurus dubius*– Yu & Foo, 1991: 63, unnumbered fig. [= *Pagurus angustus* (Stimpson, 1858)].

? Not *Pagurus dubius*– Wang, 1991: 246, fig. 208; Wang, 1992: 61 (list) Wang, 1995: 570 (list) [see remarks under *Pagurus angustus*].

Material examined.– Siangshan, Hsinchu, 14 Jul 2000: 4 males (2.3-3.6 mm), 1 female (3.7 mm), (NTOU); Hsinchu County, 24 Jan 1999: 1 male (5.7 mm), 2 ovig. females (4.7, 5.7 mm), (NTOU); Tongsiao, Miaoli County, 12 Mar 1997: 1 male (4.7 mm), (NTOU); Datong, Changhua County, 30 Nov 1996: 2 ovig. females (5.1, 5.9 mm), (NTOU); Fubao, Changhua County, 28 Mar 1996: 1 male (5.4 mm), (NTOU); Sinbao, Changhua County, 28 Mar 1997: 2 males (3.9, 5.5 mm), 1 female (3.9 mm), 1 damaged specimen (2.7 mm), (NTOU).– 24 Apr 1997: 3 males (1.9-5.6 mm), 1 female (4.5 mm), (NTOU); Mailiao, Yunlin County, 1 Dec 1996: 1 ovig. female (4.1 mm), (NTOU); Taisi, Yunlin County, 16 Apr 1988: 2 males (4.3, 4.6 mm), 4 females (3.1-3.9 mm), (NTOU); Singda Harbor, Kaohsiung County, 31 Dec 1984: 1 male (4.2 mm), (NTOU); no specific locality, 3 Oct. 1986: 1 ovig. female (4.3 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum triangular or rounded. Ocular peduncles slightly shorter than shield, corneas weakly dilated; ocular acicles each with small submarginal spine. Antennular and antennal peduncles both reaching distal corneal margins or slightly beyond. Chelipeds unequal, with tendency in males for more elongate right; palm of right cheliped with dorsomesial margin delimited by row of spines in females but not delimited in males, dorsal surface with numerous scattered small spinules or tubercles, dorsolateral margin with row of larger spines; carpus with dorsomesial and dorsolateral margins not delimited, dorsal surface with scattered spinules and tubercles; merus with few scattered small tubercles and 1 prominent tubercle on ventral surface. Left cheliped with convex dorsal surface of palm armed in midline with 2 or 3 usually short rows of small spines, dorsolateral margin also with row of small spines, dorsomesial margin not delimited; dorsolateral and dorsomesial margins of carpus each with row of spines, dorsal surface unarmed; merus with most posterior spine of ventromesial row distinctly larger. Ambulatory legs with dactyls longer than propodi, lateral and mesial faces each with shallow longitudinal sulcus, ventral margins each with 8-20 corneous spines; propodi each with few corneous spinules on ventral surfaces, at least on second pereopods; carpi each with row of small spines on second and dorsodistal spine on third. Fourth pereopods with propodal rasps each consisting or 4 or 5 rows of corneous scales. Telson with posterior lobes separated by distinct median cleft, terminal margins horizontal to slightly oblique, each with prominent spine adjacent to cleft separated from outer 2 or 3 large spines by row of spinules.

Size.– Maximum reported shield length 7.4 mm.

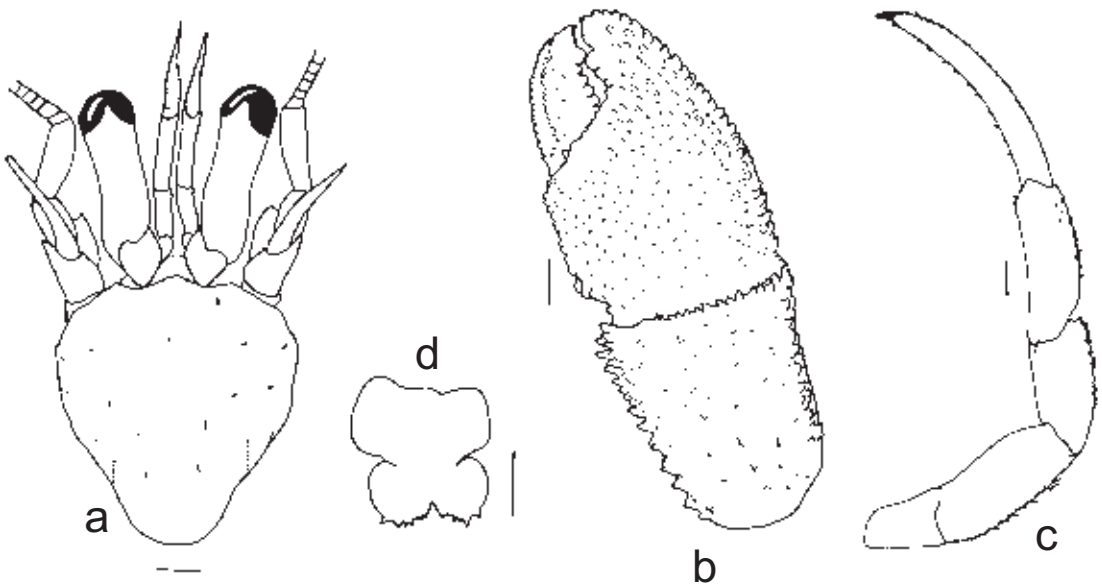
Coloration.– Shield generally light yellowish-brown to yellowish-green with darker brown or green markings. Ocular peduncles milky or yellowish-white, with tan, brown or grayish-brown median band and irregular markings of grayish-brown on dorsal surface. Right cheliped generally dark grayish-brown, olive-drab or greenish-blue, rarely reddish-brown; dactyl with poorly defined white median band and brown or grayish-blue patches; palm sometimes with white band at articulation of dactyl and fixed finger; carpus

grayish-brown to greenish-blue dorsally, with grayish-blue spots mesially and laterally; merus with transverse dark brown or olive-green band subdistally, lateral and mesial faces with white spots. Left cheliped similar. Ambulatory legs with base color of dactyl and propodus dark brown or olive, rarely reddish-orange or reddish-brown, carpi and meri grayish-brown, olive or greenish-blue; dactyls olive, tips white, brown or reddish-brown narrow median stripe on lateral face; propodi each with patch of white, yellowish-brown or greenish-white on lateral face at least distally; carpi each with broad median dark brown or bluish-green stripe on lateral face; meri each with poorly defined transverse band of dark brown or bluish-green on lateral face anterior to midlength.

Habitat.– Sandy and muddy intertidal flats and extending into estuarine zones.

Distribution.– Japan from southern Hokkaido to Kyushu and Okinawa Island, Primorye, Russia, Korea, northeastern coast of China, west coast of Taiwan; intertidal to 5 m.

Remarks.– As pointed out by Komai & Mishima (2003), the species identified as *Pagurus dubius* by Yu & Foo (1991) is not the species by that name found to be a junior synonym of *P. minutus*, but rather is *P. angustus* (Stimpson, 1858).



Ovig. female (5.9 mm), Datong, Changhua County, 30 Nov 1996: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Pagurus angustus (Stimpson, 1858)

Fulong, Taipei County, 23 Feb 2007.

Eupagurus angustus Simpson, 1858: 88; Stimpson, 1907: 225.

Pagurus dubius– Yu & Foo, 1991: 63, unnumbered figure [not *Pagurus dubius* (Ortmann, 1892)].

? *Pagurus dubius*– Wang, 1991: 247, fig. 206; Wang, 1992: 61 (list); Wang, 1995: 570 (list) [? not *Pagurus dubius* (Ortmann, 1892)].

Material examined.– Aodi, Taipei County, 20 May 2005: 1 male (3.7 mm), 3 females (2.8-4.6 mm), (NTOU), 4 juveniles (1.3-1.6 mm), (NTOU).– 6 Oct 2005: 3 males (1.7-4.2 mm), (NTOU).– 20 May 2006: 2 males (3.0, 3.6 mm), 3 females (1.9-4.1 mm), (NTOU).– 27 May 2006: 1 male (1.8 mm), (NTOU), 2 juveniles (1.2, 1.5 mm), (NTOU); Fulong, Taipei County, 12 Aug 2006: 2 males (2.2, 2.5 mm), 4 females (2.5-3.2 mm), (NTOU), 2 juveniles (1.4, 1.7 mm), (NTOU).– 23 Feb 2007: 1 male (5.4 mm), (NTOU); Gongliao, Taipei County, 20 May 2005: 1 male (3.2 mm), (NTOU).– 27 May 2005: 3 juveniles (1.0-1.2 mm), (NTOU); Longdong, Taipei County, Dec 1984: 1 male (3.2 mm), 2 females (2.0, 3.3 mm), (NTOU); Magang, Taipei County, 5 Feb 2007: 1 female (3.0 mm), (NTOU); Mao-ao, Taipei County, 25 Jun 2006: 2 males (2.0, 2.3 mm), 1 female (2.2 mm), 3 juveniles (1.8-1.8 mm), (NTOU).– 11 Aug 2006: 9 males (2.0-4.3 mm), 2 females (1.9, 2.1 mm), 17 juveniles (1.2-1.7 mm), (NTOU); Meiyanshan, Taipei County, 7 Oct 2005: 1 male (3.8 mm), (NTOU); Cingluo, Penghu County, 25 Apr 1992: 1 male (4.9 mm), (NTOU).– no specific date, 1 male (5.6 mm), (NTOU); Penghu County, 11 Oct 1984: 2 males (3.2, 4.1 mm), 2 females (2.2, 5.1 mm), (NTOU); Matsu, Lienchiang County, 1 May 1988: 9 males (4.1-6.3 mm), 1 ovig. female (4.7 mm), (NTOU); Wuciou, Kinmen County, 1 May 1988: 1 male (4.8 mm), (NTOU); no specific locality: 1 male (2.0 mm), (NTOU).

Diagnosis.– Shield longer than broad; rostrum broadly triangular. Ocular peduncles more than half length of shield, corneas very slight dilated; ocular acicles terminally acute. Antennular and antennal peduncles reaching approximately to distal corneal margins; antennal acicle not reaching beyond base of cornea. Third maxillipeds each with 3 accessory teeth on crista dentata. Right cheliped lacking appreciable setation; dorsomesial margin of palm not distinctly delimited, dorsolateral margin with row of moderately prominent spines, dorsal surfaces of chela and carpus each with irregular rows of spinose tubercles or small spines; ventral margin of merus with 1 prominent tubercle. Left cheliped with dorsal surface of chela roundly elevated in midline; palm with dorsomesial surface depressed, dorsolateral surface convex; spines of carpus prominent. Ambulatory legs somewhat laterally compressed; dactyls shorter to slightly longer than propodi, ventral margins each with 6-9 prominent corneous spines; lateral face of propodus of left third pereopod with irregular single or double row of small tubercles on or near ventral margin; dorsal margins of carpi of second pereopods each with 4-8 spines, third pereopods with only dorsodistal spine. Fourth pereopods each with propodal rasp consisting of 4-6 rows of corneous scales. Telson with posterior lobes separated by small median cleft; terminal margins weakly concave, each with row of very small corneous spinules.

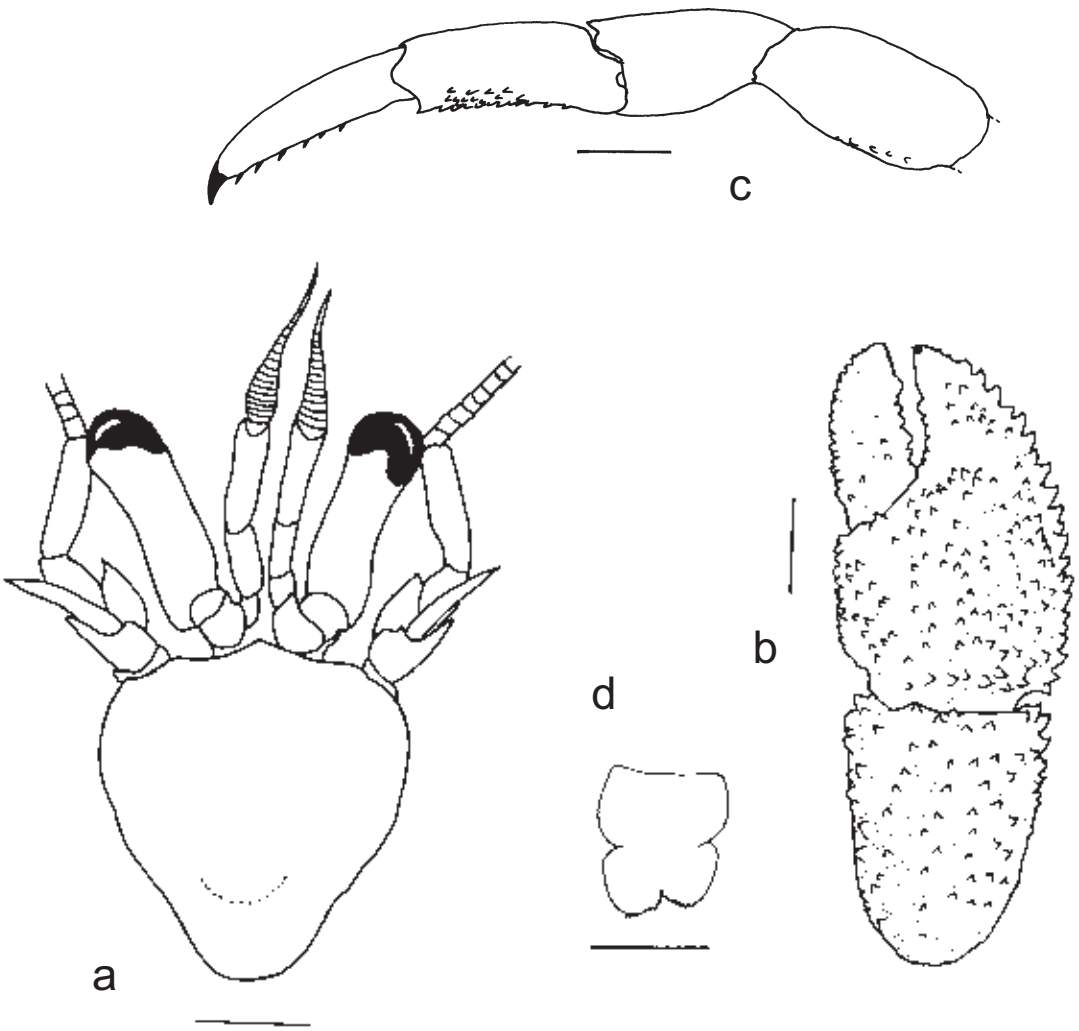
Size.– Maximum reported shield length approximately 6.5 mm.

Coloration.– Shield generally dark brown. Ocular peduncles white, each with brownish-olive to reddish-brown band at midlength. Antennular peduncles brownish-olive, flagella orange. Chelipeds dark brown to dark blue, fingers sometimes white. Ambulatory legs with dactyls reddish-brown to bluish-black in proximal halves, white distally except reddish-brown tips; propodi each with reddish-brown or bluish-black and white broad band and median reddish-brown to black narrow stripe on lateral face; carpi generally bluish-black with median black stripe; meri banded or striped in reddish-brown to bluish-black and white.

Habitat.– Gastropod shells.

Distribution.– Kikaiga-shima, Japan, Taiwan; intertidal and shallow subtidal.

Remarks.– As noted previously, this species, reported as *Pagurus dubius* by Yu & Foo (1991), was shown by Komai & Mishima (2003) not to represent Ortmann's (1892) taxon. Because Taiwan was included in the distributions of the taxon identified by Wang (1991) as *P. dubius*, it also is questionably included in the synonymy, as it is recognized that Wang may have confounded more than one species under that name. The Taiwanese species agrees well with Stimpson's (1858) description of *Pagurus angustus* from Japan, a species very poorly known. Stimpson did not describe the left third pereopod in *P. angustus* as having a series of tubercles on the lateral face of the propodus as the Taiwanese specimens have, but neither did Stimpson describe this character for a similar species, *Pagurus samuelis* (Stimpson, 1858) in which such armature is also present. Thus it is presumed that this omission in the descriptions of both species were simply oversights on the author's part. The species we interpret here as *P. angustus* has shorter ambulatory dactyls with fewer ventral marginal spines than *P. minutus*, the senior synonym of *P. dubius*.



Male (2.0 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b**, carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Scales equal 1 mm.

Pagurus nigrivittatus Komai, 2003

Fulong, Taipei County, 23 Feb 2007.

Pagurus pilosipes– Miyake & Imafuku, 1980b: 60, pl. 2, fig. 5; Miyake, 1982: 132, pl. 44, fig. 5; Oh, 1983: 106, pl. 1, figs. 3, 4, pl. 2, figs. 1-5; Takeda, 1986: 126, unnumbered fig.; Asakura, 1995: 363, pl. 97, fig. 9; Minemizu, 2000: 148, unnumbered fig. [not *Pagurus pilosipes* (Stimpson, 1858)].

Pagurus dubius– Matsukubo, 1999: 170, unnumbered fig. [not *Pagurus dubius* (Ortmann, 1892)].

Pagurus nigrivittatus Komai, 2003a: 141, figs. 16-19, 24D, 25B.

Material examined.– Aodi, Taipei County, 20 May 2006: 2 males (1.9, 1.9 mm), 1 female (1.7 mm), 3 specimens not sexed (1.3-1.6 mm), (NTOU).– 27 May 2006: 3 males (2.7-2.9 mm), 3 females (2.0-2.4 mm), 4 ovig. females (1.9-2.2 mm), 4 specimen not sexed (1.4-1.6 mm), (NTOU).– 6 Oct 2006: 3 males (1.8-3.4 mm), 4 females (1.7-2.1 mm), 4 specimen not sexed (1.3-1.6 mm), (NTOU); Fulong, Taipei County, 12 Aug 2006: 2 males (2.6, 3.3 mm), 1 female (2.4 mm), 2 specimen not sexed (1.4, 1.7 mm), (NTOU).– 23 Feb 2007: 1 male (3.1 mm), (NTOU); Magang, Taipei County, 5 Aug 1996, 2 males (2.6, 2.6 mm), 2 females (1.9, 2.5 mm), paratypes, (NTOU); Mao-ao, Taipei County, 25 Jun 2006: 32 males (1.8-3.5 mm), 10 females (2.1-2.8 mm), 14 specimen not sexed (1.0-1.7 mm), (NTOU).– 11 Aug 2006: 42 males (1.9-4.0 mm), 16 females (1.8-3.6 mm), 18 specimen not sexed (1.4-1.8 mm), (NTOU); Meiyanshan, Taipei County, 27 May 2006: 4 males (1.7-3.7 mm), 5 females (1.8-2.0 mm), 14 ovig. females (1.9-2.3 mm), (NTOU); Dasi, Yilan County: 1 male (3.9 mm), (NTOU).– no specific date: 2 males (3.8, 4.4 mm), (NTOU); Guoye, Penghu County, 23 Apr 1992: 6 males (1.8-2.1 mm), 4 females (2.0-2.2 mm), (NTOU); Wukan, Penghu County, 28 May 2002: 2 males (2.4, 3.6 mm), 1 female (2.8 mm), (NTOU).

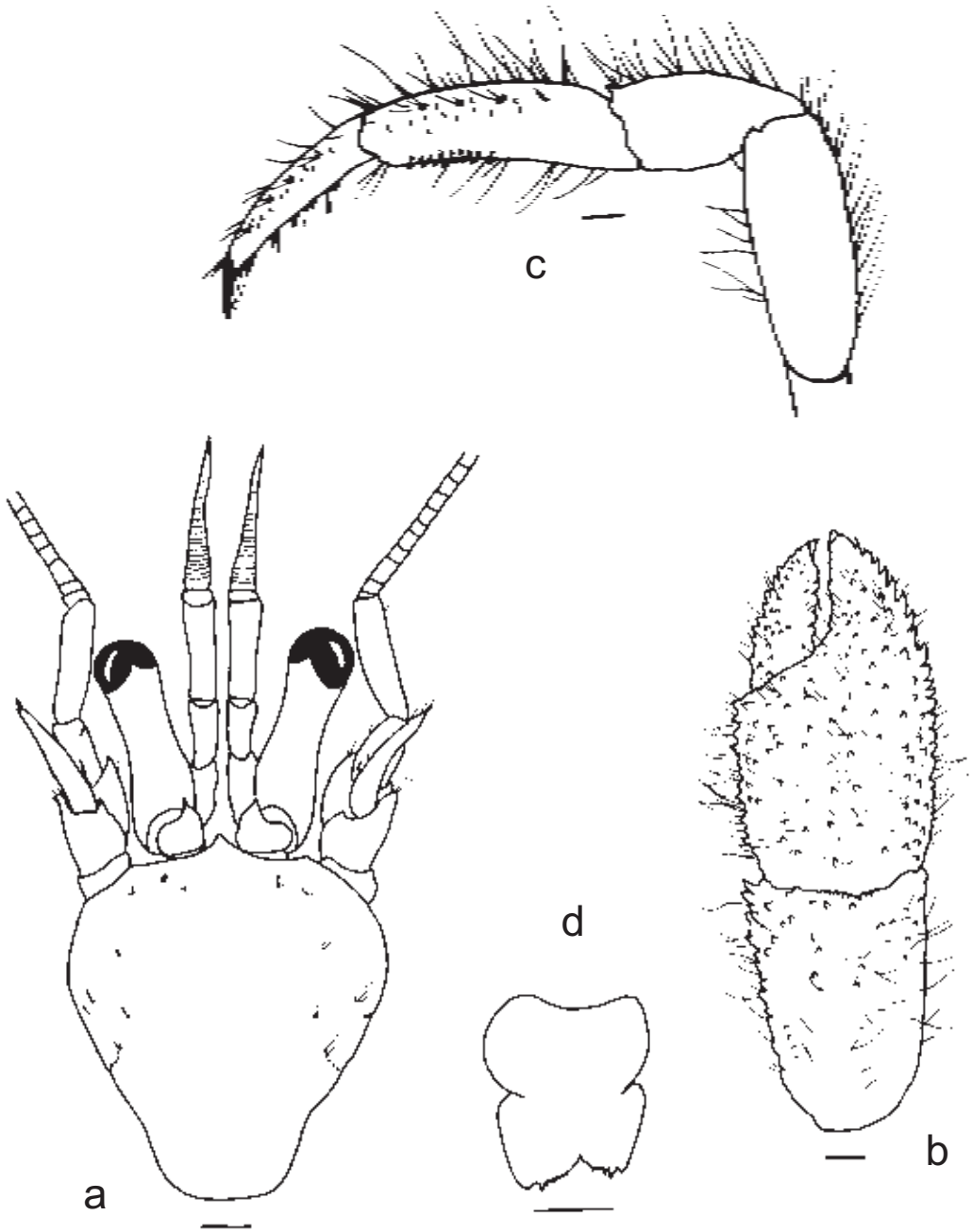
Diagnosis.– Shield length equaling width or slightly longer; rostrum triangular or rounded. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with small submarginal spine. Antennular peduncles reaching or slightly overreaching distal corneal margins; antennal peduncles not quite or just reaching distal corneal margins. Chelipeds with right larger, tufts of short and moderately long setae present but not concealing armature; palm of right cheliped with dorsomesial margin not delimited, convex dorsal surface with irregular rows of small spines, dorsolateral margin with row of moderately prominent spines; carpus with single or double row of small spines on dorsomesial margin, dorsolateral margin not delimited, dorsal surface with few small spines or tubercles. Left cheliped with dorsal surface of palm elevated in midline and armed with 2 rows of moderately small to large spines, dorsomesial margin not delimited, sloping dorsolateral surface with scattered small spines or tubercles, dorsolateral margin delimited by row of spines in females but not delimited in males; dorsomesial and dorsolateral margins of carpus each with row of moderately large spines, dorsal surface unarmed. Ambulatory legs with third pereopods dissimilar; dactyls slightly shorter to slightly longer than propodi, ventral margins each with 5-7 corneous spines, lateral face of left third with short rows of calcareous tubercles ventrally; propodi each with dorsal surfaces unarmed, lateral face and ventral surface of left third with rows of small calcareous tubercles at least in distal halves; carpi each with dorsodistal spine. Fourth pereopods each with propodal rasp consisting of 4 or 5 rows of corneous scales. Telson with posterior lobes separated by small median cleft, terminal margins somewhat oblique, each with 4 or 5 large spines, occasionally interspersed with few spinules.

Size.– Maximum recorded shield length 4.4 mm.

Coloration.– Shield light gray or brownish-gray, with few faint darker brown markings. Ocular peduncles bluish-white with brownish-gray band medially. Antennular peduncles light blue with dark median spot, flagella orange. Right cheliped generally dark brown, distal portion of dactyl whitish or whitish-tan; carpus with white stripe on dorsal surface mesially, mesial and lateral faces each with darker irregular spot-like markings; merus with white transverse band subdistally, lateral and mesial faces each with dark grayish-brown area irregularly spotted with white. Coloration of left cheliped similar, but mesial face of carpus with distinct dark stripe. Base color of ambulatory legs white or bluish-white, with distinct dark grayish-brown or reddish-brown stripes: dactyls dark grayish or reddish-brown dorsally and ventrally, lateral and mesial faces each with similar median stripe; propodi and carpi with white dorsal surfaces and dark grayish or reddish-brown ventral surfaces, lateral and mesial faces each with one dorsal and one median darker stripe; meri each with three slightly oblique reddish-brown stripes on lateral face.

Habitat.– Gastropod shells.

Distribution.– Pacific coast of Japan from Boso Peninsula to Kyushu, Mikuni, Fukui Prefecture, Sea of Japan, Taiwan; intertidal to 7 m.



Male (3.9 mm), Dasi, Yilan County, no specific date: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 0.5 mm.

Pagurus luticola Komai & Chan, 2006

CP71, holotype.

Pagurus luticola Komai & Chan, 2006: 240, figs. 1-5.

Material examined.– Dasi fishing port, Yilan County, 28 Oct 2002, 1 male (9.0 mm), paratype, (NTOU); Gueishan Island, vent st. 7, 24°52.171'N, 121°58.530'E, PCP, 247 m, 13 Jul 2005: 1 male (6.1 mm), 1 female (4.4 mm), paratypes, (NTOU); CP71, 24°52.33'N, 122°03.10'E, 600 m, 6 May 2001: 1 male (12.4 mm), holotype, (NTOU); CP120, 24°51.79'N, 122°02.54'E, 520-640 m, 31 July 2001: 2 males (3.4, 3.8 mm), 1 female (3.5 mm), paratypes, (NTOU); CP195, 24°52.02'N, 122°03.11'E, 605-572 m, 11 Sep 2002: 8 males (4.9-7.8 mm), 2 females (4.2, 5.7 mm), paratypes, 8 specimens infested with rhizocephalans, not paratypes, (NTOU); CP211, 24°40.49'N, 122°11.216'E, 517-518 m, 26 Aug 2003: 1 male (7.4 mm), paratype, (NTOU); CP234, 25°22.36'N, 122°31.8'E,550-549 m, 22 Jul 2004: 5 males (5.0-7.7 mm), 4 females (5.3-6.9 mm), partypes, (NTOU); CP248, 24°51.74'N, 122°02.43'E, 516-557 m, 28 Aug 2004: 1 male (5.0 mm), paratype, (NTOU); CP274, 24°47.76'N, 122°00.32'E, 338-277 m, 13 Jun 2005: 1 male (5.0 mm), 3 females (4.0-4.7 mm), paratypes, (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 1 male (4.8 mm), (NTOU); no specific locality: 1 male (10.4 mm), (NTOU).

Diagnosis.– Shield slightly longer than broad; rostrum triangular. Ocular peduncles more than half length of shield, corneas not dilated; ocular acicles each with small submarginal spine. Antennular and antennal peduncles overreaching distal margins of corneas. Chelipeds grossly unequal, spines of chelae and carpi practically concealed by tufts of long setae; right cheliped with mesial surface of dactyl covered with numerous, tiny, occasionally corneous-tipped granules, dorsomesial margin of palm weakly delimited by row

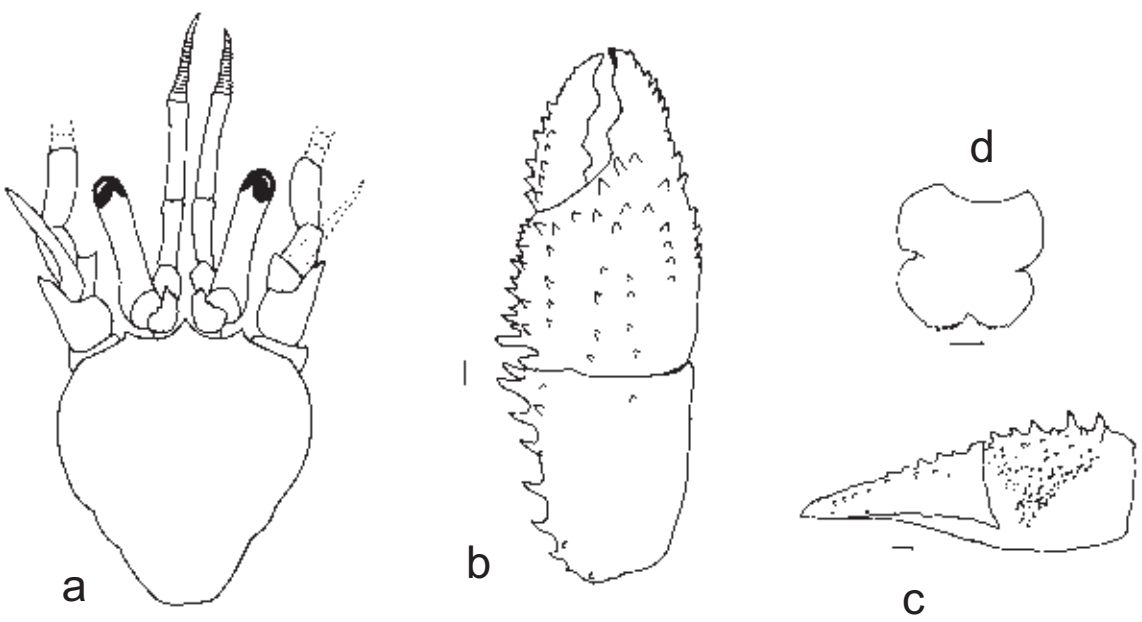
of large spines, convex dorsal surface with 5 or 6 irregular rows of large spines, dorsolateral margin not distinctly delimited on palm; carpus with row of large spines on dorsomesial margin, dorsal surface with few small spines, dorsolateral margin not delimited. Left cheliped with 3 or 4 irregular longitudinal rows of granules on mesial surface of dactyl; palm with dorsal surface elevated in midline, and armed with 2 irregular longitudinal rows of large spines, dorsolateral margin with single or double row of moderately small to large spines, mesial surface with several to numerous small granules or tubercles; dorsolateral margin of carpus with few low protuberances, dorsomesial margin with row of large spines. Ambulatory legs with dactyls slightly longer than propodi, ventral margins each with 8-12 slender corneous spines; propodi each with row of low transverse protuberances and tufts of long setae on dorsal surfaces; dorsal margins of carpi each with row of spines on right second or with dorsodistal spine and few small spines or spinulose tubercles on left second, only with dorsodistal spine on each third. Propodal rasp of fourth pereopod consisting of 3 or 4 rows of corneous scales. Telson with posterior lobes separated by small median cleft; terminal margins weakly oblique, each with row of 6-8 small, corneous-tipped spines.

Size.– Maximum shield length reported 12.4 mm.

Coloration.– Body generally pale orange or tan. Shield and telson each with pair of submedian longitudinal faint orange stripes. Ocular peduncles indistinctly mottled with orange and pale orange or tan patches. Chelipeds and ambulatory legs light or dull orange with scattered, indistinct white spots, but without conspicuous markings.

Habitat.– Muddy substrates; found using various gastropod shells, but with no associations with other invertebrates noted.

Distribution.– Known only from off northeastern Taiwan; 247-640 m.



Male (10.4 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** dactyl and palm of right cheliped (mesial view); **d,** telson. Scales equal 1 mm.

Pagurus confusus Komai & Yu, 1998

CP212.

Eupagurus obtusifrons– Yokoya, 1933: 85 (in part) [not *Eupagurus obtusifrons* Ortmann, 1892].

Pagurus obtusifrons– Miyake, 1978: 106, pl. 2, fig. 4; Miyake, 1982: 128, pl. 43, fig. 5; Baba, 1986: 203, 304, fig. 151; Yu & Foo, 1991: 65, unnumbered fig.; Okutani, 1994: 228, fig. 6 [not *Pagurus obtusifrons* (Ortmann, 1892)].

Pagurus confusus Komai & Yu, 1999: 197, figs. 6-9.

Material examined.– Dasi fishing port, Yilan County, 29 Feb 1988: 1 male (9.8 mm), (NTOU).– 1996: 1 male (9.2 mm), (NTOU).– 25 Feb 1997: 2 males (9.4, 11.0 mm), paratypes, (NTOU).– 28 May 1997: 1 female (8.9 mm), (NTOU).– 30 May 1997: 1 male (9.2 mm), (NTOU).– 20 Feb 1998: 6 males (9.0-10.7 mm), (NTOU).– 3 Mar 1998: 3 males (8.0-10.7 mm), (NTOU).– May 1998: 6 males (5.4-10.0 mm), 1 female (6.5 mm), 1 ovig. female (8.6 mm), (NTOU).– 28 Sep 2002: 1 male (7.3 mm), (NTOU).– 18 Apr 2005: 1 male (12.0 mm), (NTOU).– 11 Feb 2004: 1 ovig. female (8.9 mm), (NTOU); Nafang-ao fishing port, Yilan County, 22 Apr 1985: 3 males (7.2-9.6 mm), (NTOU).– 22 May 1990: 1 male (10.1 mm), (NTOU).– 21 May 1992: 1 female (7.7 mm), (NTOU).– 27 Aug 1996: 1 male (10.3 mm), paratype, (NTOU).– 28 May 1997: 1 male (8.0 mm), (NTOU).– 18 Nov 1997: 1 male (9.4 mm), paratype, (NTOU).– no specific date: 2 males (9.4, 11.0 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 male (6.3 mm), (NTOU); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 5 males (5.4-7.6 mm), 2 females (4.3, 5.3 mm), 1 ovig. female (5.1 mm), (NTOU); OCP293, 24°57.719'N, 122°04.693'E, 262-232 m, 8 Aug 2005: 3 males (4.8-9.1 mm), 2 females (4.8, 7.6 mm), (NTOU); "TAIWAN 2000": 1 male (6.7 mm), 1 female (4.1 mm), (NTOU); no

specific locality: 1 male (8.4 mm), (NTOU).– 2 males (8.4, 9.5 mm), (NTOU).– 13 Mar 1992: 1 male (10.3 mm), (NTOU).

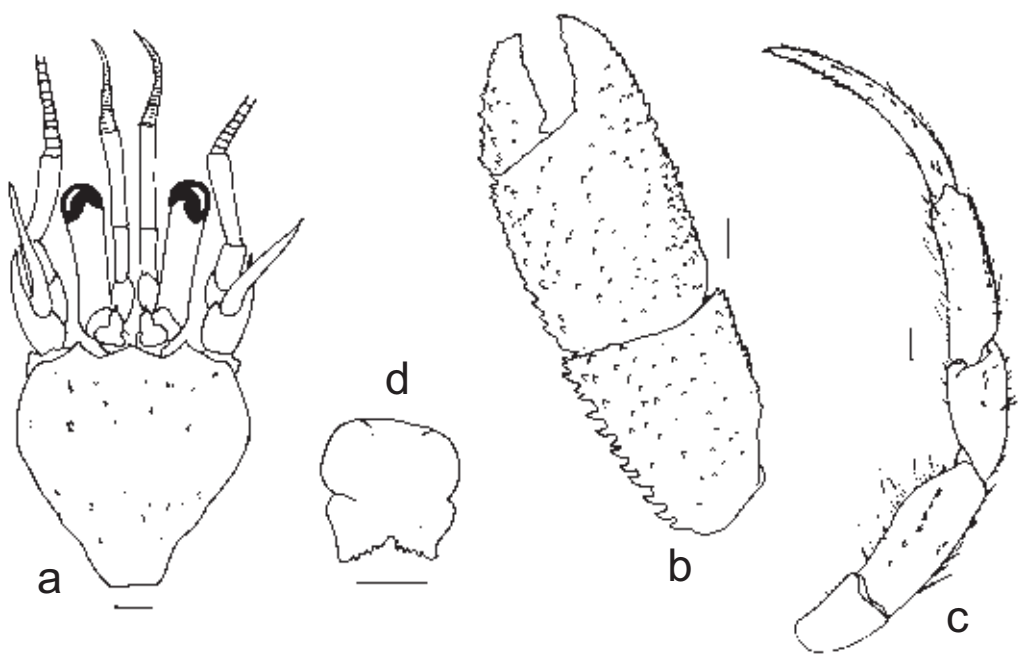
Diagnosis.– Shield length equal to width or slightly longer; rostrum broadly triangular. Ocular peduncles more than half shield length, corneas not noticeably dilated; ocular acicles each with prominent submarginal spine. Antennular and antennal peduncles reaching or more often overreaching distal corneal margins. Chelipeds grossly unequal, with armament of chelae and carpi generally concealed by long tufts of plumose setae. Right cheliped with irregular double row of spines on weakly delimited dorsomesial margin of palm, dorsal surface with 7-9 rows of spines, dorsolateral margin with prominent row of spines; carpus with row of moderately large spines on dorsomesial margin, dorsolateral margin not delimited, dorsal surface with few moderately small spines; merus without 1 or 2 very prominent spines or tubercles on ventral surface. Left cheliped with dorsal surface of palm convex, armed with submedian row of spines, dorsomesial margin not distinctly delimited but marked by few small spines, dorsolateral margin with row of distinct spines, not extending to tip of fixed finger; carpus with dorsomesial and dorsolateral row of spines. Ambulatory legs with rows of tufts of setae at least partially concealing armature; dactyls longer than propodi, ventral margins each with row of 27-35 very small corneous spines; propodi unarmed; carpi each with row of spines on second pereopods, third with dorsodistal spine and occasionally few small spines or spinules proximally. Propodal rasp of fourth pereopod consisting of 3 rows of corneous scales. Telson with posterior lobes separated by narrow median cleft, somewhat oblique terminal margins each with 4-7 small spines.

Size.– Maximum reported shield length 12.0 mm.

Coloration.– Shield, chelipeds and ambulatory legs generally yellowish or light reddish-brown, pinkish-red or orange. Ocular peduncles generally cream or white, with tinge of reddish-brown or pink proximally. Meri of ambulatory legs tending to show diffuse banding.

Habitat.– Gastropod shells.

Distribution.– Southern Japan from Tosa Bay to Bungo Strait, Taiwan; 90-262 m.



Male (12.0 mm), Dasi fishing port, Yilan County, 18 Apr. 2005: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view), **d,** telson. Setae partially omitted. Scales equal 2 mm.

Parapaguridae Smith, 1882

The common name applied to members of this family is deep-water hermit crabs because they are rarely captured in depths of less than 100 m, and for many species the depth distributions range between 200 and 5000 m. Of the ten genera recognized, five are monotypic and morphologically quite unusual hermit crabs. One of those five, *Tsunogaipagurus* Osawa, 1995, has now been found in Taiwanese waters, together with all five of the more typical genera.

Key to the Taiwanese genera of the family Parapaguridae

1. Rostrum obtusely triangular or broadly rounded; pleon twisted; uropods asymmetrical ……2
- Rostrum acutely triangular; pleon straight; uropods symmetrical ……*Tsunogaipagurus*
2. Shield distinctly broader than long; dactyls of ambulatory legs straight or nearly so, corneas prominently dilated; males with exopods of second pleopods rudimentary, endopods with distinctly twisted distal segments ……*Strobopagurus*
- Shield usually about as broad as long; dactyls of ambulatory legs curved; corneas weakly to moderately dilated; males with exopods of second pleopods usually absent, endopods with distal segments not twisted ……3
3. Vestigial pleurobranch present on each side of last (eighth) thoracic somite ……*Sympagurus*
- No vestigial pleurobranch on each side of last (eighth) thoracic somite ……4
4. Epistomial spine present, distinctly curved upward ……*Oncopagurus*
- Epistomial spine absent or if present, straight ……5
5. Gill lamellae biserial or only distally quadriserial; fourth segments of antennal peduncles each with dorsodistal spine; ocular peduncles at least half length of shield ……*Paragiopagurus*
- Gill lamellae deeply quadriserial; fourth segments of antennal peduncles without dorsodistal spine; ocular peduncles less than half shield length ……*Parapagurus*

Tsunogaipagurus Osawa, 1995

Tsunogaipagurus chuni (Balss, 1911) was originally collected off the African coast of Kenya, and was known only from Balss' (1911, 1912) descriptions and figures. Its discovery in the Izu Islands of central Japan was not only a major extension in the geographic range of the species, it afforded Osawa (1996) the opportunity to critically review its generic placement. It was subsequently collected in southwestern Japan and has now been found in Taiwan.

Tsunogaipagurus chuni (Balss, 1911)

Nanfang-ao fishing port, Yilan County, 10 Mar 2005.

Parapagurus chuni Balss, 1911: 3, figs. 3, 4; Balss, 1912: 101, figs. 11-13, 24, pl. 8, fig. 1, pl. 11, figs. 9, 10.
Sympagurus chuni– Lemaitre, 1989: 37 (list).
Tsunogaipagurus chuni– Osawa, 1995: 63, figs. 1-3; Osawa, 1996: 878, fig. 1.

Material examined.– Nanfang-ao fishing port, Yilan County, 10 Mar 2005: 1 male (6.6 mm), (NTOU).

Diagnosis.– Gills distally quadriserial. Shield longer than broad, well calcified; rostrum acutely triangular, produced beyond bases of ocular acicles. Ocular peduncles approximately half shield length, corneas dilated; ocular acicles each with prominent terminal spine. Antennular peduncles slightly overreaching distal margins of corneas; antennal peduncles reaching beyond bases of corneas but usually not beyond corneal margins; antennal acicle with terminal bifid spine and 3-5 spines on mesial margin. Right cheliped (missing in Taiwan specimen) with dorsal surface of palm covered with prominent tubercles at least partially concealed by long, plumose setae, ventral surface with covering of somewhat larger tubercles, but lacking setae; dorsomesial and dorsolateral margins of carpus each with row of spines, elevated dorsal midline also with row of spines. Left cheliped (missing in Taiwan specimen) with chela unarmed; carpus with dorsomesial and smaller dorsolateral spine on distal margin. Ambulatory legs with dactyls longer than propodi, ventral margins each with 3 or 4 spines; propodi unarmed; carpi each with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 1 row of conical scales. Male first gonopods (right with distal segment missing) with distal segment broadly subtriangular, partially rolled to form incomplete tube. Uropods symmetrical or nearly so. Telson with faint lateral indentations, posterior lobes generally symmetrical,

separated by shallow median cleft; terminal margins each with row of corneous spines, 1 distinctly thicker.

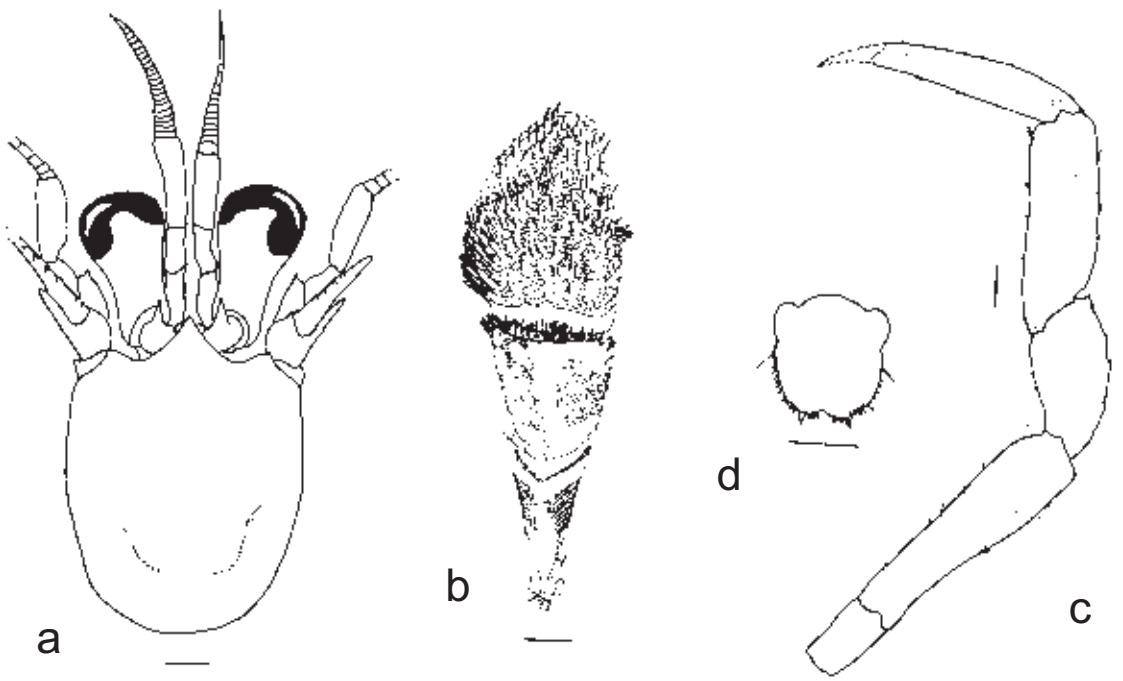
Size.– Maximum reported shield length 6.6 mm.

Coloration.– Shield creamy-white to reddish-orange. Ocular peduncles creamy-white or light orange proximally, with broad brown band distally. Antennular peduncles light orange. Chelipeds with broad red patch on each merus and carpus, left with similar patch on palm. Ambulatory legs white, each with red or reddish-orange patch on merus, carpus, propodus and dactyl.

Habitat.– Scaphapod shells, on shell and gravel substrates.

Distribution.– Eastern Africa, Izu Islands of Japan, Taiwan; 192-977 m.

Remarks.– The Taiwanese specimen lacks both chelipeds and the tips of the ambulatory dactyls are broken, but there is little doubt that the identification is accurate. This is the first report of the species in Taiwanese waters, and because of the unusual ornamentation of the right cheliped, it has been reproduced from Osawa's 1995, figure 3A and included in the current figure with the author's permission.



Male (6.6 mm), Nanfang-ao fishing port, Yilan County, 10 Mar 2005: **a,** Shield and cephalic appendages (aesthetascs omitted); **b,** right cheliped of female from Izu Islands (after Osawa, 1995); **c,** left third pereopod (lateral view); **d,** telson. Some setae omitted. Scales equal 1 mm.

Strobopagurus Lemaitre, 1989

Two of the three species assigned to *Strobopagurus* are found in Taiwan, but both have very broad, albeit somewhat disjunct distributions as may be seen in the diagnoses.

Key to the Taiwanese species of *Strobopagurus*

1. Antennal acicles with quite short spines on mesial margins in proximal halves; dorsomesial and dorsolateral margins of right chela rounded, with numerous small spines; length/height ratio of meri of second and third pereopods ≥ 3.0 ……*S. gracilipes*
- Antennal acicles with long spines on mesial margins in proximal halves; dorsomesial and dorsolateral margins of right chela each armed with single or double row of prominent spines; length/height ratio of meri of second and third pereopods ≤ 2.5 ……*S. sibogae*

Strobopagurus gracilipes (A. Milne-Edwards, 1891)

CP214.

Sympagurus gracilipes A. Milne-Edwards, 1891: 132; A. Milne-Edwards & Bouvier, 1894: 68, pl. 9, figs. 18-34; A. Milne-Edwards & Bouvier, 1900: 194, pl. 24, figs. 7, 8; Forest, 1954: 167, figs. 3, 7.

Parapagurus gracilipes– Forest, 1955: 103, pl. 3, figs. 8-11.

Strobopagurus gracilipes– Lemaitre, 1989: 36; Lemaitre, 1990: 225, figs. 3-5; Lemaitre, 2004a: 364, figs. 1E, 3C, D, 4H, I, 5F, G, 6, 8A-D.

Strobopagurus cf. *sibogae*– Poupin, 1993: 51 (abstract) [not *Strobopagurus sibogae* (de Saint Laurent, 1972)].

Strobopagurus cf. *gracilipes*– Lemaitre, 1994: 377, figs. 1, 2.

Not *Strobopagurus* aff. *gracilipes*– Zhadan, 1997: 77, figs. 15, 16 [= ? *Bivalvopagurus* sp.]

Material examined.– CP20, 22°21.0'N, 120°04.3'E, 720-766 m, 29 Jul 2000: 1 female (4.7 mm), (NTOU); CP55, 24°26.9'N, 122°18.1'E, 638-824 m, 4 Aug 2000: 1 male (damaged), (NTOU); CD139, 22°10.73'N, 120°14.1'E, 852-718 m, 23 Nov 2001: 1 female (4.2 mm), (NTOU); CP214, 24°28.59'N, 122°12.66'E, 490-1027 m, 27 Aug 2003: 4 males (5.2-6.1 mm), 8 ovig. females (3.8-5.2 mm), 4 specimens not sexed (4.3-5.7 mm), (NTOU); CP234, 25°22.36'N, 122°31.8'E, 550-549 m, 22 Jul 2004: 8 specimens not sexed (4.1-7.0 mm, 2 ovig.), (NTOU); CP371 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 5 males (3.6-5.8 mm), 2 females (4.0, 4.1 mm), 4 ovig. females (4.0-5.2 mm), (NTOU).

Diagnosis.– Gills biserial or distally quadriserial. Shield moderately well calcified; rostrum very broadly rounded, with short dorsal ridge. Ocular peduncles more than half length of shield; corneas somewhat dilated; ocular acicles each with prominent terminal spine. Antennular peduncles much longer than antennal

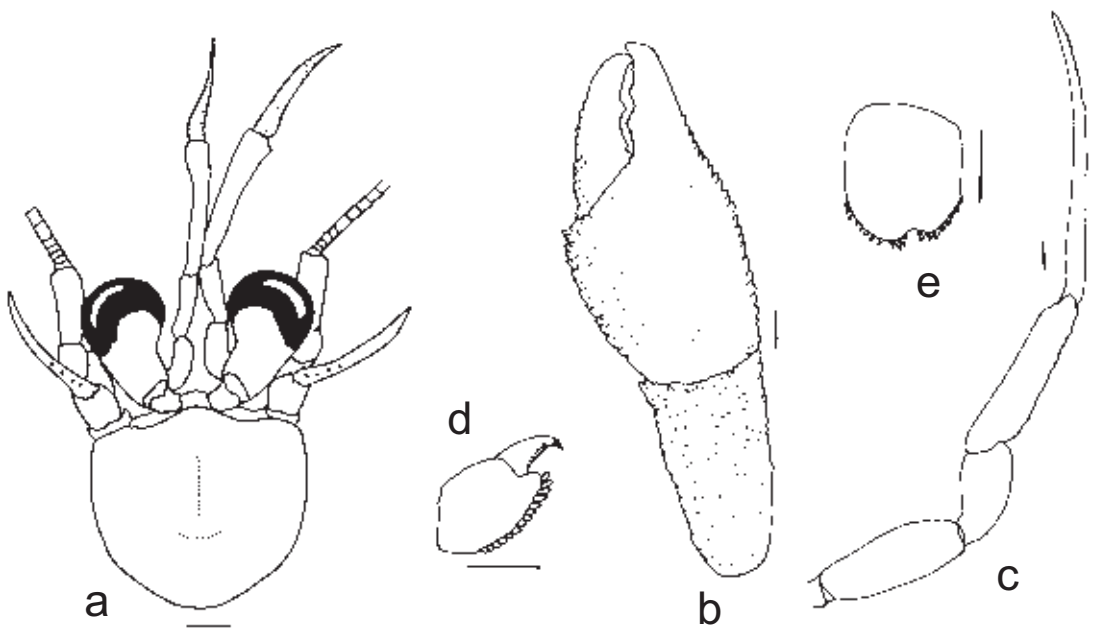
peduncles, but both overreaching distal corneal margins; antennal acicle also exceeding distal margin of cornea, with few to several small spines on mesial margin proximally. Chelipeds slender, usually iridescent; right cheliped with dorsal surface of chela unarmed or with few spinules on weakly delimited dorsomesial and dorsolateral margins; carpus with few small spines or spinules on dorsal surface, at least distally. Left - cheliped appreciably smaller than right; chela and carpus unarmed or latter with few dorsal and distal spines and with few scattered tufts of sparse setae. Ambulatory legs each with row of long spinules on dorsal margin of dactyl, propodus, carpus and merus; dorso-ventral heights of meri 3.0-3.5. Fourth pereopods each with short propodus, 1.5 times higher than long; propodal rasp consisting of 1 row of ovate scales. Telson with weakly delineated, but distinctly asymmetrical posterior lobes, each armed with row of corneous spines.

Size.– Maximum recorded shield length 8.9 mm.

Coloration.– Somewhat variable; shield and cephalic appendages white, light orange, or pinkish-orange. Antennular and antennal peduncles light red or orange. Chelipeds white, light orange or pinkish-orange, becoming darker near bases of fingers and distally on carpi. Ambulatory legs white or pink, most often with lateral faces of meri, carpi and propodi light orange or with light orange stripe; dactyls white distally, light orange proximally.

Habitat.– Gastropod shells frequently covered by actinians.

Distribution.– Eastern Atlantic from Portugal to Morocco, including Azores, Canary and Cape Verde Islands; Pacific from Hawaii to Taiwan, including French Polynesia, Solomon Islands, Vanuatu, and New Caledonia; 75-1200 m.



Female (4.7 mm), CP20: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of right fourth pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Strobopagurus sibogae (de Saint Laurent, 1972)

CP216.

Parapagurus sibogae de Saint Laurent, 1972: 116, figs. 10, 23.

Parapagurus kilburni Kensley, 1973: 285, figs. 1, 2.

Strobopagurus sibogae– Lemaitre, 1989: 36; Lemaitre, 1996: 167, fig. 1; Lemaitre, 2004a: 369, figs. 1F, 3E-H, 4J, K, 5H, I, 8E.

Strobopagurus kilburni– Lemaitre, 1989: 36.

Not *Strobopagurus* cf. *sibogae*– Poupin, 1993: 51 (abstract) [= *Strobopagurus gracilipes* (A. Milne-Edwards, 1891)].

Material examined.– Dasi fishing port, Yilan County, 25 May 1998: 1 male (9.0 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 23 Mar 1999: 1 male (7.9 mm), (NTOU); Donggang fishing port, Pingtung County: 1 male (7.2 mm), (NTOU); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 1 male (7.5 mm), (NTOU); CP212, 24°34.60'E, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 male (7.4 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 1 female (6.2 mm), (NTOU).

Diagnosis.– Gills biserial or distally quadriserial. Shield moderately well calcified, rostrum broadly rounded, with short dorsal ridge. Ocular peduncles more than half length of shield, corneas somewhat dilated; ocular acicles each with prominent terminal spine. Antennular peduncles much longer than antennal peduncles, but both overreaching distal corneal margins; antennal acicle also exceeding distal margin of cornea, with 5-7 prominent spines on mesial margin in proximal half. Right cheliped with dorsal surface of chela unarmed, dorsomesial and dorsolateral margins each with single or double row of prominent spines;

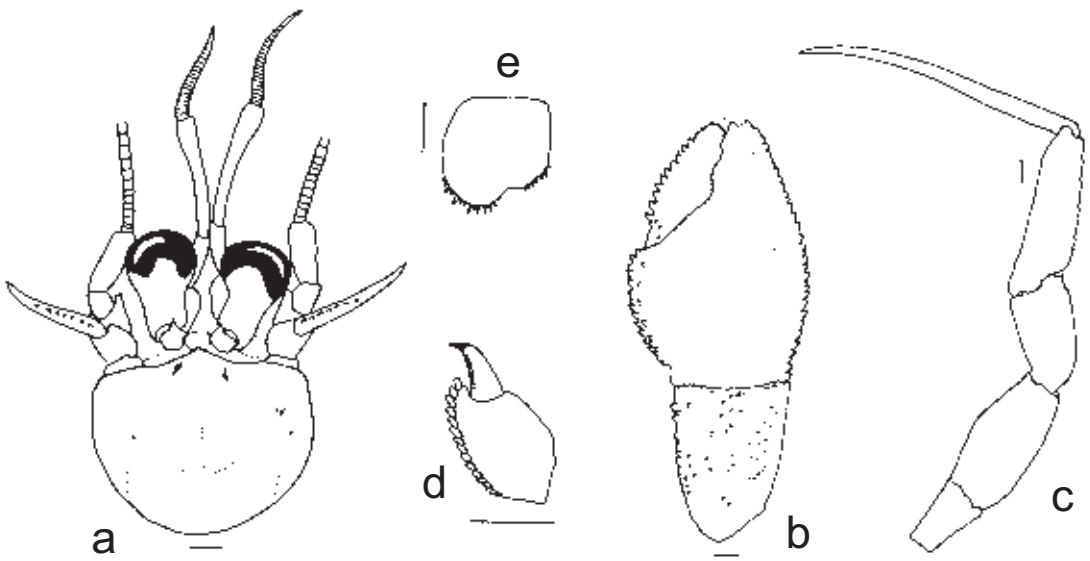
carpus with few small spines or spinules on dorsal surface, dorsomesial margin with 1 or 2 rows of small spines. Left cheliped with chela unarmed; carpus with few small spines on dorsal surface in distal half. Ambulatory legs each with row of long spiniform bristles on dorsal margin of dactyl, propodus, carpus and merus; dorso-ventral heights of meri 2.0-2.5. Fourth pereopods each with elongate propodus, length subequal to height; propodal rasp consisting of 1 row of rounded scales. Telson with weakly delineated, but distinctly asymmetrical posterior lobes, each armed with row of corneous, often distinctly curved spines.

Size.– Maximum reported shield length 9.0 mm.

Coloration.– Shield and cephalic appendages generally white or light whitish-orange. Antennules light orange. Chelipeds predominately light orange with white finger-tips, but chelae sometimes predominantly white, with dorsomesial faces light orange; carpi orange, each with dark orange on ventrolateral margin; meri each with dark orange band distally. Base color of ambulatory legs white or with faint orange tinge; dactyls light orange in proximal halves; propodi and carpi each with orange or reddish-orange stripe on lateral face dorsally and ventrally; meri each light orange proximally, fading to white distally, but with dark orange or reddish-orange band at dorsodistal margin.

Habitat.– Gastropod shells.

Distribution.– Mozambique, Madagascar, Australia, Indonesia, New Caledonia, Philippine Islands, South China Sea, Taiwan, Japan, Solomon Islands; 40-980 m.



Female (6.2 mm), CP216: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Sympagurus Smith, 1883

Species of *Sympagurus* are found worldwide, but with the preponderance located in the Indo-Pacific. Of the 17 recognized species, 14 are Pacific, although not necessarily restricted to this region. Of this number, half have been reported from Taiwan, and one, as far as presently known, is endemic to Taiwanese waters. Several species are particularly noteworthy because of their inferred mutualistic relationships with deep-sea anemones of the genus *Stylobates* Dall, 1903 (Williams & McDermott, 2004). In these relationships, species of this genus attach to small shells inhabited by the hermit crabs and then coat the shell with a chitinous parchment-like material that grows in the form of a coiled shell around the hermit's pleon. The anemone benefits from the hard surface provided that is otherwise unavailable in their particular environment and the hermit benefits from having a shell that grows as it does.

Key to the Taiwanese species of *Sympagurus*

1. Gills deeply quadriserial ……2
- Gills biserial or only distally quadriserial ……4
2. Corneas reduced, conical ……*S. acinops*
- Corneas not reduced, hemispherical ……3
3. Ocular acicles simple; dactylar claws of fourth pereopods long, particularly so in females ……*S. planimanus*
- Ocular acicles bi- or multifid; dactylar claws of fourth pereopods short in both sexes ……*S. affinis*
4. Shield distinctly broader than long ……*S. brevipes*
- Shield approximately as broad as long ……5
5. Propodal rasps of fourth pereopods each with 2 rows of ovate scales ……*S. chani*
- Propodal rasps of fourth pereopods each with 2 or more rows of conical scales ……6
6. Anterior ventrolateral margin of telson with long, slender corneous spines and bristle-like setae ……*S. burkenroadi*
- Anterior ventrolateral margin of telson without long, slender, corneous spines and bristle-like setae, at most with long simple setae ……*S. trispinosus*

Sympagurus acinops Lemaitre, 1989

CD210.

Sympagurus acinops Lemaitre, 1989: 52, figs. 24-27; Lemaitre, 2004b: 101, figs. 1b$_{1,2}$, 9, 10, 34.

Material examined.– CD210, 24°28.99'N, 122°12.79'E, 500-1183 m, 1 Jun 2003: 1 male (2.8 mm), (NTOU).

Diagnosis.– Gills deeply quadriserial. Shield approximately as long as broad, dorsal surface well calcified, except for narrow median region; rostrum rounded, with short ridge. Ocular peduncles slightly less to slightly more than half shield length, corneas reduced, subconical; ocular acicles each with prominent terminal spine. Antennular and antennal peduncles both overreaching distal corneal margins, antennular peduncles longest; antennal acicle long, mesial margin with 4-10 prominent spines over entire length and at least partially concealed by dense setae. Epistomial spine short and straight. Chelipeds both with sparse to moderately dense setae; right cheliped massive, dactyl articulating obliquely; dorsomesial and dorsolateral margins of palm each with row of spines or tubercles, dorsal surface with irregular rows of small spines in proximal half; carpus with dorsal covering of spines or tubercles. Left cheliped with few small spines dorsomesially on palm; carpus with prominent dorsodistal spine and smaller laterodistal spine or spinule. Ambulatory legs with dactyls much longer than propodi, dorsal and dorsomesial faces each with row of long setae, ventromesial margin with 4-7 spinules; carpi each with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales distally, often 2 rows proximally. Telson with posterior lobes separated by moderately broad, V-shaped median cleft, terminal margins each with row of corneous spines. Males with well developed, paired first and second gonopods.

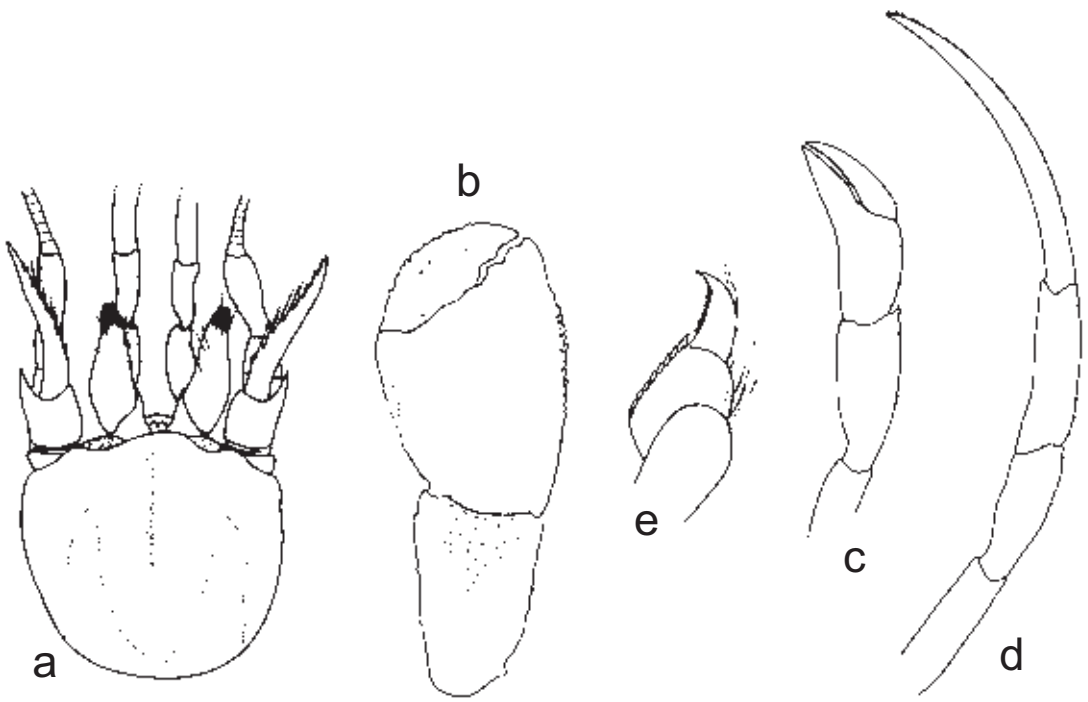
Size.– Maximum reported shield length 6.5 mm.

Coloration.– Shield and cephalic appendages generally pinkish-white. Ocular peduncles and acicles also pinkish-white. Chelipeds and ambulatory legs white or pinkish-white, with darker pinkish tint on proximal segments.

Habitat.– Gastropod shells, occasionally with one or more small actinian or zoanthid polyps, sometimes completely overgrown by zoanthid.

Distribution.– Tongue of the Ocean, Bahamas, western Atlantic, Canary Islands, eastern Atlantic, New Caledonia and Taiwan, western Pacific; 311-2537 m.

Remarks.– This is the first report of *Sympagurus acinops* in Taiwanese waters and represents a considerable extension of the range of this species in the western Pacific.



Male (2.8 mm), CD210: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** carpus and chela of left cheliped; **d,** left third pereopod (lateral view); **e,** dactyl and propodus of left fourth pereopod (lateral view). Setae partially omitted. Not to scale.

Sympagurus planimanus (de Saint Laurent, 1972)

CD138, male.

CP20, ovig. female.

Parapagurus planimanus de Saint Laurent, 1972: 109, figs. 4, 22.

Sympagurus planimanus– Lemaitre, 1989: 34; Lemaitre, 1994a: 387, figs. 9, 10; Lemaitre, 2004b: 109, figs. 1e1,2, 13, 35, 35b.

Material examined.– CP20, 22°21.0'N, 120°04.3'E, 720-766 m, 29 Jul 2000: 1 male (6.2 mm), 1 ovig. female (5.1 mm), (NTOU); CD133, 22°15.07'N, 120°08.02'E, 748-690 m, 21 Nov 2001: 3 males (5.5-7.0 mm), 1 female (4.4 mm), 1 ovig. female (6.6 mm), (NTOU); CD134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 male (5.9 mm), (NTOU); CD138, 22°13.13'N, 120°20.17'E, 441-789 m, 23 Nov 2001: 5 males (3.4-6.6 mm), 1 ovig. female (4.4 mm), (NTOU); CP139, 22°10.73'N, 120°14.1'E, 852-718 m, 23 Nov 2001: 1 ovig. female (3.7 mm), (NTOU); CD193, 22°22.84'N, 120°07.21'E, 812-900 m, 29 Aug 2002: 1 male (4.4 mm), 1 female (3.9 mm), (NTOU); CP299, 22°16.255'N, 120°03.083'E, 806-835 m, 11 Aug 2005: 2 specimens not sexed (5.4, 6.1 mm), (NTOU).

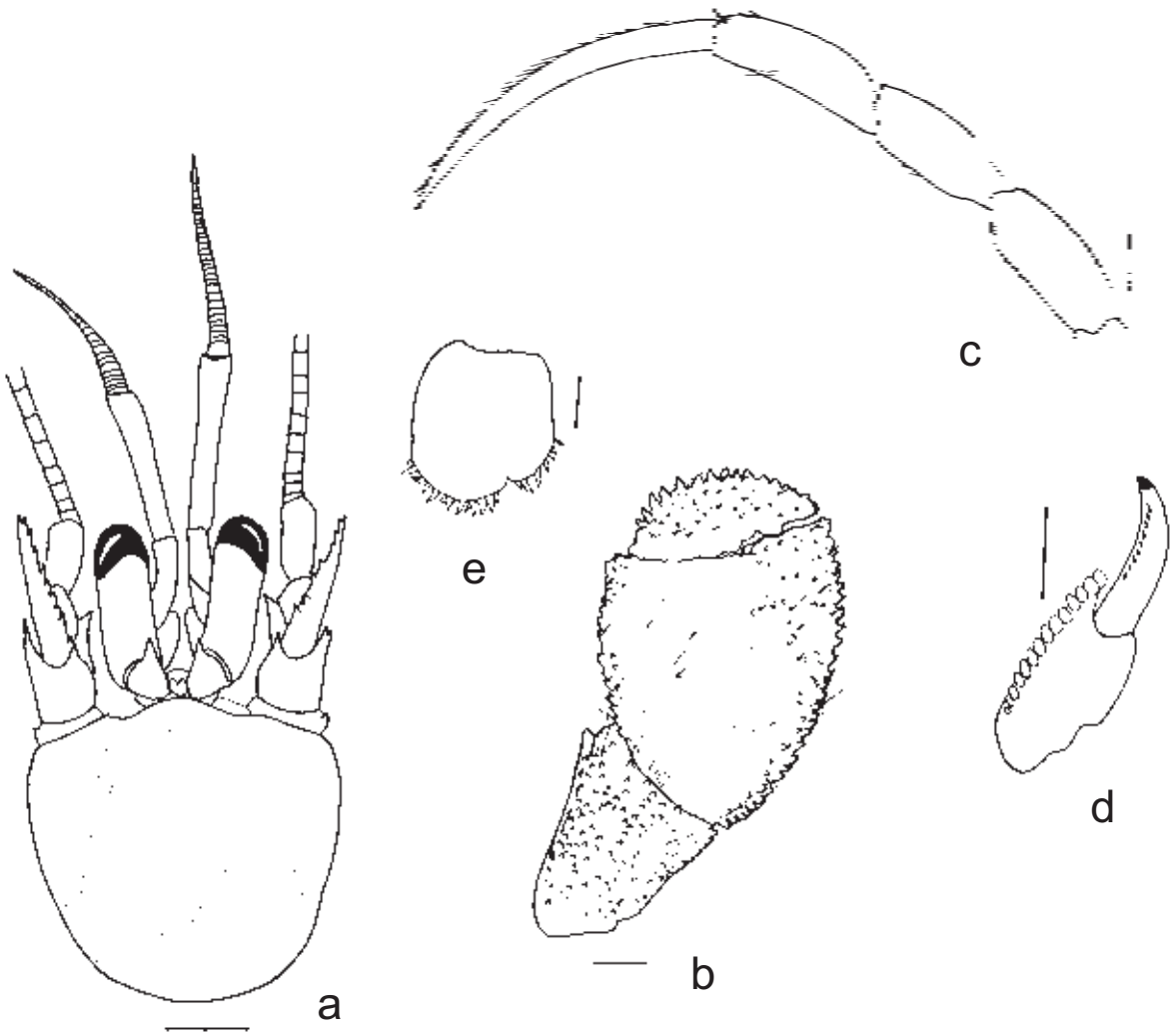
Diagnosis.– Gills deeply quadriserial. Shield approximately as long as broad, dorsal surface weakly calcified posteromedianly; rostrum broadly rounded, with short ridge. Ocular peduncles more than half shield length, corneas weakly, if at all dilated; ocular acicles each with prominent terminal spine. Antennular peduncles overreaching distal margins of corneas by lengths of penultimate segments; antennal peduncles exceeding distal corneal margins little if at all; antennal acicle long, mesial margin with 7-10 spines. Epistomial spine absent. Chelipeds both with moderately dense setation; right chela operculate, dactyl with deeply concave ventromesial surface; dorsomesial and dorsolateral margins of palm each with row of spines, dorsal surface unarmed; carpus with numerous scattered small spines or tubercles on dorsal surface. Left cheliped with unarmed chela; carpus with dorsodistal spine. Ambulatory legs with dactyls approximately twice length of propodi, each with 4-6 corneous spinules on ventromesial surface, row of bristle-like setae on dorsal surface; propodi unarmed; carpi each with dorsodistal spine. Fourth pereopod with 1 row of ovate corneous scales in propodal rasp; dactylar claw extremely long and curved in large females, somewhat shorter in smaller females and males. Telson with posterior lobes separated by broad concavity, terminal margins each with prominent corneous spines. Females often with vestigial right second pleopod.

Size.– Maximum reported shield length 7.0 mm.

Coloration.– Shield cream to white or tan with patches of light orange or reddish-orange. Ocular, antennular and antennal peduncles light orange with some cream or white. Dorsal surfaces of right cheliped and left chela whitish or yellowish-tan; carpus of left cheliped light orange or tan; meri of both chelipeds light reddish-orange. Ambulatory legs light orange or orangish-tan, but whitish on dorsal surfaces of carpi.

Habitat.– Gastropod shells.

Distribution.– South China Sea, Taiwan, Indonesia, Australia, French Polynesia; 100-1450 m.



Ovig. female (3.7 mm), CP139: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm (a-c) and 0.5 mm (d, e).

Sympagurus affinis (Henderson, 1888)

CP214.

Parapagurus affinis Henderson, 1888: 90, pl. 9, fig. 4.

Sympagurus affinis– Lemaitre, 1989: 37; Lemaitre, 1994: 379 (in part), figs. 3, 4, 28a; Zhadan, 1997: 70, figs. 10-12; Lemaitre, 2004b: 110, figs. 1f$_{1,2}$, 14, 34, 35d.

Material examined.– CP55, 24°26.9'N, 122°18.1'E, 638-824 m, 4 Aug 2000: 1 male (9.6 mm), (NTOU); CP214, 24°28.59'N, 122°12.66'E, 490-1027 m, 27 Aug 2003: 2 specimens not sexed (3.6, 5.3 mm), (NTOU); CD230, 22°19.32'N, 120°03.3'E, 795-840 m, 30 Aug 2003: 1 male (5.0 mm), (NTOU); PCP332, 22°13.975'N, 120°00.224'E, 961-1026 m, 5 Oct 2005: 1 male (9.4 mm), (NTOU); PCP342, 22°16.648'N, 119°59.960'E, 988-1010 m, 8 Mar 2006: 1 male (8.8 mm), 1 female (8.6 mm), 1 ovig. female (10.5 mm), (NTOU).

Diagnosis.– Gills deeply quadriserial. Shield approximately as long as broad, dorsal surface weakly calcified posteromedianly; rostrum broadly rounded, with short ridge. Ocular peduncles more than half shield length, corneas weakly dilated; ocular acicles each with bi- or multifid terminal spine. Antennular peduncles overreaching distal margins of corneas by at least lengths of ultimate segments; antennal peduncles exceeding distal corneal margins by half lengths of fifth segments; antennal acicle moderately long, mesial margin with 9-11 spines, partially hidden by long setae. Epistomial spine absent. Carpi and chelae of chelipeds both with dense, plumose setae; right cheliped with ventromesial surface of dactyl weakly concave; dorsomesial and dorsolateral margins of palm each with irregular rows of spines, dorsal surface unarmed or with scattered small tubercles; carpus with numerous small spines or tubercles on dorsal surface. Left cheliped with

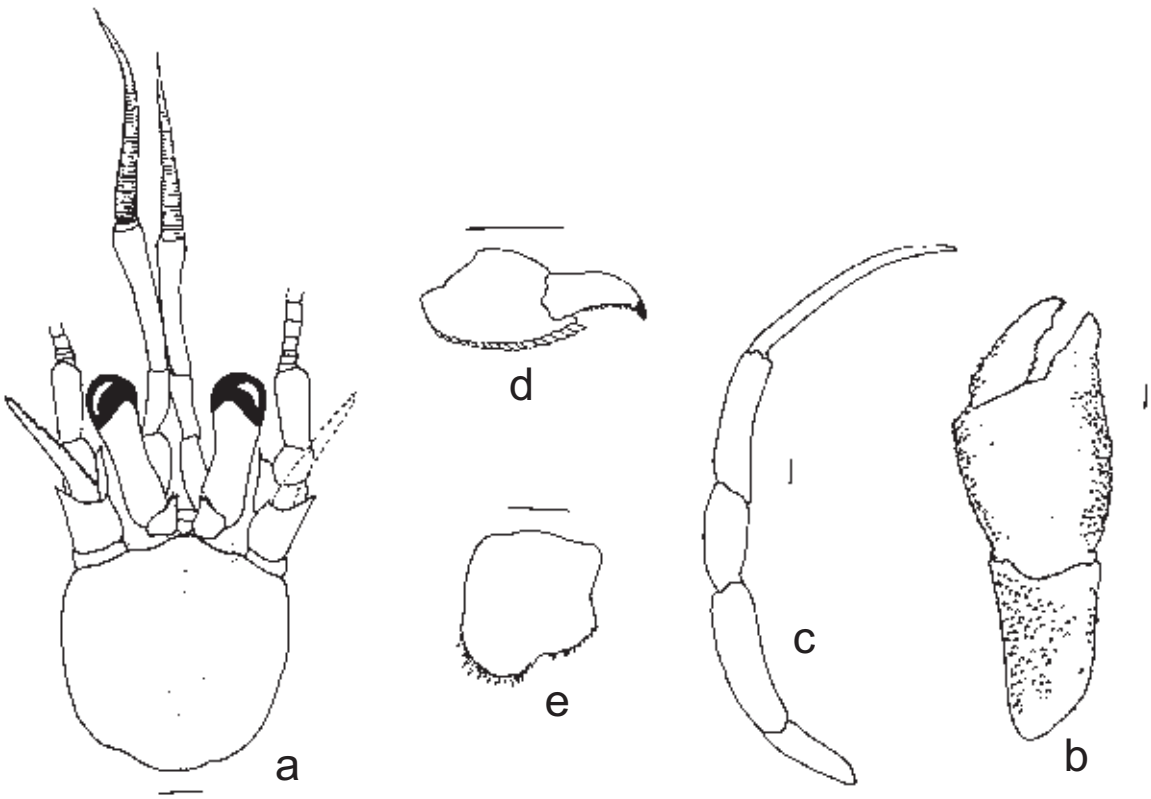
unarmed chela; carpus with dorsodistal spine. Ambulatory legs each with row of bristle-like setae on dactyl, propodus, carpus and merus; dactyl also with row of 9 or 10 corneous spinules on ventromesial surface; carpus with dorsodistal spine. Fourth pereopod with short dactylar claw; propodal rasp consisting of 1 row of ovate scales. Telson with posterior lobes separated by shallow, U-shaped median cleft, terminal margins each with row of corneous spines.

Size.– Maximum reported shield length 11.3 mm.

Coloration.– Shield creamy-yellow and reddish-orange to pink and reddish-orange. Ocular peduncles striped white or pink and reddish-orange. Chelae of chelipeds creamy-yellow to white with reddish-orange tint; carpi creamy-white to reddish-orange; meri white with reddish-orange transverse band or entirely reddish-orange. Ambulatory legs; with white dactyls tipped in reddish-orange; propodi and carpi each with reddish-orange stripe or large patch on lateral face; meri each with arcing band of reddish-orange on lateral face or segment entirely reddish-orange.

Habitat.– Gastropod shells usually with actinian polyps attached.

Distribution.– Madagascar, Australia, New Guinea, Indonesia, New Caledonia and environs, Philippine Islands, Taiwan, eastern Japan, Vanuatu, French Polynesia, Hawaii, Nazaca and Sala y Gomez Ridges; 147-1450 m.



Male (9.6 mm), CP55: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** dactyl and propodus of right fourth pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Sympagurus brevipes (de Saint Laurent, 1972)

Nanfang-ao fishing port, Yilan County, 5 Dec 1997.

Parapagurus arcuatus var. *monstrosus*– Balss, 1912: 99, pl. 10, fig. 3 [not *Oncopagurus monstrosus* (Alcock, 1894)].

Parapagurus brevipes de Saint Laurent, 1972: 105, figs. 2, 14.

Sympagurus brevipes– Lemaitre, 1989: 37; Lemaitre, 1996: 170, figs. 2, 3a, b, 4, 5a, 6; Lemaitre, 2004b: 124, figs. 1h1,2, 25, 26a, 34, 35c.

Material examined.– Nanfang-ao fishing port, Yilan County, 5 Dec 1997: 1 male (14.2 mm), (NTOU); CD136, 22°07.75'N, 120°00.87'E, 1211-998 m, 22 Nov 2001: 1 female (7.4 mm), (NTOU); CD139, 22°10.73'N, 120°14.1'E, 852-718 m, 23 Nov 2001: 1 female (4.9 mm), (NTOU); CD140, 22°11.4'N, 120°22.58'E, 452-280 m, 23 Nov 2001: 1 specimen not sexed (9.4 mm), (NTOU); CP170, 22°12.09'N, 120°24.50'E, 330-405 m, 26 May 2002: 1 ovig. female (12.7 mm), (NTOU); CD194, 22°11.6'N, 120°23.82'E, 402-505 m, 29 Aug 2002: 1 ovig. female (11.6 mm), (NTOU); PCP343, 22°15.699'N, 120°02.131'E, 945-1059 m, 8 Mar 2006: 2 males (7.0, 12.6 mm), 1 ovig. female (16.7 mm), (NTOU); no specific locality: 1 specimen not sexed (4.8 mm), (NTOU).

Diagnosis.– Gills biserial or only distally quadriserial. Shield broader than long, dorsal surface weakly calcified medianly; rostrum triangular, with short ridge. Ocular peduncles more than half shield length, corneas weakly dilated; ocular acicles each with simple, rarely bifid, terminal spine. Antennular peduncles overreaching distal margins of corneas by at least lengths of ultimate segments; antennal peduncles reaching to or only slightly exceeding distal corneal margins; antennal acicles moderately long, mesial margins each with

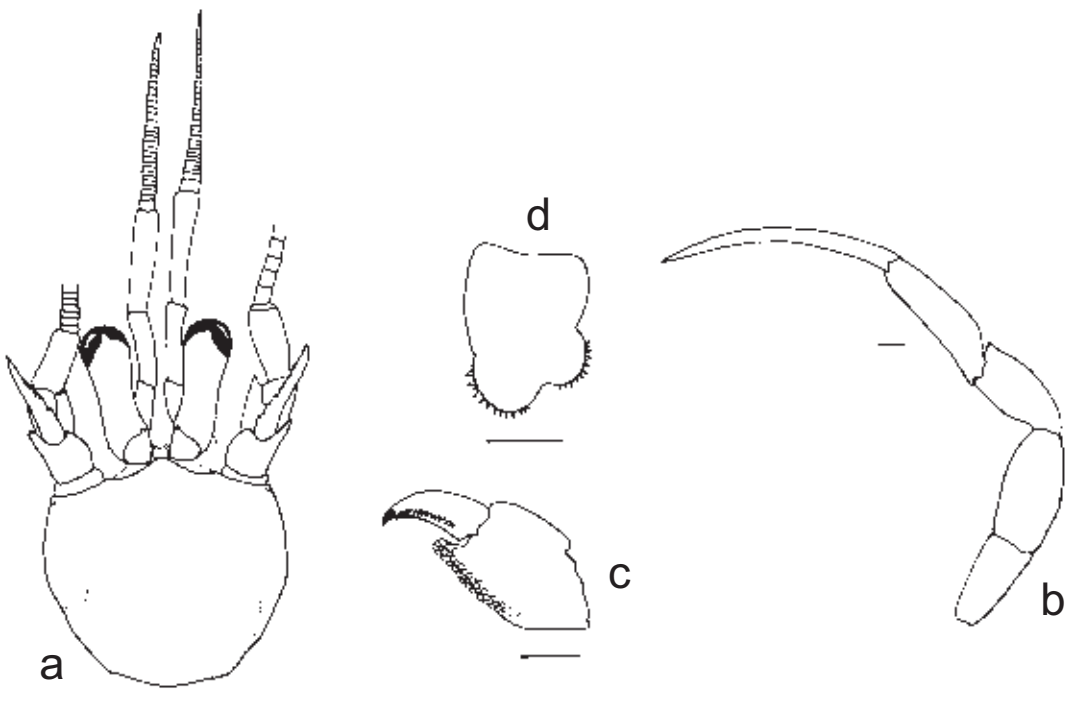
9-12 spines, partially hidden by long setae. Epistomial spine short, straight or absent. Carpi and chelae of chelipeds both with dense, plumose setae; right cheliped with ventromesial surface of dactyl weakly concave; dorsomesial and dorsolateral margins of palm each with irregular rows of spines, dorsal surface unarmed; carpus with numerous small spines or tubercles on dorsal surface. Left cheliped with unarmed chela; carpus with dorsodistal spine and row of 2-4 spines on dorsal surface mesially. Ambulatory legs each with row of bristle-like setae on dorsal surface of dactyl, row of 20-25 corneous spinules on ventromesial surface, 3 dorsomesial oblique rows of long setae distally; carpus with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 4-6 rows of ovate scales. Telson with posterior lobes separated by shallow, V-shaped median cleft, terminal margins each with row of corneous spines.

Size.– Maximum reported shield length 26.0 mm.

Coloration.– Generally creamy-white. Shield with light reddish-orange patches. Ocular peduncles reddish-orange dorsolaterally, white dorsomesially. Antennular and antennal peduncles light reddish-orange or orange. Chelae and carpi of chelipeds whitish, with faint reddish-orange tint, and frequently dark reddish-orange proximally on left carpus; meri each with reddish-orange stripe or patch dorsally in proximal half. Ambulatory legs with lateral faces of meri generally reddish-orange or white with large reddish-orange patch or stripe; carpi and propodi each with lateral reddish-orange stripe; dactyls white with orange or reddish-orange tips.

Habitat.– Frequently associated with actinian-secreted carcinoecium similar to that of *Stylobates*; occasionally occupying gastropod shells with attached actinian or other epifauna.

Distribution.– Zanzibar, Madagascar, Australia, Indonesia, New Caledonia, Vanuatu, Philippine Islands, South China Sea, Taiwan; 210-1300 m.



Specimen not sexed (4.8 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** left third pereopod (lateral view); **c,** dactyl and propodus of left fourth pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm (**a, b, d**) and 2 mm (**c**).

Sympagurus chani Lemaitre, 2004

CP32, holotype.

Sympagurus chani Lemaitre, 2004b: 131, figs. 28, 29, 34, 35e.

Material examined.– CP32, 22°01.7'N, 120°11.1'E, 910-1129 m, 30 Jul 2000: 1 male (6.4 mm), holotype, (NTOU); CD 134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 male (not measured), (NTOU); PCP333, 22°13.612'N, 120°01.917'E, 889-1037 m, 5 Oct 2005: 2 females (7.0, 7.0 mm), another not measured), (NTOU).

Diagnosis.– Gills biserial or only distally quadriserial. Shield approximately as long as broad, dorsal surface generally well calcified; rostrum bluntly triangular, with short ridge. Ocular peduncles more than half shield length, corneas slightly to somewhat dilated; ocular acicles each with bifid terminal spine. Antennular peduncles overreaching distal margins of corneas by at least lengths of ultimate segments; antennal peduncles exceeding distal corneal margins by half lengths of fifth segments; antennal acicle long, mesial margin with 5-7 spines, partially hidden by long setae. Epistomial spine short and straight. Dense setae on dactyl and fixed finger of right cheliped dorsally and ventrally, on mesial and lateral margins of palm and carpus and on ventral surfaces of carpus and merus; palm also with rows of small spines on dorsomesial and dorsolateral margins; carpus with numerous small spines on dorsal surface. Left cheliped with moderately dense setae; chela unarmed; carpus with dorsodistal spine. Ambulatory legs each with dorsal and dorsomesial row of long setae on dactyl, row of 6-8 corneous spinules on ventromesial surface; propodus and carpus setose dorsally, carpus also with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 2 rows of ovate scales. Telson with posterior lobes separated by shallow, V-shaped median cleft, terminal margins each with row of corneous

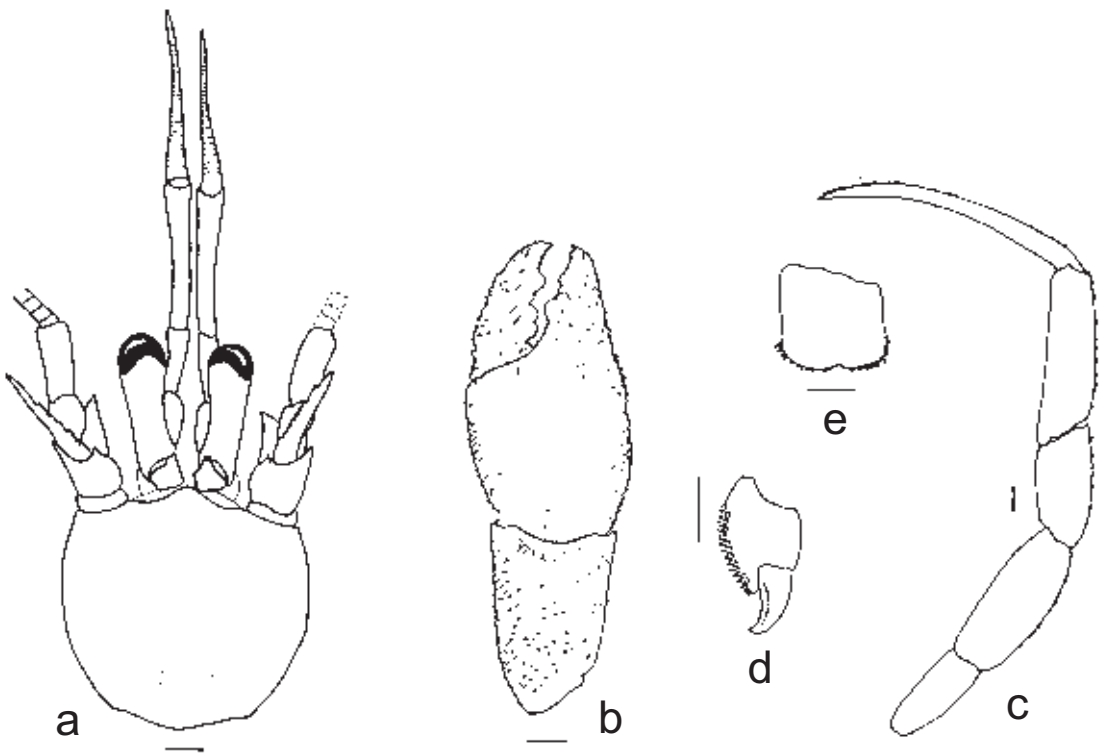
spines.

Size.– Maximum reported shield length 7.0 mm.

Coloration.– Shield mottled white and red or reddish-orange. Ocular peduncles white dorsally, reddish mesially and laterally or reddish to reddish-orange proximally and white distally. Right cheliped white with reddish patch on lateral face of merus proximally. Left cheliped primarily white with reddish patches dorsomesially on fingers and lateral face of merus proximally or with palm and dorsal surface of carpus white, fixed fingers, lateral and mesial faces of carpus and entire merus reddish to reddish-white. Ambulatory legs white dorsally and laterally, reddish mesially and ventrally or white dorsally on all segments, ventral surfaces and varying portions of mesial and lateral faces reddish-orange.

Habitat.– Gastropod shells.

Distribution.– Taiwan; 736-1129 m.



Male holotype (6.4 mm), CP32: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of right fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Sympagurus burkenroadi Thompson, 1943

Nanfang-ao fishing port, Yilan County, 29 Jul 2004, male.

CD203, ovig. female.

Sympagurus burkenroadi Thompson, 1943: 419, fig. 1; Lemaitre, 2004b: 134, figs. 1j$_{1,2}$, 30, 34.
Sympagurus papposus Lemaitre, 1996: 180, figs. 3c, d, 5b, 8-10; Lemaitre, 2000: 211, fig. 67.
Parapagurus dofleini– de Saint Laurent, 1972: 105 (in part) [not *Parapagurus dofleini* Balss, 1912].

Material examined.– Nanfang-ao fishing port, Yilan County, 21 Dec 1990: 1 ovig. female (20.2 mm), (NTOU).– 29 Jul 2004: 2 males (13.2, 14.4 mm), (NTOU); CD133, 22°15.07'N, 120°08.02'E, 748-690 m, 21 Nov 2001: 1 male (12.4 mm), 1 ovig. female (10.5 mm), (NTOU); CD135, 22°17.21'N, 120°00.28'E, 961-1112 m, 22 Nov 2001: 1 male (12.8 mm), (NTOU); CD137, 22°12.92'N, 120°25.93'E, 316-477 m, 23 Nov 2001: 1 male (12.1 mm), (NTOU); CD193, 22°22.84'N, 120°07.21'E, 812-900 m, 29 Aug 2002: 2 specimens not sexed (6.0, 6.7 mm), (NTOU); CD194, 22°11.6'N, 120°23.82'E, 402-505 m, 29 Aug 2002: 1 male (7.6 mm), (NTOU); CD203, 22°00.2'N, 120°28.94'E, 635-868 m, 29 May 2003: 1 male (10.9 mm), 2 ovig. females (9.4, 16.1 mm), (NTOU); CP214, 24°28.59'N, 122°12.66'E, 490-1027 m, 27 Aug 2003: 1 male (18.2 mm), (NTOU); CD229, 22°13.35'N, 120°01.9'E, 1060-880 m, 30 Aug 2003: 1 male (12.2 mm), (NTOU); CD271, 22°20.19'N, 120°07.02'E, 703-785 m, 28 Dec 2004: 2 males (10.0, 14.5 mm), 2 females (8.4, 11.1 mm), (NTOU); CP300, 22°14.555'N, 119°58.719'E, 960-972 m, 11 Aug 2005: 1 female (4.9 mm); no specific locality: 1 male (16.9 mm), 1 female (12.7 mm), (NTOU).– 21 Apr 1995: 1 male (10.0 mm), (NTOU).

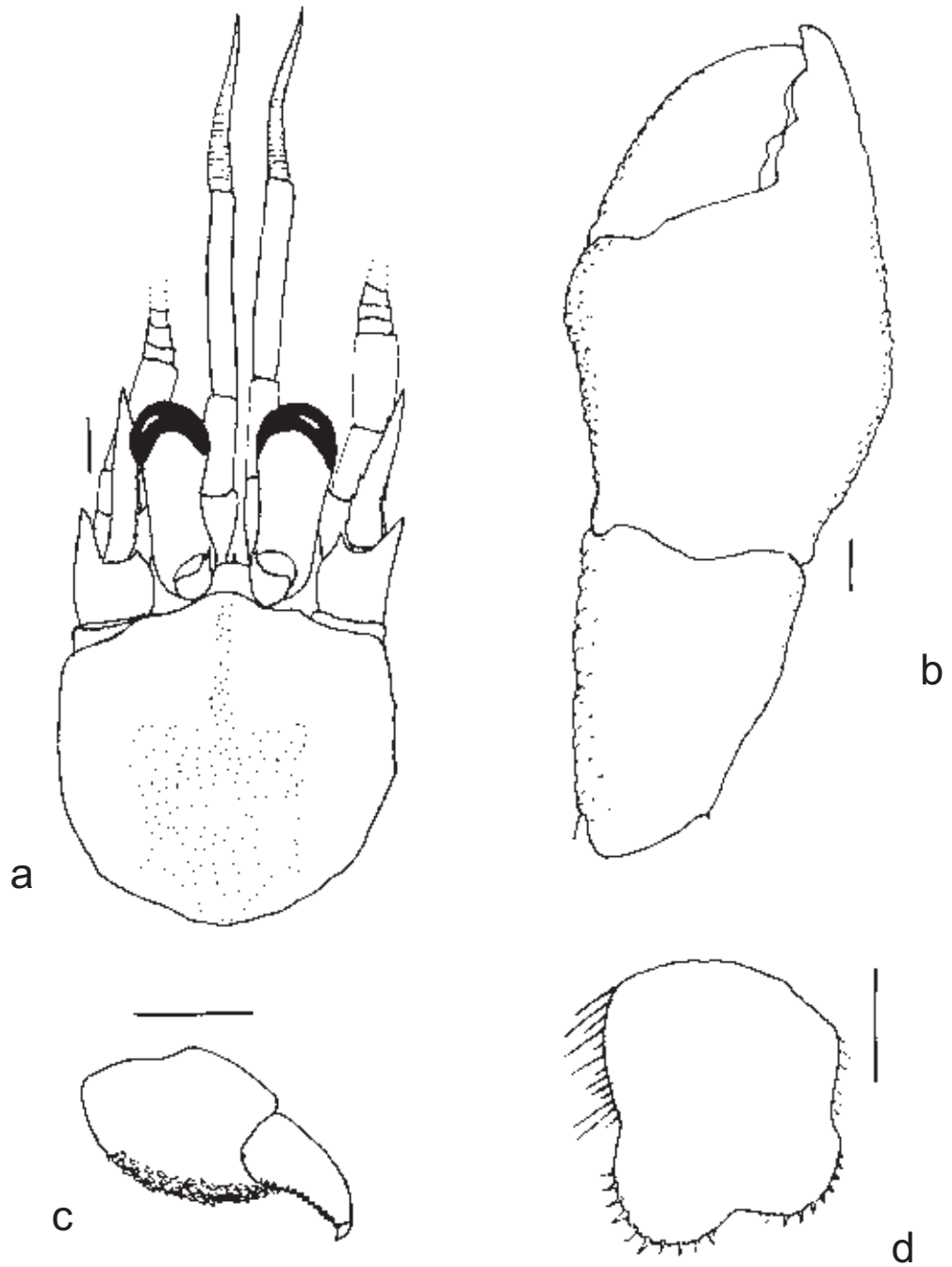
Diagnosis.– Gills biserial or distally quadriserial. Shield as broad as long; dorsal surface frequently weakly calcified medially; rostrum broadly triangular, with short ridge. Ocular peduncles approximately half length of shield, corneas slightly dilated; ocular acicles each terminating in simple or occasionally bi- or trifid spine. Antennular and antennal peduncles both overreaching distal corneal margins, antennular peduncles longest; antennal acicle long, mesial margin with 7-13 spines, partially hidden by long setae. Epistome unarmed or with short, straight spine. Chelipeds both with covering of dense plumose setae; palm of right cheliped with irregular rows of small spines on rounded mesial and lateral faces, dorsal surface unarmed or with scattered tubercles. Palm of left cheliped unarmed or with dorsomesial row of small tubercles or spines; carpus with or without row of small tubercles or spines on dorsomesial margin. Ambulatory legs with dactyls somewhat longer than propodi, each with dorsomesial row of long setae and ventromesial row of 17-30 small corneous spines; carpi each with small dorsodistal spine. Fourth pereopod with propodal rasp consisting of 2 or 3 rows of conical scales. Females rarely with rudimentary paired first pleopods and vestigial second right pleopod. Telson with ventrolateral margin of left anterior lobe (sometimes also right) with cluster of corneous spines mixed with long bristle-like setae in females; male with ventrolateral margins of anterior lobes usually with long setae, rarely corneous spines; posterior lobes separated by small U- or V-shaped median cleft, rounded terminal margins each with row corneous spines.

Size.– Maximum reported shield length 20.2 mm.

Coloration.– Shield white with broad reddish-orange elongate patch medially and smaller patches laterally. Ocular peduncles white dorsally, light orange ventrally or predominantly light reddish-orange. Antennular and antennal peduncles light to dark reddish-orange. Right cheliped with chela and carpus white, merus tinged with orange or reddish-orange; left cheliped with dactyl and fixed finger orange or reddish-orange, palm white; carpus and merus each white with orange or reddish-orange stripe laterally. Ambulatory legs each with segments white dorsally, reddish-orange ventrally.

Habitat.– Found living in large zoanthids (probably *Epizoanthus* sp.) and often sharing this carcinoecium with other invertebrates.

Distribution.– Madagascar, Indonesia, Australia, New Zealand, New Caledonia, South China Sea, Taiwan, Japan; 205-1120 m.



Male (10.3 mm), CD229: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** dactyl and propodus of left fourth pereopod (lateral view); **d,** telson. Setae partially omitted. Scales equal 1 mm.

Sympagurus trispinosus (Balss, 1911)

PCP332.

Parapagurus arcuatus var. *trispinosa* Balss, 1911: 3; Balss, 1912: 100, fig. 8, pl. 7, fig. 2, pl. 10, fig. 4.
Parapagurus armatus var. *trispinosus*– Carlgren, 1928a: 168, fig. 7, 9G; Carlgren, 1928b: 167, fig. 1b.
Parapagurus trispinosus– de Saint Laurent, 1972: 105; Fautin Dunn et al., 1981: 386, fig. 6.
Sympagurus trispinosus– Lemaitre, 1989: 37; Lemaitre, 1994: 390, figs. 11, 12, 28c; Poupin, 1996: 20, pl. 9c; Spiridonov & Zhadan, 1999: 629, fig. 2; Lemaitre, 2004b: 139, figs. 1$I_{1,2}$, 33, 34.

Material examined.– CD133, 22°15.07'N, 120°08.02'E, 748-690 m, 21 Nov 2001: 1 male (10.5 mm), 1 ovig. female (10.5 mm), (NTOU); CD134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 male (10.4 mm), 1 ovig. female (11.6 mm); CD141, 22°12.04'N, 119°59.96'E, 1110-985 m, 24 Nov 2001: 1 male (12.7 mm), (NTOU); CD193, 22°22.84'N, 120°07.21'E, 812-900 m, 29 Aug 2002: 1 male (9.9 mm), 3 ovig. females (10.0-12.6 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 3 males (6.2-14.7 mm), 3 females (6.3-10.1 mm), (NTOU); CD229, 22°13.35'N, 120°01.9'E, 1060-880 m, 30 Aug 2003: 1 ovig. female (11.5 mm), (NTOU); CD231, 22°14.32'N, 119°58.78'E, 951-1062 m, 31 Aug 2003: 2 ovig. females (12.7, 12.8 mm), (NTOU); no specific locality: 2 males (15.4, 15.5 mm), (NTOU).

Diagnosis.– Gills biserial or distally quadriserial. Shield as broad as long or slightly broader; dorsal surface only weakly calcified medially; rostrum broadly subtriangular, with short ridge. Ocular peduncles half length of shield or slightly longer, corneas slightly dilated; ocular acicles each terminating in bi- or multifid spine. Antennular and antennal peduncles both overreaching distal corneal margins, antennular peduncles much longer; antennal acicle long, mesial margin with 9-13 spines at least partially concealed by long setae.

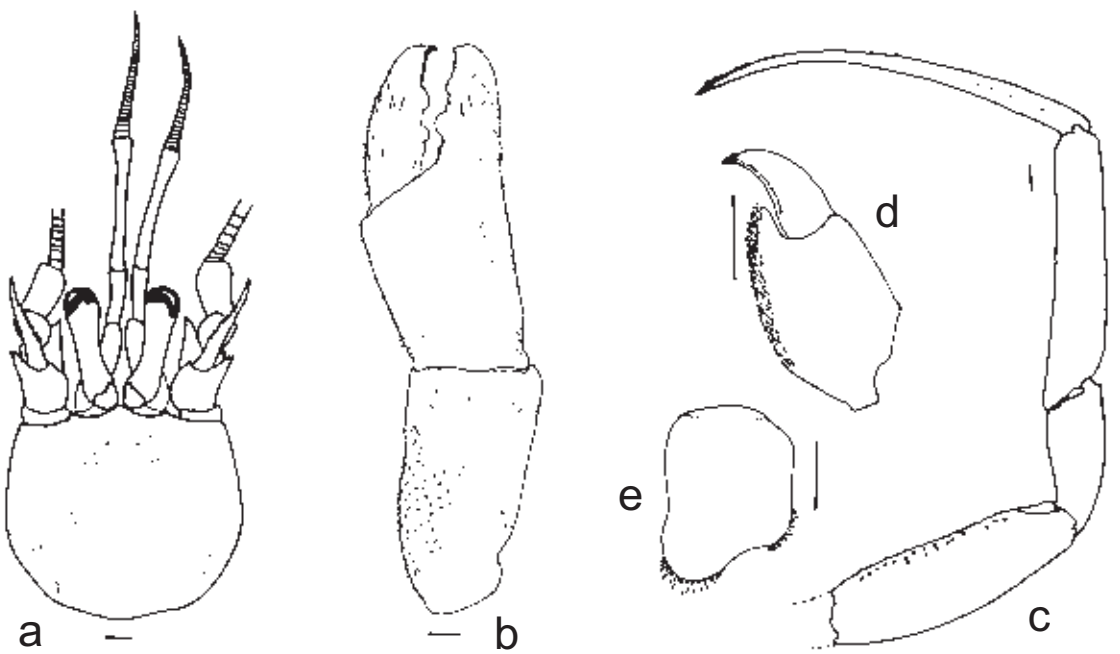
Epistomial spine short, straight. Chelipeds both with covering of dense setae on chelae, carpi and distal portions of meri; dorsomesial and dorsolateral margins of palm of right cheliped unarmed or each with irregular rows of small spines; carpus with numerous small spines or tubercles on dorsal surface proximally. Left cheliped with unarmed chela; carpus with or without marginal row of spines on dorsal surface. Ambulatory legs with dactyls longer than propodi, each with row of tiny corneous spinules, mesial faces each with few short, oblique rows of bristles distally; carpi each with small dorsodistal spine, second pereopods also usually with row of small spines on each dorsal surface. Fourth pereopod with 3 or 4 rows of conical or lanceolate scales in propodal rasp. Telson with posterior lobes separated by broad, shallow median concavity, terminal margins each with row of corneous spines.

Size.– Maximum reported shield length 20.5 mm.

Coloration.– Body and appendages creamy-yellow or pinkish-white; tips of ambulatory dactyls pinkish or reddish-orange.

Habitat.– Symbiotic inhabitant of *Stylobates cancrisocia* (Carlgren, 1928).

Distribution.– South Africa, Zanzibar, Madagascar, Reunion, Australia, Indonesia, New Caledonia, Philippine Islands, South China Sea, Taiwan, Vanuatu, and French Polynesia; 209-1500 m.



Male (15.5 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 2 mm.

Oncopagurus Lemaitre, 1996

In an effort to more clearly define the large, and at that time, heterogeneous genus *Sympagurus* sensu lato, Lemaitre (1996) established the genus *Oncopagurus* for a group of species that he previously (Lemaitre, 1994) had referred to simply as *Sympagurus* Group 1. As the name *Onco*, from the Greek *onkos* meaning hook, in combination with *Pagurus*, implies, members of this genus share one synapomorphy that sets them apart from other parapagurids, namely, an epistomial spine that prominently curves upward.

Key to the Taiwanese species of *Oncopagurus*

1. Ocular acicles each with terminal simple spine ……2
- Ocular acicles each with terminal bi- or multifid spine ……*O. orientalis*
2. Ventral surface of palm of right cheliped with prominently elevated tuberculate or spinose area medianly ……*Oncopagurus* n. sp.
- Ventral surface of palm of right cheliped without prominently elevated tuberculate of spinose area medianly ……3
3. Carpus of left cheliped with irregular dorsal row of spines; merus of right third pereopod with several spines on dorsal surface ……*O. indicus*
- Carpus of left cheliped with only dorsodistal spine; merus of right third pereopod without several spines on dorsal surface ……*O. monstrosus*

Oncopagurus orientalis (de Saint Laurent, 1972)

CP246.

Parapagurus orientalis de Saint Laurent, 1972: 114, figs. 8, 16.

Sympagurus orientalis– Lemaitre, 1989: 37.

Oncopagurus orientalis– Lemaitre, 1996: 194; Lemaitre, 1997: 577, figs. 1, 2.

Material examined.– DW56, 24°29.8'N, 122°12.6'E, 438-539 m, 4 Aug 2000: 1 male (3.2 mm), (NTOU); CP68, 24°49.57'N, 122°00.75'E, 370 m, 6 May 2001: 1 male (5.3 mm), (NTOU); CP74, 24°50.84'N, 121°59.28'E, 220 m, 7 May 2001: 2 specimens not sexed (3.9, 4.6 mm), (NTOU); CP246, 24°51.68'N, 122°01.25'E, 427-393 m, 27 Aug 2004: 2 males (4.7, 5.3 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 2 males (3.1, 3.3 mm), 3 females (2.8-3.0 mm), (NTOU).

Diagnosis.– Gills biserial. Shield as long as broad, dorsal surface weakly calcified medianly; rostrum broadly rounded, with short median ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each terminating in prominent bi- or occasionally multifid spine. Antennular peduncles exceeding distal margins of corneas by entire lengths of ultimate segments; antennal peduncles not exceeding distal corneal margins; antennal acicle moderately long, mesial margin with 8-12 spines. Epistomial spine prominently curved upward. Chelipeds somewhat iridescent and with moderately dense setae; dorsomesial and dorsolateral margins of palm of right cheliped each with row of spines, dorsal surface with scattered spines. Left cheliped with unarmed chela; carpus with dorsodistal spine. Ambulatory legs with dactyls longer than propodi, ventromesial margins each with 1-4 minute spinules, rows of long setae dorsally and dorsomesially; carpi each with small dorsodistal spine; merus of right third pereopod with dorsal row of small

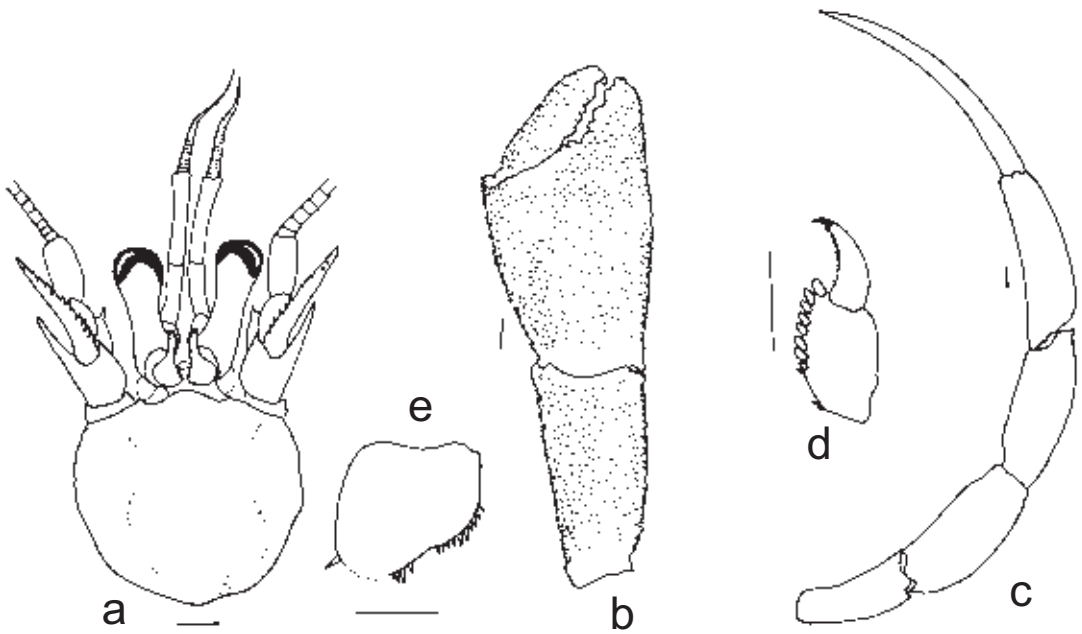
spines. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Males without paired first gonopods; second paired, but rudimentary or vestigial. Females with vestigial right second pleopod. Telson with right posterior lobe weakly developed, separated from much larger left lobe by weak concavity or shallow U-shaped cleft; terminal margins each with row corneous spines, small and few in number on right.

Size.– Maximum recorded shield length 5.3 mm.

Coloration.– Shield pinkish with pale orange patches. Ocular peduncles with faint orangish tint. Chelipeds whitish with faint orange tint; carpi and meri slightly darker. Dactyls of ambulatory legs faintly orangish-white. Propodi, carpi and meri white, each with faint reddish-tan area proximally.

Habitat.– Gastropod shells and coarse textured zooanthids.

Distribution.– Moluccas, Indonesia, Philippine Islands, Taiwan; 220-613 m.



Male (5.3 mm), CP68: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Oncopagurus n. sp.

CP56.

Material examined.– CP56, 24°29.8'N, 122°12.6'E, 438-539 m, 4 Aug 2000: 1 female (2.6 mm), (NTOU); DW151, 22°18.34'N, 121°30,04, 301-356 m, 20 May 2002: 1 male (2.0 mm), (NTOU).

Diagnosis.– Gills biserial. Shield as long as broad; dorsal surface weakly calcified medianly; rostrum very broadly rounded, with short median ridge. Ocular peduncles more than half shield length, corneas somewhat dilated; ocular acicles each with terminal spine indistinctly submarginal. Antennular peduncles overreaching distal margins of corneas by entire lengths of ultimate segments; antennal peduncles reaching to or nearly to distal corneal margins, produced dorsolateral distal angles of second segments each with 2 or 3 small spines on mesial margin; antennal acicle with row of spines on mesial margin. Small epistomial spine curved upward. Right cheliped with fringes of dense setae on lateral and mesial margins of chela; dactyl with row of prominent spines on dorsomesial margin; palm with row of spines on dorsomesial and on dorsolateral margins, lateral row much more prominent, dorsal surface with scattered very small spinules, mesial face rounded and covered with densely-packed tubercles, ventral surface with prominently elevated area armed with small spines; carpus with scattered small spines on dorsal surface. Left cheliped with scattered minute granules on dorsal surface of chela; carpus with distomesial and distolateral spine. Ambulatory legs with dactyls longer than propodi, ventromesial margins each with 7 or 8 fine corneous spines; propodi all with very weakly protuberant dorsal margins; carpi with dorsal margins minutely serrate, each also with small dorsodistal spine; meri with minutely spinose dorsal margins on second pereopods and minutely serrate dorsal margins on third. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Telson with

posterior lobes asymmetrical, terminal margins each with row of several long corneous spines interspersed with smaller spines.

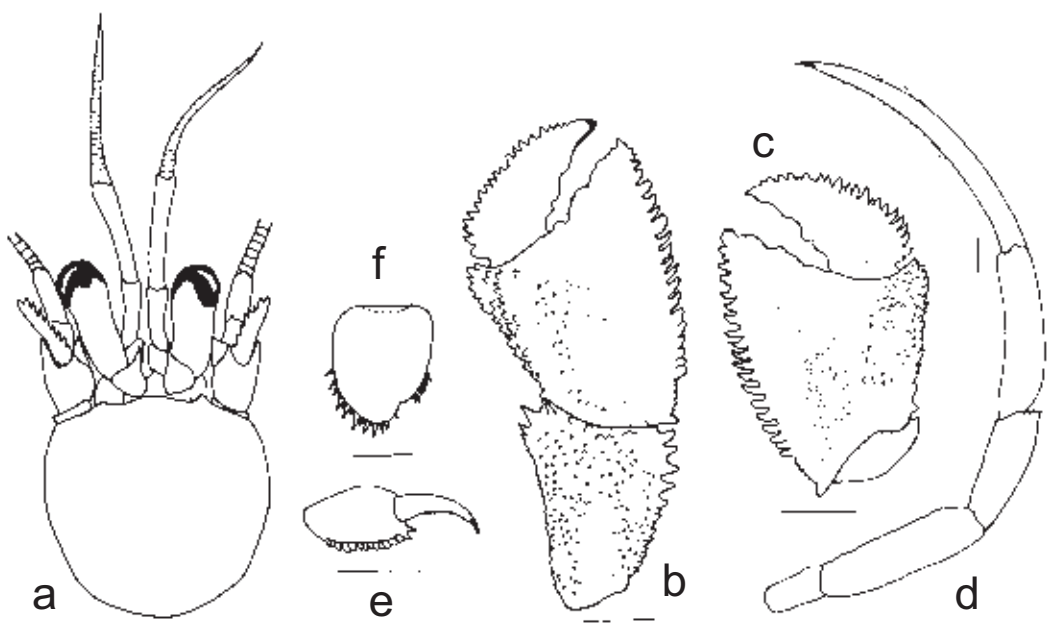
Size.– Maximum reported shield length 2.6 mm.

Coloration.– Shield whitish-yellow. Ocular peduncles yellowish-white. Right cheliped with dorsal surfaces of chela and carpus yellowish with tinge of reddish-orange marginally; merus predominantly light reddish-orange. Left cheliped with chela and carpus yellowish with patch of reddish-orange proximally; merus predominantly reddish-orange. Dactyls of ambulatory legs whitish-yellow, third also with light reddish-orange tint proximally; propodi, carpi and meri also yellowish-white, propodi and meri each with light reddish-orange areas proximally and distally, carpi each with reddish-orange proximally.

Habitat.– Gastropod shells.

Distribution.– Taiwan; 301-438 m, possibly to 539 m.

Remarks.– This new species, presently being described by Dr. Rafael Lemaitre, National Museum of Natural History, Smithsonian Institution, Washington, D.C., is similar to *O. glebosus* Lemaitre, 1997 from Indonesia, and was reported as that species in the on-line version of this catalog before being recognized as an undescribed taxon. Lemaitre (1997) remarked that *O. glebosus* was set apart from all other parapagurid species in having the terminal spines of the ocular acicles submarginal. The acicular spines of this Taiwan species are neither clearly marginal nor distinctly submarginal; they appear indistinctly submarginal. The dorsolateral distal angle of the second antennal peduncular segment is unarmed in *O. glebosus*, but has 1 or 2 small spines on each mesial margin in the new species. The raised ridges on the ventral surface of the dactyl and fixed finger described for the right chela in *O. glebosus* are not developed in the Taiwanese species, and the elevated proximal region of the palm is armed with small spines rather than a cluster of tubercles as in *O. glebosus*. Additionally, the ventromesial margins of the ambulatory dactyls were described as having a few very small spines, whereas the dactyls of the new species each is armed with 8-11 moderately prominent slender corneous spines.



Female (2.6 mm), CP56: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped (dorsal view); **c,** right chela (ventral view); **d,** left third pereopod (lateral view); **e,** dactyl and propodus of right fourth pereopod (lateral view): **f,** telson. Some setae omitted. Scales equal 1 mm.

Oncopagurus indicus (Alcock, 1905)

DW60.

CP214.

DW56.

Sympagurus bicristatus var. *indicus* Alcock, 1905: 105, pl. 10, fig. 4.
Parapagurus bicristatus– Balss, 1912: 98, figs. 6, 7 [not *Parapagurus bicristatus* (A. Milne-Edwards, 1880)].
? *Parapagurus minutus*– Thompson, 1943: 417 [? Not *Parapagurus minutus* Henderson, 1896].
Sympagurus bicristatus– Thompson, 1943: 418.
Parapagurus bicristatus indicus– de Saint Laurent, 1972: 112.
Sympagurus indicus– Lemaitre, 1989: 37.
Oncopagurus indicus– Lemaitre, 1996: 195, figs. 17, 18.

Material examined.– DW44, 22°47.2'N, 121°27.3'E, 439-350 m, 2 Aug 2000: 1 female (2.3 mm), (NTOU); DW56, 24°29.8'N, 122°12.6'E, 438-539 m, 4 Aug 2000: 1 female (2.8 mm), (NTOU); DW60, 24°41.2'N, 122°11.8'E, 532-418 m, 4 Aug 2000: 1 male (4.4 mm), (NTOU); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 1 male (4.4 mm), (NTOU); CP214, 24°28.59'N, 122°12.66'E, 490-1027 m, 27 Aug 2003: 1 female (4.6 mm), (NTOU); CP248, 24°51.74'N, 122°02.43'E, 516-557 m, 28 Aug 2004: 1 male (3.0 mm), (NTOU); CP264, 24°28.07'N, 121°53.55'E, 330-297 m, 1 Sep 2004: 2 males (3.0, 3.4 mm), 1 female (3.2 mm), (NTOU).

Diagnosis.– Gills biserial. Shield as long as broad, dorsal surface weakly calcified medianly; rostrum very broadly rounded, with short ridge. Ocular peduncles longer than half length of shield, corneas slightly dilated; ocular acicles each with prominent terminal spine. Antennular peduncles overreaching distal corneal margins by lengths of ultimate peduncular segments; antennal peduncles not or just barely reaching distal corneal margins; antennal acicle long, mesial margin with 8-11 spines. Epistomial spine prominently curved upward. Chelipeds both with moderately dense setae; right chela operculate, somewhat dimorphic; palm with dorsomesial margin delineated by row spines, mesial face perpendicular or weakly concave and armed with scattered spinules in males, distinctly concave, distally expanded, and very weakly armed in females; carpus

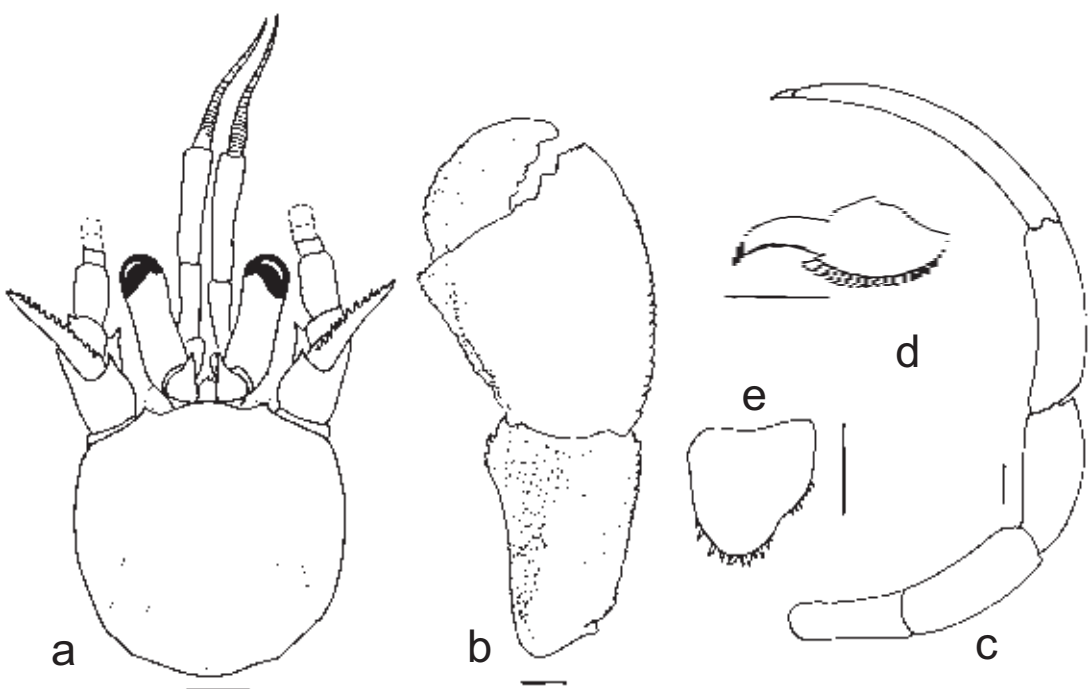
with moderately few to very numerous small spines or spinules on dorsal surface; dorsolateral margin with row of moderately prominent spines. Left cheliped with dorsolateral margin of palm unarmed or with few small spines on dorsal surface mesially; carpus with dorsodistal spine and irregular row of small spines or tubercles of dorsomesial margin. Ambulatory legs with dactyls appreciably longer than propodi; carpi each with dorsodistal spine; dorsal margins of meri each usually with several small spines. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Male first gonopods with weakly concave distal lobes. Females with vestigial right second pleopod. Telson with posterior lobes separated by broad, very weak concavity or shallow, broad U-shaped cleft.

Size.– Maximum recorded shield length 4.6 mm.

Coloration.– Shield light whitish-orange to light reddish-orange, sometimes with blotches of darker reddish-orange; ocular peduncles light reddish-orange. Chela of right cheliped white, often tinged with reddish-orange on dorsal surface proximally; carpus reddish-orange with broad bluish-white or white band at distal margin; merus predominately reddish-orange or with white laterally. Left cheliped with proximal half of palm reddish-orange, dactyl, fixed finger and distal half of palm predominantly bluish-white or white; carpus bluish-white or white distally, remainder reddish-orange; merus also reddish-orange with whitish distally. Dactyls of ambulatory legs bluish-white, each with or without reddish-orange band proximally, sometimes very faint; propodi, carpi varying from distal halves bluish-white, proximal halves reddish-orange to alternating bands of bluish-white and reddish-orange; meri similarly colored or with reddish-orange coloration only dorsally and ventrally.

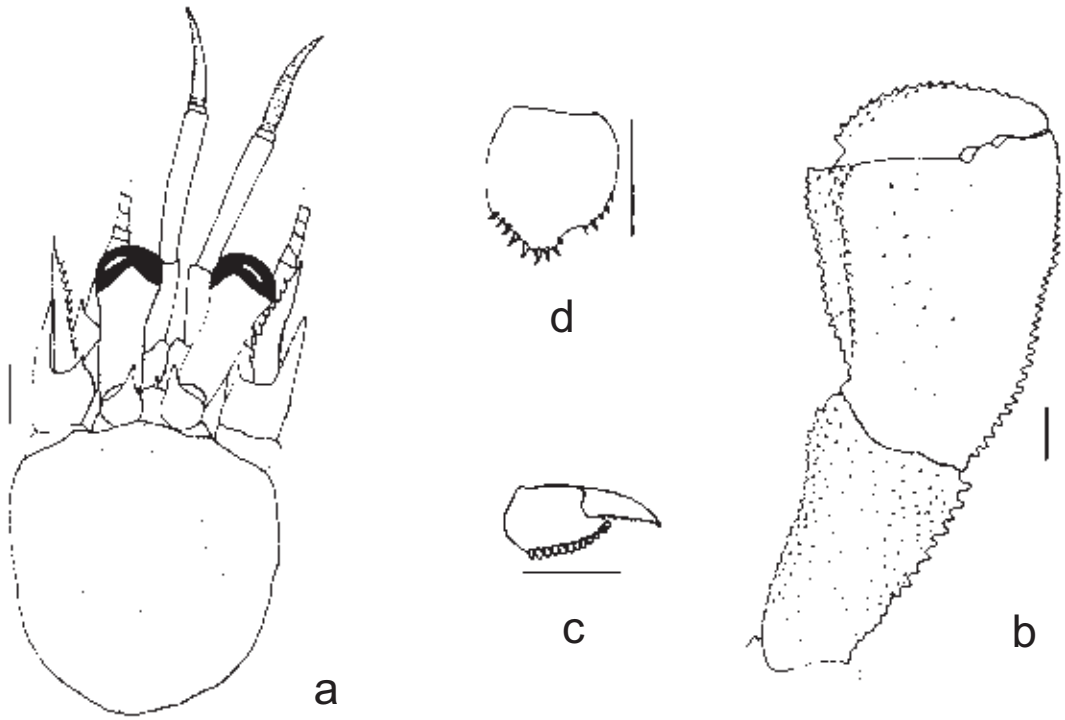
Habitat.– Gastropod shells, occasionally with one or more anthozoan polyps attached.

Distribution.– Zanzibar, Maldives, Australia, Indonesia, Philippine Islands, Taiwan, Hawaiian Islands; 183-1480.



Male (4.4 mm), DW60: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae omitted. Scales equal 1 mm.

Oncopagurus monstrosus (Alcock, 1894)



Male (3.5 mm), CP269: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** dactyl and propodus of right fourth pereopod (lateral view); **d,** telson. Scales equal 1 mm.

"? *Parapagurus monstrosus*" Alcock, 1894: 243.

Sympagurus monstrosus– Henderson, 1896: 533; Alcock & Anderson, 1897: pl. 32, fig. 4.

Sympagurus arcuatus var. *monstrosus*– Alcock, 1905: 104, pl. 10, fig. 5.

? *Eupagurus brevimanus*– Yokoya, 1933: 90, fig. 34.

Parapagurus monstrosus– Miyake, 1982: 119, pl. 40, fig. 1; Baba, 1986: 198, 302, fig. 146; Wang, 1991: 243, fig. 203; Imafuku, 1992: 234, unnumbered fig.

Oncopagurus monstrosus– Lemaitre, 1996: 199, figs. 19, 20.

Not *Parapagurus arcuatus* var. *monstrosus*– Balss, 1912: 99, pl. 10, fig. 3 [= *Sympagurus brevipes* de Saint Laurent, 1972)].

Material examined.– CP269, 24°30.55'N, 122°05.78'E, 399-397 m, 2 Sep 2004: 3 males (2.3-3.5 mm), (MNHN Pg 7598).

Diagnosis.– Gills biserial. Shield as long as broad, dorsal surface weakly calcified; rostrum broadly rounded, with short median ridge. Ocular peduncles more than half shield length, corneas somewhat dilated; ocular acicles each with prominent terminal spine. Antennular and antennal peduncles overreaching distal corneal margins, but antennular peduncles much longer; antennal acicle moderately long, mesial margin with 8-15 spines. Epistomial spine prominently curved upward. Chelipeds somewhat iridescent and with moderately dense setation; dactyl of right cheliped with concave ventromesial face; dorsomesial and dorsolateral margins of palm each with row of spines, dorsal surface with irregular rows of small spines;

carpus spinulose or spinose. Left cheliped with unarmed palm; carpus with dorsodistal spine. Ambulatory legs with dactyls considerably longer than propodi, ventromesial faces each with row of 5-15 small corneous spines, rows of long setae on dorsal and dorsomesial faces; carpi each with dorsodistal spine; merus of third right pereopod unarmed or rarely with 1 or 2 small spines on dorsal surface. Propodal rasp of fourth pereopod consisting of 1 row of ovate scales. Males with distal segments of first gonopods weakly concave. Females with vestigial right second pleopod. Telson with posterior lobes separated by moderately deep, broad median concavity, terminal margins each with single or double row of corneous spines.

Size.– Maximum reported shield length 6.6 mm.

Coloration.– Carapace light orange. Right cheliped creamy-white with reddish-orange proximally on merus and carpus. Left cheliped and ambulatory legs light pink with 1 or 2 reddish-orange patches on lateral face of each merus, carpus and propodus (based on Miyake, 1982; Baba,1986; Imafuku, 1992).

Habitat.– Gastropod shells usually with attached actinian.

Distribution.– Bay of Bengal, Gulf of Aden, Australia, Indonesia, Philippine Islands, Taiwan, Japan; 202-1000 m.

Paragiopagurus Lemaitre, 1996

Paragiopagurus, a genus established for Lemaitre's (1994) Group 3 of *Sympagurus*, does not have defining apomorphies such as the presence of a curved and upwardly directed epistomial spine seen in *Oncopagurus*, and may, in fact, be a heterogeneous assemblage such as *Pagurus*. However, one attribute shared by the majority of species of *Paragiopagurus* is their tolerance of shallow waters. At least four species have been collected in depths of less than 100 meters while others are reported with ranges between 100 and 300 meters. The genus also contains the first parapagurid found in association with a hydrothermal vent.

Key to the Taiwanese species of *Paragiopagurus*

1. Ventral surface of right chela with covering with mushroom-shaped tubercles ……*P. boletifer*
- Ventral surface of right chela with covering of spines, simple tubercles, or smooth ……2
2. Dactyls of ambulatory legs each with irregular rows of numerous corneous spines on mesial face ventrally; ischia of third maxillipeds with long, dense bacteriophore setae ……*P. ventilatus*
- Dactyls of ambulatory legs each with no more than single row of corneous spines on mesial face ventrally; ischia of third maxillipeds without long, dense bacteriophore setae ……3
3. Ocular acicles simple; males with paired first gonopods ……*P. diogenes*
- Ocular acicles bi- or multifid; males without paired first gonopods ……4
4. Ventromesial surfaces of ambulatory dactyls each with 3-5 corneous spinules ……*P. bicarinatus*
- Ventromesial surfaces of ambulatory dactyls each with 8 or more minute to moderately large corneous spines or spinules ……5
5. Dorsal surface of palm of right cheliped armed with prominent spines ……*P. hirsutus*
- Dorsal surface of palm of right cheliped unarmed or armed with small spines or tubercles ……*P. acutus*

Paragiopagurus boletifer (de Saint Laurent, 1972)

CP212.

Parapagurus boletifer de Saint Laurent, 1972: 110, figs. 5, 20; Miyake, 1982: 120, pl. 120, fig. 4; Baba, 1986: 197, 301, fig. 144.

Sympagurus boletifer– Lemaitre, 1987: 34; Lemaitre, 1994: 382, figs. 5, 6, 27a, b, 28b, c.

Paragiopagurus boletifer– Lemaitre, 1996: 218.

Material examined.– Dasi fishing port, Yilan County, May 1997: 1 male (5.8 mm), (NTOU).– May 1998: 1 male (5.2 mm), (NTOU); Nanfang-ao fishing port, Yilan County, 23 Mar 1999: 1 female (6.4 mm), (NTOU); DW149, 22°18.5'N, 121°29.37'E, 258 m, 20 May 2002: 1 juv. (1.7 mm); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 4 females (2.4-5.0 mm), (NTOU); CP216, 24°34.71'N, 122°04.02'E, 209-280 m, 27 Aug 2003: 11 males (4.1-6.0 mm), 2 females (4.7, 5.4 mm), (NTOU); no specific locality: 1 male (8.9 mm), (NTOU).

Diagnosis.– Gills biserial or distally quadriserial. Shield as long as broad, dorsal surface usually with entire central portion weakly calcified; rostrum very broadly rounded, with short median ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with prominent terminal spine. Antennular peduncles overreaching distal margins of corneas by lengths of penultimate segments; antennal peduncles often reaching distal corneal margins; antennal acicle with 11-14 spines on mesial margin. Epistomial spine short, straight. Right cheliped massive, operculate; chela with dorsal surface covered with numerous spines and dense setae, ventral surface with covering of mushroom-shaped tubercles; carpus with numerous small spines and tubercles on dorsal surface. Left cheliped with dorsomesial row of

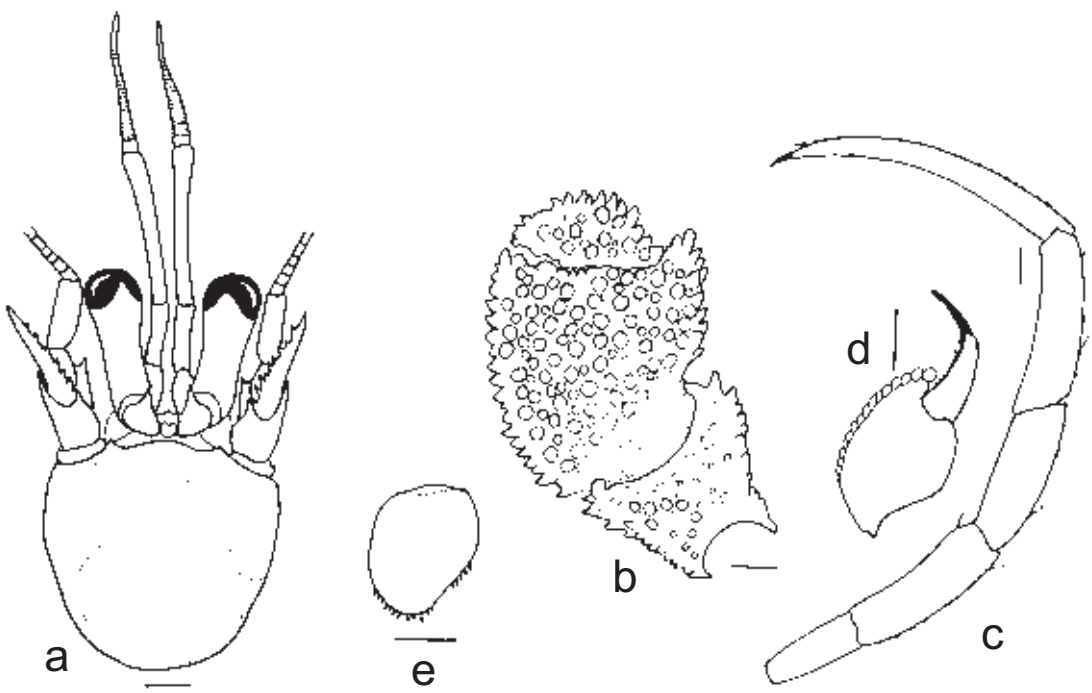
spines on palm; carpus with dorsodistal spine. Ambulatory legs with dactyls approximately twice as long as propodi, dorsal and dorsomesial surfaces each with row of long bristle-like setae, ventromesial surfaces each with approximately 12 corneous spinules; carpi each with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Male with paired first and second gonopods; female with vestigial right second pleopod. Telson with posterior lobes separated by broad, shallow V-shaped median cleft; terminal margins each with row of corneous spines.

Size.– Maximum reported shield length 8.9 mm.

Coloration.– Shield creamy-yellow tinged with orange to pinkish-orange with scattered darker splotches. Ocular peduncles pale yellow or light pinkish-orange, darker in distal halves. Antennular peduncles pale yellow with flagella pale purple to pink or distal two segments and flagella blue. Antennal peduncles pale yellow or pinkish-orange. Chela and carpus of right cheliped with dorsal and ventral surfaces reddish-orange, mushroom-tubercles and spines white; merus whitish with tinge of pale orange distally or entirely reddish-orange. Left cheliped and ambulatory legs uniformly light purple or light reddish-orange with faint bluish tint on some segments.

Habitat.– Gastropod shells.

Distribution.– Comoro Islands, Australia, Taiwan, Japan, French Polynesia, Hawaii; 89-280 m.



Male (5.2 mm), Dasi fishing port, Yilan County, May 1998: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped (ventral view); **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Paragiopagurus ventilatus Lemaitre, 2004

Gueishan Island, Yilan County, vent st. 9, male.

Gueishan Island, Yilan County, vent st. 9, ovig. female.

Paragiopagurus ventilatus Lemaitre, 2004c: 326, figs. 1-5.

Material examined.– Gueishan Island, Yilan County, normal st. 1, 24°50.699'N, 122°00.802'E, PCP, 350 m, 13 Jul 2005: 1 male (5.9 mm), (NTOU).– vent st. 9, 24°50.662'N, 121°59.697'E, PCP, 200 m, 13 Jul 2005: 5 males (4.9-5.1 mm), 2 ovig. females (4.0, 4.6 mm), (NTOU).– no specific data: 1 specimen not sexed (3.8 mm), (NTOU); CP113, 24°50.80'N, 121°59.88'E, 281 m, 21 May 2001: 1 male (5.6 mm), holotype, 6 males (4.5-5.7 mm), 1 female (4.9 mm), paratypes, (NTOU).

Diagnosis.– Gills biserial. Shield approximately as broad as long, dorsal surface weakly calcified in midline; rostrum broadly rounded, with short median ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with simple or rarely bifid terminal spine, dorsal surface with transverse striae. Antennular peduncles overreaching distal margins of corneas by nearly entire lengths of ultimate segments; antennal peduncles approximately reaching distal corneal margins; antennal acicle with 4-9 spines on mesial margin, at least partially concealed by setae. Ischia and bases of third maxillipeds each with dense long bacteriophore setae on outer faces. Epistomial spine straight, simple to trifid; rarely absent. Proportions and armature of right cheliped size and sex dependent; palm elongate in males, shorter and broader in females, dorsomesial and dorsolateral margins each with row of spines at least in females, dorsal surface with tufts of setae; dorsomesial and dorsolateral margins of carpus each with row of spines, more prominent in females; mesial and ventral surfaces of merus with long, dense bacteriophore setae. Left cheliped with tufts of setae and small tubercles on dorsal surface of palm; carpus with irregular rows of small spines on dorsal surface concealed at least partially by long setae. Ambulatory legs with dactyls longer than propodi, mesial faces each with irregular row of 18-40 corneous spines; propodi, carpi and meri all with tufts or short transverse rows of setae. Fourth pereopod with propodal rasp consisting of single row, at least distally, of rounded scales. Males lacking first gonopods, second pleopod unpaired, rudimentary; female with rudimentary second right pleopod. Telson with posterior lobes separated by broad, shallow concavity; terminal margins each with short row of corneous spines.

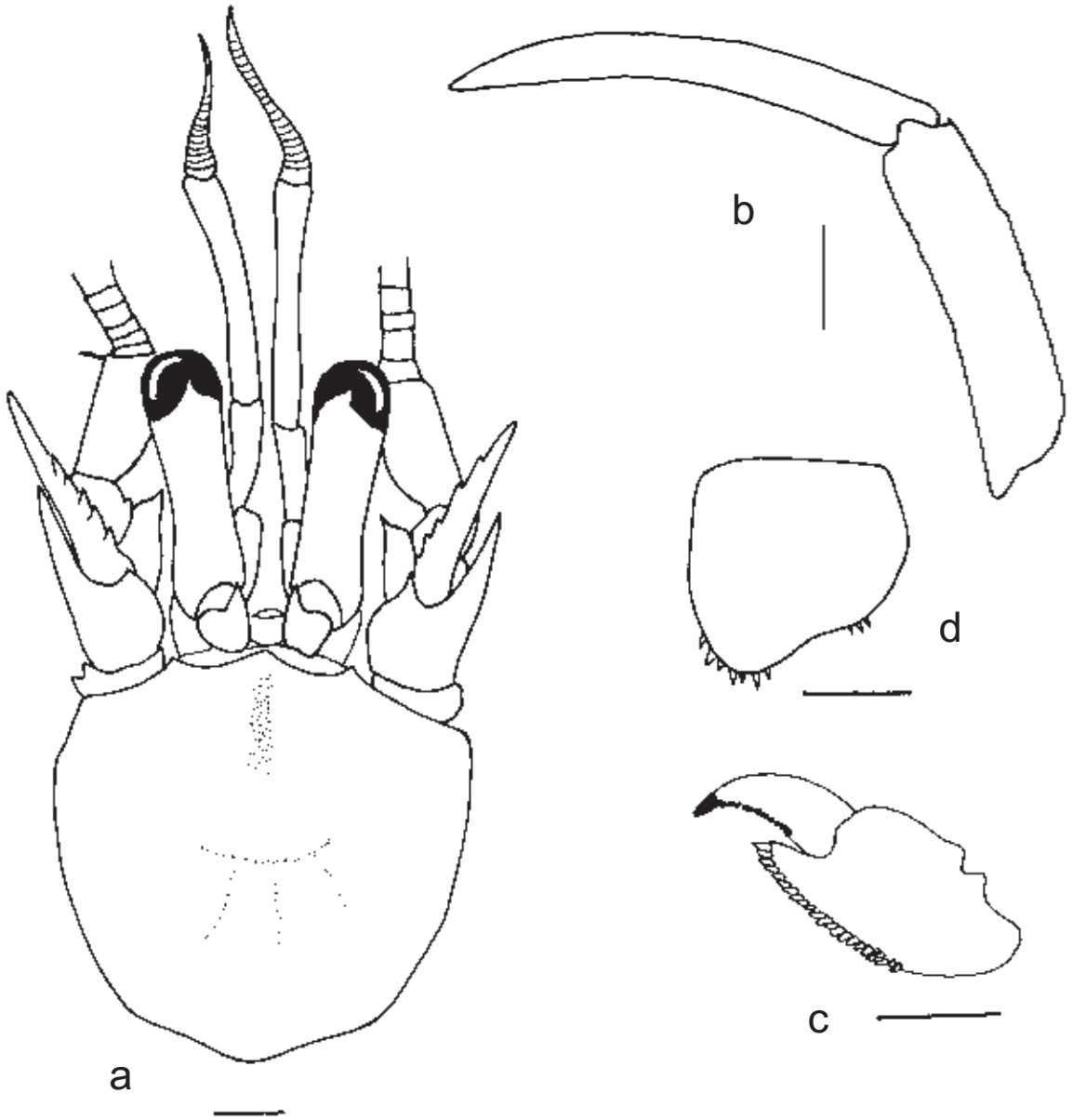
Size.– Maximum reported shield length 5.7 mm.

Coloration.– Shield and cephalic appendages cream with areas of pale pink or reddish-orange. Chelipeds and ambulatory legs red, reddish-orange or pink; dactyls and propodi of second and third pereopods each sometimes with pale pink or white stripe on lateral face; meri sometimes each with oblique pale stripe on lateral face.

Habitat.– Gastropod shells of the buccinid genus *Siphonalia*, in association with hydrothermal vents.

Distribution.– NE Taiwan; 128-281 m.

Remarks.– At present known only from Taiwanese waters.



Specimen not sexed (3.8 mm), Gueishan Island, Yilan County, no specific data: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** dactyl and propodus of left third pereopod (lateral view); **c,** dactyl and propodus of left fourth pereopod (lateral view); **d,** telson. Setae omitted. Scales equal 1 mm.

Paragiopagurus diogenes (Whitelegge, 1900)

Gushan fishing port, Kaohsiung County, 14 Jul 1985.

Sympagurus diogenes Whitelegge, 1900: 172, pl. 34, fig. 3; Lemaitre 1994: 412, fig. 27g.

Parapagurus diogenes– Miyake, 1960: 90, pl. 45, fig. 2; de Saint Laurent 1972: 108; Miyake, 1975: 326, pl. 117, figs. 3, 6; Miyake, 1978: 72, figs. 26, 27b, pl. 4, fig. 5; Miyake, 1982: 119, pl. 40, fig, 2; Baba, 1986: 197, 301, fig. 145; Yu & Foo, 1991: 70, unnumbered fig.

Paragiopagurus diogenes– Lemaitre 1996: 208, figs. 14d, e, 24; Lemaitre, 2000: 219, fig. 70.

Not *Sympagurus arcuatus diogenes* Hale, 1941: 279 [specific identity indeterminant].

Material examined.– Dasi fishing port, Yilan County, Oct 1973: 1 male (6.2 mm), (NTOU).– 7 Nov 1990: 1 ovig. female (7.5 mm), (NTOU); Nanfang-ao fishing port, Yilan County, May 1998: 2 males (8.8, 9.1 mm), 1 female (6.2 mm), 1 ovig. female (7.7 mm), (NTOU); Cianjhen fishing port, Kaohsiung City, 5 Jan 1985: 2 males (5.4, 5.5 mm), (NTOU); Gushan fishing port, Kaohsiung County, 14 Jul 1985: 1 female (6.2 mm), (NTOU); Singda Harbor fishing port, Kaohsiung County, 6 May 1988: 1 male (7.4 mm), (NTOU).

Diagnosis.– Gills distally quadriserial. Shield as broad as long; dorsal surface weakly calcified medially, and with low blister-like tubercles; rostrum broadly rounded, with short median ridge. Ocular peduncles more than half length of shield, corneas somewhat dilated; ocular acicles each terminating in prominent spine. Antennular and antennal peduncles exceeding distal margins of corneas, antennular peduncles longer; antennal acicle with 4-8 prominent spines on mesial margin. Epistomial spine prominent, straight. Chelipeds glabrous or with scattered short setae, carpi and chelae usually iridescent dorsally; palm of right cheliped with row of small spines on dorsomesial margin, dorsolateral margin with row of larger spines, dorsal surface with

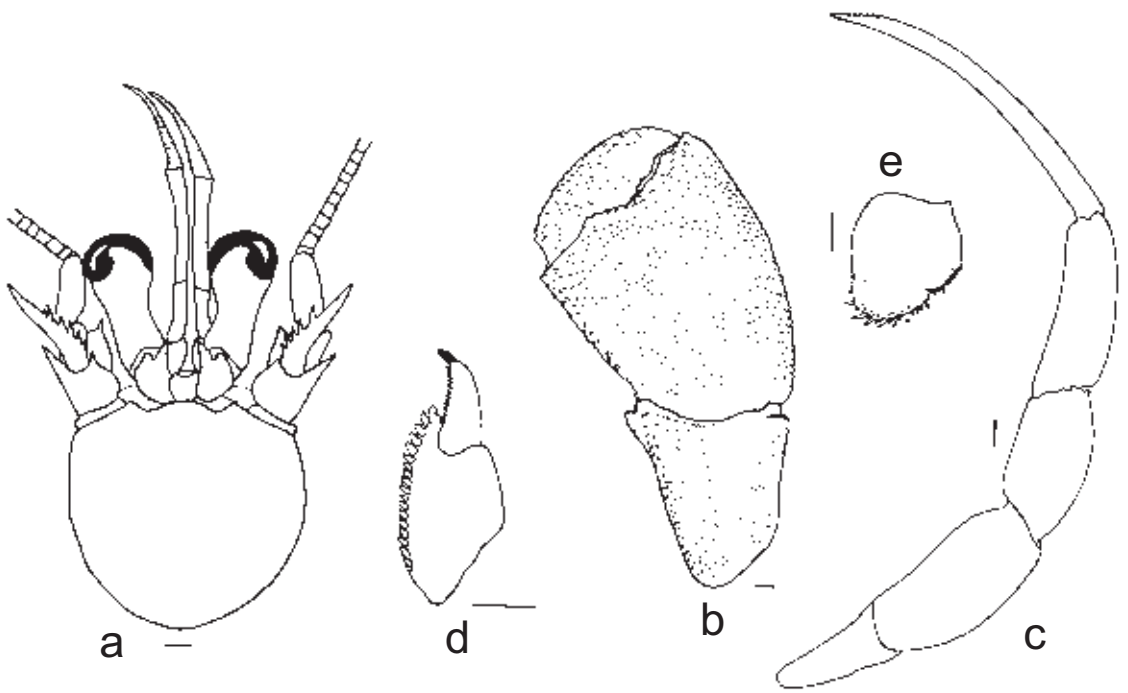
covering of small tubercles or spines; dorsal surface of carpus also with covering of small spines. Left cheliped with few small spines dorsomesially on palm; carpus with irregular row of small spines dorsally. Ambulatory legs with dactyls considerably longer than propodi, each with ventromesial row of 8-14 corneous spines; carpi each with dorsodistal spine. Fourth pereopod with propodal rasp consisting of 1 row of rounded scales. Male first and second gonopods developed; females with vestigial second right pleopod and occasionally paired first pleopods. Telson usually with low, blister-like tubercles on dorsal surface; posterior lobes separated by very small median cleft, terminal margins each with numerous corneous spines.

Size.– Maximum reported shield length 11.5 mm.

Coloration.– Shield reddish-tan with reddish-orange patches laterally. Ocular peduncles tan proximally more reddish-tan distally. Antennular peduncles reddish-brown. Antennal peduncles reddish-tan. Right cheliped with dactyl and lateral part of palm, including fixed finger pinkish-white with scatted small reddish-brown spots, remainder of dorsal surface reddish-orange; carpus darker and iridescent reddish-orange; merus lighter reddish-orange. Left cheliped with dactyl, fixed finger and lateral portion of palm white with scattered reddish-brown dots, central dorsal surface of palm reddish-tan or brown; carpus reddish-brown to reddish-orange; merus lighter reddish-tan. Ambulatory legs with dactyls and propodi light tan; carpi darker tan, each with proximal oblique stripe on lateral face; meri light tan.

Habitat.– Gastropod shells.

Distribution.– Australia, New Zealand, South China Sea, Taiwan, Japan; 40-695 m.



Male (9.1 mm), Nanfang-ao fishing port, Yilan County, May 1998: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Paragiopagurus bicarinatus (de Saint Laurent, 1972)

CP23.

Parapagurus acutus bicarinatus de Saint Laurent, 1972: 113.

Sympagurus acutus bicarinatus– Lemaitre, 1989: 37.

Paragiopagurus bicarinatus– Lemaitre, 1996: 214, fig. 27.

Material examined.– CP19, 22°24.2'N, 120°10.2'E, 467-634 m, 29 July 2000: 1 male (3.1 mm), (NTOU); CP371, 24°28.521'N, 122°12.828'E, 582-613 m, 26 Aug 2006: 3 males (2.8-3.5 mm), (NTOU).

Diagnosis.– Gills biserial. Shield as long as broad, dorsal surface weakly calcified medially; rostrum broadly rounded, with low median ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with prominent multifid terminal spine. Antennular peduncles overreaching distal margins of corneas by more than half lengths of ultimate segments; antennal peduncles reaching distal corneal margins; antennal acicle with 10-13 spines on mesial margin. Epistomial spine straight. Chelipeds with moderately dense setae; palm of right cheliped with numerous small spines on dorsal surface, dorsomesial and dorsolateral margins each with row of prominent spines; carpus with numerous small spines and tubercles on dorsal surface, dorsolateral margin with row of spines. Left cheliped with few spinules on dorsal surface of palm; carpus with prominent dorsodistal spine and dorsomesial row of 6-15 small spines. Ambulatory legs with dactyls somewhat longer than propodi, dorsal and dorsomesial surfaces each with row of long setae, ventromesial surfaces each with 3 or 4 small corneous spinules; carpi each with dorsodistal spine, second pereopods also each often with 2 small spines dorsally. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Male without paired first gonopods, with unpaired left second pleopod; female with

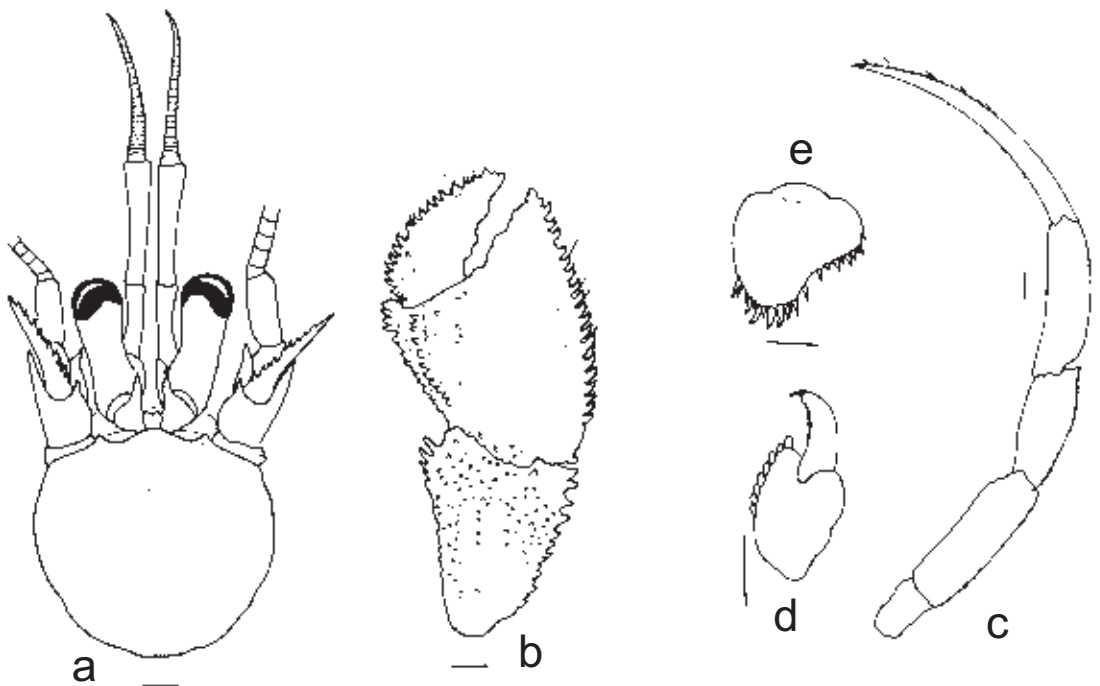
vestigial right second pleopod. Telson with posterior lobes separated by shallow median concavity; terminal margins each with row of corneous spines.

Size.– Maximum reported shield length 5.6 mm.

Coloration.– Shield and cephalic appendages, including ocular peduncles, and chelipeds pinkish-white. Ambulatory legs slightly darker light pink.

Habitat.– Gastropod shells.

Distribution.– Australia, Philippine Islands, Taiwan; 274-1070 m.



Male (3.1 mm), CP19: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm (**a-c**) and 0.5 (**d, e**).

Paragiopagurus hirsutus (de Saint Laurent, 1972)

CP212.

Parapagurus acutus hirsutus de Saint Laurent, 1972: 113, fig. 19.

Sympagurus acutus hirsutus– Lemaitre 1989: 37.

Paragiopagurus hirsutus– Lemaitre 1996: 217, fig. 28; Lemaitre, 2000: 221, fig. 71.

Material examined.– Nanfang-ao fishing port, Yilan County, 23 Mar 1999: 1 male (5.7 mm), (NTOU); CP58, 24°35.1'N, 122°05.8'E, 221-254 m, 4 Aug 2000: 1 female (3.8 mm), (NTOU); CP212, 24°34.60'N, 122°05.84'E, 223-260 m, 26 Aug 2003: 7 males (4.3-5.7 mm), 2 females (3.5, 4.3 mm), (NTOU).

Diagnosis.– Biserial gills. Shield as long as broad; dorsal surface weakly calcified medially; rostrum broadly rounded, with low dorsal ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with multifid spine. Antennular peduncles overreaching distal margins of corneas; antennal peduncles reaching distal corneal margins; antennal acicle also reaching distal margin of cornea, mesial margin with 8-13 spines; antennal flagellum with long setae. Epistomial spine straight, frequently bifid. Right cheliped with palm broader than long; surfaces with moderately dense setae; dactyl with longitudinal row of blunt spines on ventral face; dorsal face of palm with prominent spines, dorsolateral and dorsomesial margins each with row of strong spines, ventral face with numerous tubercles; carpus with numerous small tubercles or spines on dorsal surface. Left cheliped with few small spines on dorsal surface of chela; carpus with dorsal row of 2-6 small spines and prominent dorsodistal spine. Dactyls of ambulatory legs each with ventromesial row of 8-13 corneous spines; carpi each with small dorsodistal spine; carpi of second pereopods each also with 1-4 small spines on dorsal margin. Fourth pereopod with propodal rasp consisting of

1 row of ovate scales. Telson with rounded posterior lobes (left elongate) separated by U-shaped median cleft, terminal margins with curved, often long, corneous spines. Male lacking first gonopods, with unpaired, uniramous second left pleopod. Females with vestigial right second pleopod.

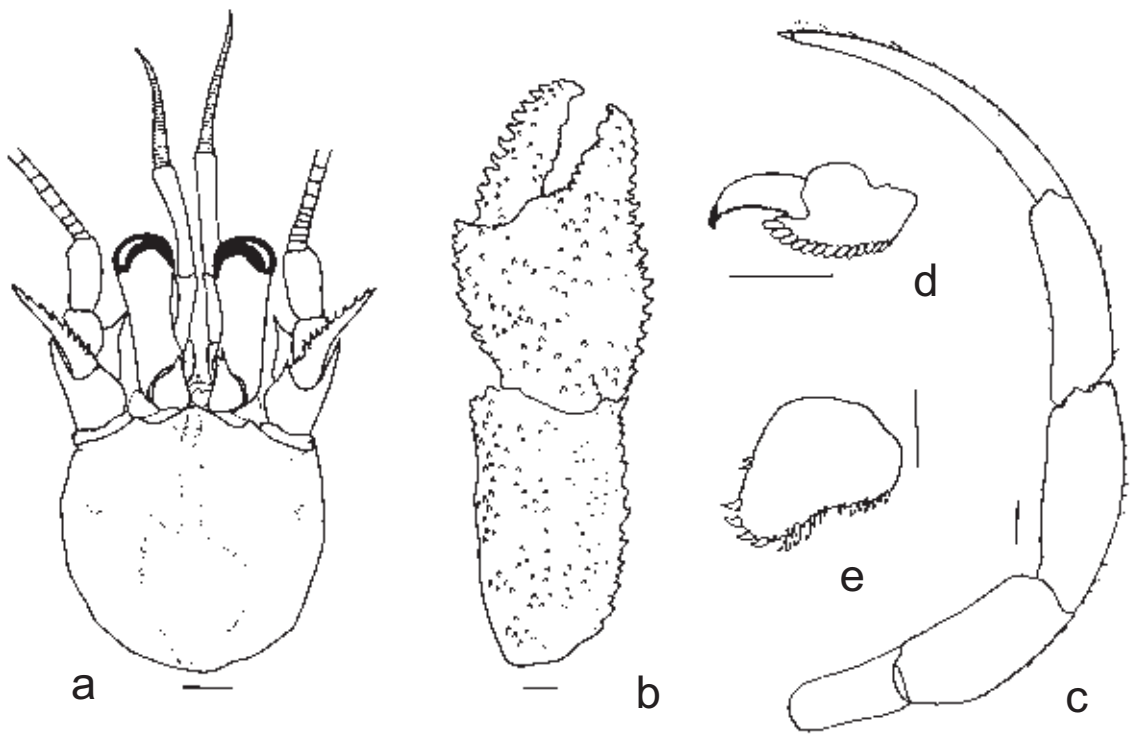
Size.– Maximum reported shield length 8.8 mm.

Coloration.– Shield whitish, tinged with light orange or generally reddish-orange; ocular peduncles and acicles light orange or reddish-orange. Chelipeds with chelae whitish-orange, spines darker; carpi whitish centrally, with dark reddish-orange band distally and proximally, spines also darker reddish-orange; meri generally whitish with areas or patches of dark reddish-orange. Ambulatory legs with dactyls light reddish-orange, tips white; propodi, carpi and meri, each banded light orange or reddish-orange and white.

Habitat.– Inhabits gastropod shells.

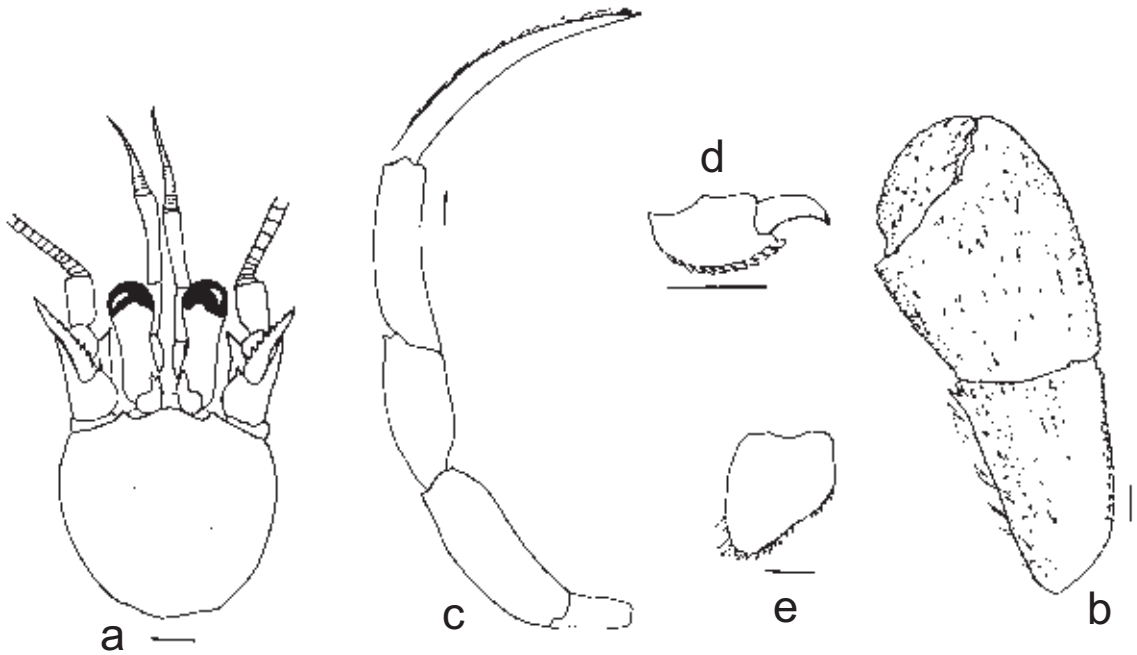
Distribution.– China Seas, Taiwan, Philippine Islands, Australia, New Zealand, questionably off Durban, South Africa; 221-505 m.

Remarks.– Two males from station CP212 were incorrectly identified as *Oncopagurus stockmani* Zhadan, 1997 in the online version of this catalog.



Male (5.3 mm), CP212: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of left fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Paragiopagurus acutus (de Saint Laurent, 1972)



Male (4.4 mm), Dasi fishing port, Yilan County, 5 Jul 2001: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** right third pereopod (lateral view); **d,** dactyl and propodus of right fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Parapagurus acutus acutus de Saint Laurent, 1972: 113, figs. 7, 8.

Sympagurus acutus acutus– Lemaitre, 1989: 37.

Paragiopagurus acutus– Lemaitre, 1996: 211, figs. 25, 26.

Material examined.– Dasi fishing port, Yilan County, 5 Jul 2001: 1 male (4.4 mm), (NTOU); Gueishan Island, Yilan County, normal st. 1, 24°50.699'N, 122°00.802'E, 350 m, 13 Jul 2005: 1 male (4.8 mm), (NTOU).– normal st. 4, 24°53.563'N, 122°00.342'E, 230 m, 13 Jul 2005: 3 males (5.0-5.3 mm), 2 ovig. females (4.3, 4.4 mm), (NTOU).– vent st. 6, 24°52.327'N, 121°59.512'E, 320 m, 12 Jul 2005: 1 male (4.0 mm), 3 females (3.8-4.0 mm), (NTOU).– vent st. 7, 24°52.171'N, 121°58.530, 247 m, 13 Jul 2005: 2 males (4.5, 4.9 mm), 1 female (4.1 mm), (NTOU); CP268, 24°30.46'N, 122°06.28'E, 421-531 m, 2 Sep 2004: 1 male (3.9 mm), (NTOU); no specific locality, 27 Sep 2002: 1 male (5.7 mm), (NTOU).

Diagnosis.– Gills biserial. Shield as long as broad, dorsal surface weakly calcified in posterior half; rostrum broadly rounded, with low median ridge. Ocular peduncles more than half length of shield, corneas slightly dilated; ocular acicles each with prominent multifid terminal spine. Antennular peduncles overreaching distal margins of corneas by lengths of ultimate segments; antennal peduncles reaching distal corneal margins; antennal acicle with 9-14 spines on mesial margin. Epistomial spine straight. Chelipeds with moderately dense setae; palm of right cheliped with scattered small spines on dorsal surface, dorsomesial and dorsolateral margins each with row of spines; carpus with numerous small spines and tubercles on dorsal surface, dorsolateral margin with row of spines. Left cheliped with few spinules on dorsal surface of palm;

carpus with prominent dorsodistal spine and dorsomesial row of small spines. Ambulatory legs with dactyls longer than propodi, dorsal and dorsomesial surfaces each with row of long setae, ventromesial surfaces each with 7-15 small to minute corneous spinules; carpi each with dorsodistal spine, second pereopods also each with row of small spines dorsally. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales. Male without paired first gonopods, with unpaired left second pleopod; female with vestigial right second pleopod. Telson with posterior lobes separated by broad, shallow median concavity; terminal margins each with 1 or more rows of corneous spines.

Size.– Maximum reported shield length 7.4 mm.

Coloration.– Not known.

Habitat.– Gastropod shells.

Distribution.– Australia, Indonesia, South China Sea, Philippine Islands, Taiwan, Japan; 161-558 m.

Parapagurus Smith, 1879

In contrast to the other non-monotypic parapagurid genera, species of *Parapagurus* are less frequently found in the western Pacific than other regions of the world's ocean (cf. Lemaitre, 1999: figs. 48-50). The three species found in Taiwanese waters also are present in the waters of Japan, Indonesia, eastern and southern Australia, New Caledonia and New Zealand. The remaining 14 species of the genus are found primarily in the south Atlantic, Indian and Eastern Pacific Oceans.

Key to the Taiwanese species *Parapagurus*

1. Propodal rasps of fourth pereopods each consisting 1 or more rows of lanceolate or conical scales; terminal margins of telsonal lobes each with more than 12 closely-spaced corneous spines ……2
- Propodal rasps of fourth pereopods each consisting of 1 row (at least distally) of ovate scales; terminal margins of telsonal lobes each with fewer than 10 widely-spaced corneous spines ……*P. richeri*
2. Length of propodi of second pereopods each more than 5 times greater than lateral width ……*P. furici*
- Length of propodi of second pereopods each less than 4 times greater than lateral width ……*P. latimanus*

Parapagurus richeri Lemaitre, 1999

CP285, male.

PCP333, ovig. female.

PCP341, ovig. female.

Parapagurus pilosimnus nudus– de Saint Laurent, 1972: 102 (in part), ?pl. 1, fig. 2.
Parapagurus richeri Lemaitre, 1999: 334, figs. 19-23, 47, 48.

Material examined.– CP53, 24°15.7'N, 122°11.6'E. 2947-2903 m, 3 Aug 2000: 1 male (7.0 mm), (NTOU); CD134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 6 males (3.7-9.4 mm), 2 ovig. females (7.5, 7.7 mm), (NTOU); CP141, 22°12.04'N, 119°59.96'E, 1110-985 m, 24 Nov 2001: 1 male (7.3 mm), (NTOU); CP179, 22°21.22'N, 119°54.78'E, 1212-1063 m, 25 Aug 2001: 1 male (5.2 mm), 1 ovig. female (6.9 mm), (NTOU); CP189, 21°39.91'N, 118°20.94'E, 1649-1629 m, 27 Aug 2002: 3 males (4.9-5.9 mm), (NTOU); CP190, 21°35.01'N, 118°15.02'E, 1650-1665 m, 28 Aug 2002: 1 male (7.9 mm), 1 female (3.0 mm), 2 ovig. females (5.4, 6.8 mm), (NTOU); CP191, 21°41.04'N, 118°21.95'E, 1630-1623 m, 28 Aug 2002: 1 male (5.3 mm), 1 female (4.8 mm), 2 ovig. females (5.3, 5.7 mm), (NTOU); CP192, 22°17.19'N, 120°01.01'E, 960-1302 m, 28 Aug 2002: 2 males (5.0, 6.3 mm), (NTOU); CD210, 24°28.99'N, 122°12.79'E, 500-1183 m, 1 Jun 2003: 1 ovig. female (6.6 mm), (NTOU); CD226, 22°19.15'N, 121°04.63'E, 1171-1212 m, 29 Aug 2003: 3 males (7.7-8.3 mm), (NTOU); CP284, 24°16.34'N, 122°11.67'E, 2220-2424 m, 16 Jun 2005: 1 female (5.3 mm), (NTOU); CP285, 24°16.09'N, 122°11.52'E, 2268-2426 m, 16 Jun 2004: 1 male (5.0 mm); CP300, 22°14.555'N, 119°58.719'E, 960-972 m, 11 Aug 2005: 2 males (7.5, 8.0 mm), 1 female (6.7 mm), 1 ovig. female (6.8 mm), (NTOU); PCP332, 22°13.975'N, 120°00.224'E, 961-1026 m, 5 Oct 2002: 6 males (4.9-8.2 mm), 4 females (4.7-6.4 mm), 1 ovig. female (7.3 mm), (NTOU); PCP333, 22°13.612'N, 120°01.917'E, 889-1037 m, 5 Oct 2002: 1 male (4.3 mm), 2 ovig. females (not measured), (NTOU); PCP334, 22°14.167'N, 119°59.259'E, 994-975 m, 5 Oct 2002: 2 males (7.6, 8.2 mm), 2 females (3.6, 6.4 mm), (NTOU); PCP342, 22°16.648'N, 119°59.960'E, 988-1010 m, 8 Mar 2006: 1 ovig. female (not measured), (NTOU); PCP343, 22°15.699'N, 120°02.131'E, 945-1059 m, 8 Mar 2006: 4 males (3.7-6.5 mm), 4 females (4.4-6.0 mm), 5 ovig. females (4.4-7.3 mm), (NTOU); PCP344, 22°15.952'N, 120°0.110'E, 995-1073 m, 8

Mar 2006: 4 males (5.0-7.4 mm), (NTOU); PCP350, 22°20.885'N, 121°07.659'E, 1149-1152 m, 2 Jun 2006: 2 males (6.9, 9.4 mm), 1 ovig. female (6.9 mm), (NTOU); PCP352, 22°16.776'N, 121°05.57'E, 1182-1200 m, 2 Jun 2006: 1 male (6.9 mm), (NTOU); PCP357, 22°08.952'N, 121°04.166'E, 1253-1260 m, 3 Jun 2006: 1 male (5.9 mm), (NTOU); CP364, 22°06.335'N, 121°08.224'E, 1275-1260 m, 24 Aug 2006: 1 male (9.7 mm), (NTOU); CP375, 24°16.240'N, 122°11.720'E, 2216-2497 m, 27 Aug 2006: 1 female (5.7 mm), 1 ovig. female (9.2 mm), (NTOU); no specific locality: 1 specimen not sexed (6.7 mm), (NTOU).

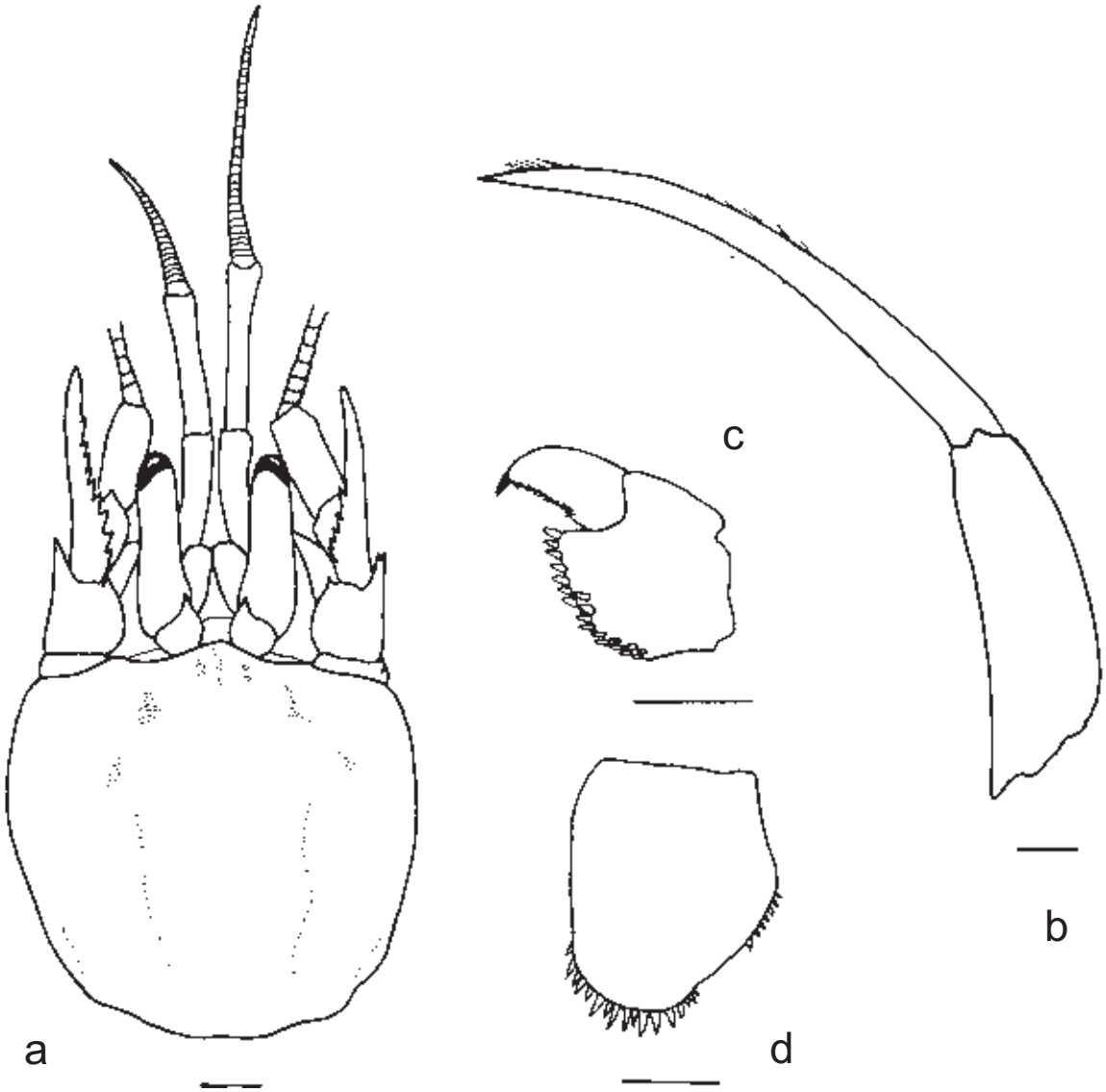
Diagnosis.– Gills deeply quadriserial. Shield approximately as long as broad, dorsal surface usually well calcified; rostrum broadly and bluntly subtriangular, with low median ridge. Ocular peduncles approximately half length of shield, corneas not dilated; ocular acicles each with prominent, simple, or rarely bifid terminal spine. Antennular and antennal peduncles both overreaching distal corneal margins, antennular peduncles longer; antennal acicle with 1-3, rarely as many as 8 small spines in proximal half. Epistomial spine usually present. Chelipeds with dorsal surfaces of carpi and chelae covered with moderately dense, simple and plumose setae; proportions of right carpus and chela influenced by size and sexual dimorphism. Palm and carpus of right cheliped each with numerous small spines and tubercles on dorsal surface. Palm of left cheliped unarmed or with few scattered spinules on dorsal surface; irregular row or rows of small spines or tubercles on carpus dorsally. Ambulatory legs with dactyls distinctly longer than propodi, ventromesial faces each with row of 8 or 9 corneous spinules; propodi 3.4 to 5.4 (second pereopods) and 3.1 to 5.3 (third pereopods) as long as high; small dorsodistal spine on each carpus. Fourth pereopod with propodal rasp consisting of 1 row of ovate scales at least distally. Telson with posterior lobes separated by moderately wide, shallow median concavity; terminal margins each usually with 7 or 8 moderately long, well-spaced corneous spines.

Size.– Maximum reported shield length 11.8 mm.

Coloration.– General appearance varying from mostly orange to almost entirely whitish. Shield and cephalic appendages pink to white; antennular flagella whitish-blue. Right cheliped with chela and carpus mostly white or tinged with pink. Other segments of right cheliped, left cheliped and ambulatory legs varying from orange, brownish-pink, light tan to whitish.

Habitats.– Gastropod shells (often with anthozoan polyp); occasionally scaphopod shells.

Distribution.– South Africa, Australia, New Zealand, Indonesia, Philippine Islands, South China Sea, Taiwan, Vanuatu; 311-4470 m.



Specimen not sexed (6.7 mm), no specific locality: **a**, shield and cephalic appendages (aesthetascs omitted); **b**, dactyl and propodus of left third pereopod (lateral view); **c**, dactyl and propodus of left fourth pereopod (lateral view); **d**, telson. Setae omitted. Scales equal 1 mm.

Parapagurus furici Lemaitre, 1999

PCP351, male.

CP41, a colony of *Epizoanthus* polyps encases this deep-water hermit crab, replacing the typical gastropod shell.

CP374, male.

CP369, ovig. female.

Parapagurus pilosimanus– Alcock, 1901: 218; Alcock, 1902: 133, fig. 67 [not *Parapagurus pilosimanus* Smith, 1879].

? *Parapagurus pilosimanus*– Wang, 1991: 244, fig. 204 [not *Parapagurus pilosimanus* Smith, 1879] (see remarks).

Parapagurus furici Lemaitre, 1999: 342, figs. 24-27, 47, 48.

Material examined.– CP41, 22°21.3'N, 121°07.7'E, 1124-1138 m, 1 Aug 2000: 1 male (11.2 mm), (NTOU); CP53, 24°15.7'N, 122°11.6'E, 2947-2903 m, 3 Aug 2000: 2 males, (8.8, 10.8 mm), 1 female (10.1 mm), 1 ovig. female (9.3 mm), (NTOU); CP125, 22°06.95'N, 120°02.35'E, 1274-1218 m, 20 Aug 2001: 1 female (5.5 mm), (NTOU); CP129, 22°05,89'N, 121°05.21'E, 1271-1275 m, 21 Aug 2001: 1 male (9.2 mm), (NTOU); CD133, 22°15.07'N, 120°08.02'E, 748-690 m, 21 Nov 2001:1 male (11.0 mm), (NTOU); CP134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 male (7.6 mm), (NTOU); CP185, 22°00.54'N, 119°27.94'E, 2334-2543 m, 26 Aug 2002: 2 males (7.2, 7.9 mm), (NTOU); CP189, 21°39.91'N, 118°20.94'E, 1649-1629 m, 27 Aug 2002: 4 males (3.1-7.7 mm), (NTOU); CP190, 21°35.01'N, 118°15.02'E, 1650-1665 m, 8 Aug 2002: 9 males (5.8-7.4 mm), 1 female (4.9 mm), 1 ovig. female (8.0 mm), (NTOU); CD199, 24°25.38'N, 122°12.41'E, 1138-1187 m, 12 Sep 2002: 4 males (8.4-9.8 mm), 2 females (6.7, 6.9 mm), 2 ovig. females (5.6, 6.2 mm), (NTOU); CD206, 22°05.67'N, 122°02.65'E, 1278-1298 m, 30 May 2003:1 male (10.9 mm), (NTOU); CD226, 22°19.15'N, 121°04.63'E, 1171-1212 m, 29 Aug 2003: 3 ovig. females (7.2-10.6 mm), (NTOU); PCP351, 22°18.245'N, 121°07.527'E, 1151-1168 m, 2 Jun 2006: 2 males (11.8, 12.3 mm), 1 female (7.5 mm), (NTOU); PCP356, 22°15.114'N, 121°04.645'E, 1196-1210 m, 3 Jun 2006: 1 male (7.4 mm), (NTOU); CP365, 22°04.322'N, 121°09.199'E, 1291-1295 m, 24 Aug 2006: 4 males (6.9-9.1 mm), (NTOU); CP369, 24°18.965'N, 122°04.204'E, 3030-3070 m, 25 Aug 2006: 1 male (not measured), 2 ovig. females (not measured), (NTOU); CP372, 24°23.619'N, 122°14.138'E, 1220-1280 m, 26 Aug 2006: 2 males (5.8, 6.7 mm), 1 female (8.1 mm), 1 ovig. female (4.7 mm), (NTOU); CP374, 24°19.195'N, 122°04.220'E, 3032-3065 m, 26 Aug 2006: 1 male (13.2 mm), (NTOU).

Diagnosis.– Gills deeply quadriserial. Shield approximately as long as broad, dorsal surface usually well calcified; rostrum broadly and bluntly subtriangular, with low median ridge. Ocular peduncles approximately half length of shield, corneas not dilated; ocular acicles each with prominent simple terminal spine. Antennular and antennal peduncles both overreaching distal corneal margins, antennular peduncles longer; antennal acicle usually unarmed, occasionally with 1-3 small spines. Epistomial spine usually absent. Chelipeds with dorsal surfaces of carpi and chelae covered with moderately dense, simple and plumose setae; proportions of right carpus and chela influenced by size and sexual dimorphism; palm and carpus each with numerous small spines and tubercles on dorsal and ventral surfaces, fewer ventrally. Palm of left cheliped unarmed or with few scattered spinules on dorsal surface; irregular row of small spines on carpus dorsally. Ambulatory legs with dactyls nearly twice as long as propodi, ventromesial faces each with row of approximately 12 corneous spinules; propodi 5.2 to 7.9 (second pereopods) and 5.0 to 7.0 (third pereopods) as long as high; small dorsodistal spine on each carpus. Fourth pereopod with propodal rasp consisting of 1 or 2 irregular rows of conical scales at least distally. Telson with posterior lobes separated by small V-shaped median cleft; terminal margins each 15 or more closely-spaced corneous spines.

Size.– Maximum reported shield length 12.3 mm.

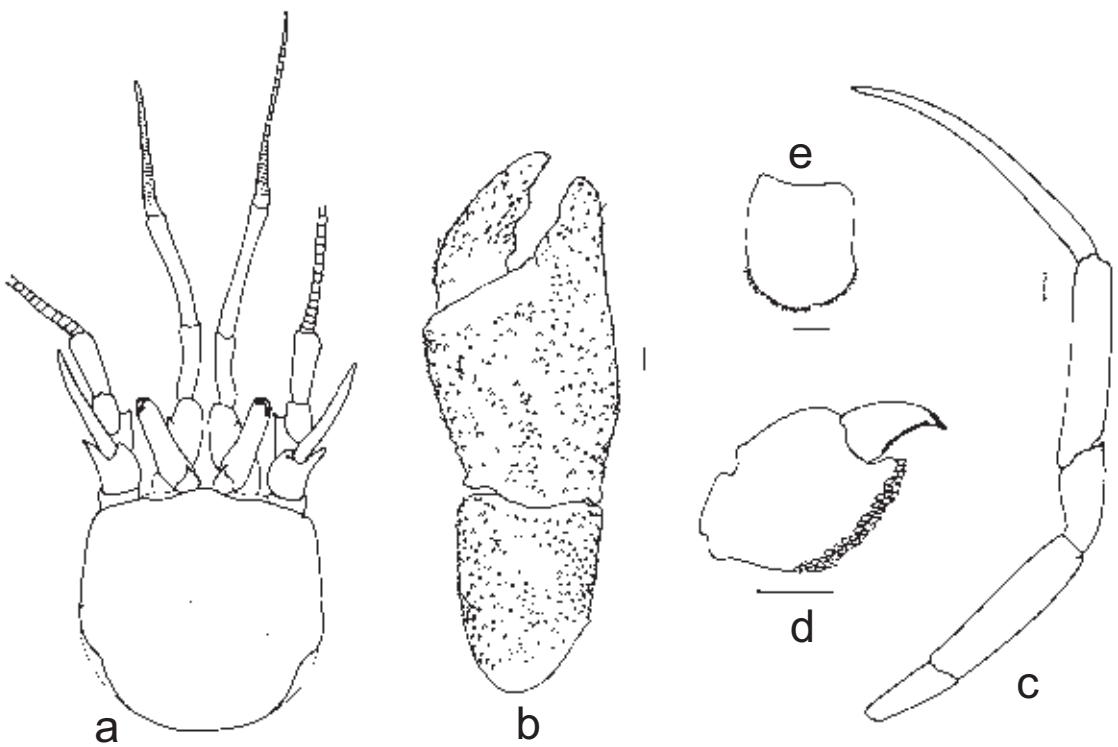
Coloration.– Body varying from mostly orange to nearly whitish. Shield, ocular peduncles and acicles and proximal segments of antennae reddish-orange, light orange or light pink, distal segments of antennular and antennal peduncles darker orange, reddish-orange or light pink; antennular flagella blue. Right cheliped cream to faintly tinged with orange or reddish-orange, meri sometimes darker orange or reddish-orange. Left

cheliped like right or entirely reddish-orange. Ambulatory legs uniformly dark orange, reddish-orange, light pink or nearly whitish.

Habitat.– Usually living in shelters formed by zoanthids.

Distribution.– Arabian Sea, Australia, New Zealand, Indonesia, Philippine Islands, South China Sea, Taiwan, Japan, Vanuatu; 311-3032 m, possibly 3070 m.

Remarks.– Wang (1991) provided a diagnosis and illustration of a taxon he identified as *Parapagurus pilosimanus* Smith, 1879; however, as pointed out by Lemaitre (1999), *P. pilosimanus* occurs only in the Atlantic. Of the three species of the genus found in the western Pacific, Lemaitre reported both *P. furici* and *P. richeri* from the South China Sea off Taiwan, but included Alcock's (1901, 1902) accounts of *P. pilosimanus* only in the synonymy of *P. furici*. Wang's (1991) mention of the use of the cnidarian, *Epizoanthus*, as a carcinoecium by his species, suggests that he may have based his identification of Alcock's (1902: fig. 67) figure. For this reason, we have questionably placed Wang's (1991) account in the synonymy of *P. furici*.



Ovig. female (9.4 mm), CP53: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** carpus and chela of right cheliped; **c,** left third pereopod (lateral view); **d,** dactyl and propodus of right fourth pereopod (lateral view); **e,** telson. Setae partially omitted. Scales equal 1 mm.

Parapagurus latimanus Henderson, 1888

PCP341, male.

CP241, ovig. female.

CD143, ovig. female.

Parapagurus latimanus Henderson, 1888: 91, pl. 9, fig. 2; Lemaitre & McLaughlin 1992: 762, fig. 9; Lemaitre 1999: 310, figs. 3, 47, 48; Lemaitre, 2000: 229, fig. 75.

Parapagurus pilosimanus pilosimanus– de Saint Laurent, 1972: 102 (in part).

Parapagurus pilosimanus latimanus– de Saint Laurent 1972: 103, pl. 1, fig. 5.

? *Parapagurus pilosimanus*– Takeda, 1982: 64, unnumbered fig.

Material examined.– CP38, 21°57.5'N, 121°03.2'E, 1316-1317 m, 1 Aug 2000: 1 female (7.0 mm), (NTOU); CP53, 24°15.7'N, 122°11.6'E, 2947-2903 m, 3 Aug 2000: 1 ovig. female (9.4 mm), (NTOU); CP129, 22°05.89'N, 121°05.21'E, 1271-1275 m, 21 Aug 2001: 1 female (7.3 mm), (NTOU); CP134, 22°16.56'N, 120°06.11'E, 736-1040 m, 22 Nov 2001: 1 ovig. female (7.7 mm), (NTOU); CD136, 22°07.75'N, 120°00.87'E, 1211-998 m, 22 Nov 2001: 1 ovig. female (6.9 mm), (NTOU); CD143, 24°57.39'N, 121°18.16'E, 1170-1145 m, 18 May 2002: 1 ovig. female (9.7 mm), (NTOU); CP179, 22°21,22'N, 119°54.78'E, 1212-1063 m, 25 Aug 2002: 1 female (5.6 mm), (NTOU); CP185, 22°00.54'N, 119°27.94'E, 2334-2543 m, 26 Aug 2002: 3 males (5.6-8.2 mm), 3 ovig. females (6.6-10.1 mm), (NTOU); CP189, 21°31.91'N, 118°20.94'E, 1649-1629 m, 27 Aug 2002: 2 females (4.5, 6.2 mm), 3 ovig. females (4.4-6.2 mm), (NTOU); CP190, 21°35.01'N, 118°15.02'E, 1650-1665 m, 28 Aug 2002: 1 male (6.2 mm), 6 females (2.8-6.1 mm), 1 ovig. female (4.9 mm); CP191: 21°41.04'N, 118°21.95'E, 1630-1623 m, 28 Aug 2002: 1 female (6.3 mm), (NTOU); CD199, 24°25.38'N, 122°12.41'E, 1138-1187 m, 12 Sep 2002: 1 male (4.1 mm), (NTOU); CP241, 25°09.51'N, 122°31.87'E, 970-975 m, 24 Jul 2004: 1 male (10.5 mm), 1 ovig. female (10.7 mm), (NTOU); CP300, 22°14.555'N, 119°58.719'E, 960-972 m, 11 Aug 2005: 1 male (5.7 mm), 1 female (5.8 mm), (NTOU); PCP333, 22°13.612'N, 120°01.917'E, 889-1037 m, 5 Oct 2005: 1 female (7.5 mm), (NTOU); PCP342, 22°16.648'N, 119°59.960'E, 988-1010 m, 8 Mar 2006: 1 male (not measured), 1

ovig. female (not measured), (NTOU); PCP343, 22°15.699'N, 120°02.131'E, 945-1059 m, 8 Mar 2006: 1 female (6.8 mm), (NTOU); PCP357, 22°08.952'N, 120°04.166'E, 1253-1260 m, 3 Jun 2006: 1 ovig. female (6.4 mm), (NTOU); CP374, 24°19.195'N, 122°04.220'E, 3032-3065 m, 26 Aug 2006: 1 ovig. female (10.6 mm), (NTOU); no specific locality: 1 specimen, not sexed (6.9 mm), (NTOU).

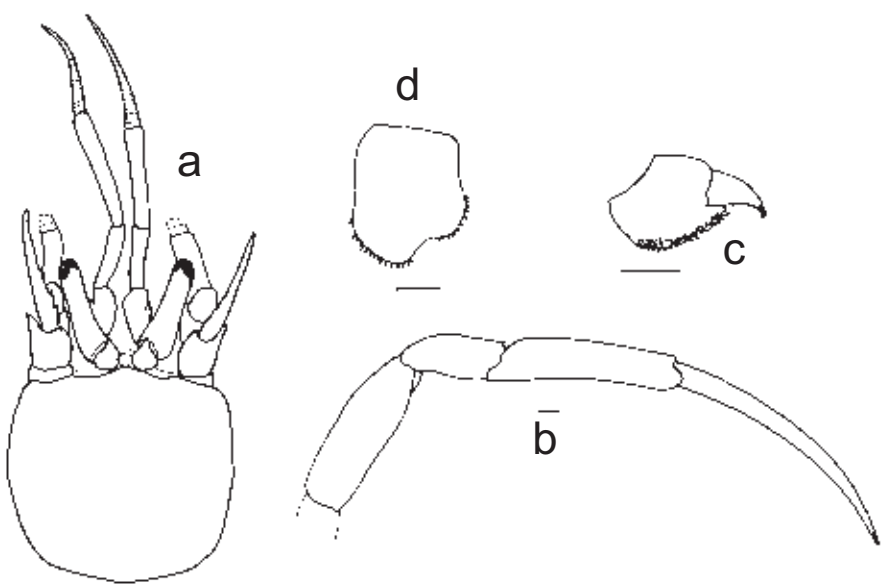
Diagnosis.– Gills deeply quadriserial. Shield approximately as broad as long, dorsal surface well calcified; rostrum broadly rounded, with short median ridge. Ocular peduncles less than half length of shield, corneas not dilated; ocular acicles each terminating in usually simple, rarely bifid, spine. Antennular and antennal peduncles both overreaching distal margins of corneas, antennular peduncles longer; antennal acicle long, mesial margin with 1-6 small spines or tubercles in proximal half, rarely unarmed. Epistomial spine usually absent. Chelipeds with dorsal surfaces of carpi and chelae covered with moderately dense, simple and plumose setae; proportions of carpus and chela of right cheliped influenced by size and sexual dimorphism; palm and carpus each with numerous small spines and tubercles on dorsal surface. Left cheliped often with few tiny spinules on chela; carpus with irregular row of small spines or tubercles on dorsal margin. Ambulatory legs with propodi less than 4 times as long as high, with dorsodistal spine on each carpus. Fourth pereopod with propodal rasp consisting of 2, or rarely 3, often irregular rows of lanceolate or conical scales. Females with rudimentary right second pleopod. Telson with posterior lobes separated by V-shaped median cleft; rounded terminal margins each with moderately long, evenly-spaced corneous spines, spines on left frequently extending down lateral margin.

Size.– Maximum reported shield length 16.0 mm.

Coloration.– Body varying from generally orange to almost entirely whitish. Shield whitish-orange to whitish. Ocular peduncles light orange to whitish. Antennular peduncles whitish, light orange or dark reddish-orange, flagella light blue. Antennal peduncles light to darker orange. Right cheliped white to light orange; left cheliped generally light orange or whitish. Ambulatory legs overall light to moderately dark orange, or whitish.

Habitat.– Usually found living in shelters formed by zoanthids, possibly species of *Epizoanthus*.

Distribution.– East Africa off Kenya, Australia, New Zealand, Indonesia, New Caledonia, Taiwan, Japan; 400-3,032 m, possibly to 3,065 m.



Specimen not sexed (6.9 mm), no specific locality: **a,** shield and cephalic appendages (aesthetascs omitted); **b,** right third pereopod (lateral view); **c,** dactyl and propodus of right fourth pereopod; **d,** telson. Setae omitted. Scales equal 1 mm.

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A CATALOG OF THE HERMIT CRABS (PAGUROIDEA) OF TAIWAN

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