

A REVIEW OF THE OCYPODID AND MICTYRID CRABS
(CRUSTACEA: DECAPODA: BRACHYURA)
IN TAIWAN

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Jung-Fu Huang, Hsiang-Ping Yu and Masatsune Takeda (1992) A review of the ocypodid and mictyrid crabs (Crustacea: Decapoda: Brachyura) in Taiwan. *Bull. Inst. Zool., Academia Sinica* 31(3): 141-161. In this study, the crab families, Ocypodidae and Mictyridae, from Taiwan are reviewed. The Ocypodidae is represented by eight genera and twenty-five species, including *Paracleistostoma depressum* de Man (a newly recorded species from Taiwan) and the Mictyridae, which is represented by only species—*Myctyrus brevidactylus* Stimpson. The main morphological, distributional, and ecological characters of these species—with their keys to all taxonomical ranks—are provided.

Key words: Taiwan, Ocypodidae, Mictyridae.

Taiwanese crab fauna were first studied by Maki and Tsuchiya (1923), who reported 11 families, 36 genera, and 61 species. Later, Sakai (1935), Miyake (1938), and Horikawa (1940) added 7, 10, and 7 species, respectively. In 1949, Lin listed 21 families, 108 genera, and 222 species in his catalogue of the brachyurous crustacea of Taiwan. However, there have been no serious studies on Taiwanese crab fauna since then; therefore, we conducted several extensive samplings around Taiwan (including the adjacent Penghu, Lan-Yu, and Green Islands and Jinmen) to gain a better understanding of Taiwanese crab fauna.

The present report deals with those species of the families Ocypodidae and

Mictyridae, which mainly inhabit estuaries and littoral areas. A total of 7 genera and 17 species of the Ocypodidae, and 1 genus and 1 species of the Mictyridae, are described here; diagnostic keys and illustrations are also provided. Another eight species of the genus *Uca* of the Ocypodidae have been reported on elsewhere (Huang *et al.*, 1989). In this study, the distinguishing characters of species other than the newly recorded *Paracleistostoma depressum* are mostly attributed to Sakai (1976).

MATERIALS AND METHODS

All specimens examined were collected from creeks and brooks. They are deposited at the Fisheries Department

of National Taiwan Ocean University (NTOU) and at the department of Zoology, Taiwan Provincial Museum.

Terms and colors used in describing the various parts of crabs mainly follow Sakai (1976) and the Stanley Gibbons Stamp Colour Key, respectively.

RESULTS

Key to the families ocypodid and mictyridal crabs in Taiwan

1. Carapace somewhat quadrilateral or subglobose. Outer orbital angle not sharply pointed.....Ocypodidae
- Carapace subcircular. Outer orbital angle thorny.....Mictyridae

Family Ocypodidae Ortmann, 1894

Key to subfamilies of Ocypodidae in Taiwan

1. Anterolateral margins of carapace without teeth. Chela of male unequal.....Ocypodinae
- Anterolateral margins of carapace usually with distinct teeth. Chela of male subequal.....2
2. Ambulatory leg IV hairy and shorter than other legs. Lateral margins of abdominal somite V of male convexed or weakly concaved.....
-Macrophthalminae
- Ambulatory leg IV not hairy and subequal to other legs. Lateral margins of abdominal somite V of male deeply concaved.....Scopimerinae

Subfamily Ocypodinae Dana, 1851

Key to genera of Ocypodinae in Taiwan

1. Basal width of immovable finger of major chela subequal to length. A hairy-ridged pouch exists between bases of ambulatory legs II and III.....*Ocypode*
- Basal width of immovable finger of

major chela two times longer than length. No hairy-ridged pouch between bases of ambulatory legs II and III.....*Uca*

Genus *Ocypode* Weber, 1795

Key to Taiwanese species of genus *Ocypode*

1. Inner surface of palm without stridulating apparatus. Exopod of third maxilliped shorter than coxa.....*O. cordimana*
- Inner surface of palm with stridulating apparatus. Exopod of third maxilliped subequal to or longer than coxa.....2
2. Cornea with prolonged projection. Ventral margin of merus of ambulatory leg I serrated.....*O. ceratophthalmus*
- Cornea without prolonged projection. Ventral margin of merus of ambulatory leg I smooth.....*O. stimpsoni*

Ocypode cordimana Desmarest, 1825

(Fig. 1; Plate 1A)

Ocypoda cordimana Desmarest, 1825: 121 (not seen); Ortmann, 1893:764; Sakai, 1976:599.

Ocypode cordimanus, Haswell, 1882:95; Stimpson, 1907:110; Miyake, 1983:161.

Ocypode cordimana, Ortmann, 1897:362; Alcock, 1900:349; Tesch, 1918:35; Sakai, 1934:319; Tweedie, 1937:141; Lin, 1949:26.

Materials examined: 4♂♂, cl. 17-20 mm, cw. 21-23 mm, fw. 3-4 mm, 28 Jan. 1986, Dan-Hai, Taipei County. 1♂, cl. 20 mm, cw. 23 mm, fw. 4 mm; 1♀, cl. 19 mm, cw. 23 mm, fw. 4 mm, 2 Apr. 1984, Lan-Yan Creek, I-Lan County.

Coloration: Carapace brownish ochra, anteromedian region ochre. Frontal, gastric, and cardiac regions covered with yellowish brown spots. Chela yellowish except dactylus, distal part of palm whitish. Color of ambulatory legs similar to that of carapace.

Habitat: This species lives and digs

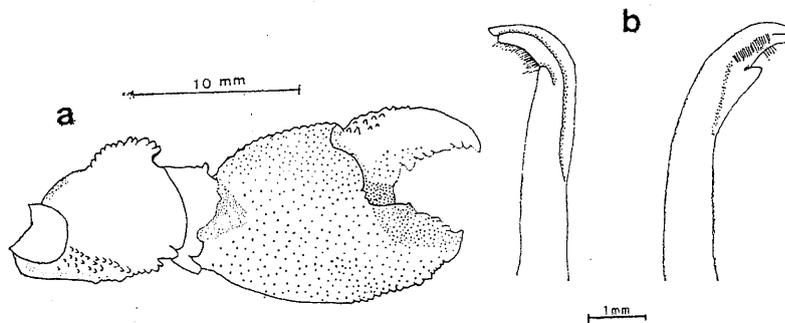


Fig. 1. *Ocypode cordimana* Desmarest, 1825. a. Inner view of major chela (♂); b. Distal portion of gonopod.

holes in sandy areas above high spring tide levels.

Distribution: This species has been recorded in the Western Pacific from Sagami Bay in central Japan through northeast Taiwan, and from the Indian Ocean to the Red Sea and the east coast of Africa.

Remarks: The presence of a stridulating apparatus with a row of long oval granules on the inner surface of the palm distinguishes this species from two other Taiwan species. *Ocypode stimpsoni* and *O. ceratophthalmus*.

***Ocypode ceratophthalmus* (Pallas, 1772)**

(Fig. 2; Plate 1B)

Cancer ceratophthalmus Pallas, 1772: 83 (not seen).

Ocypode ceratophthalma, Ortmann, 1893:767; Stimpson, 1907: 108; Maki and Tsuchiya, 1923:202; Sakai, 1976:600; Miyake, 1983:158.

Ocypoda ceratophthalma, Haswell, 1882:94; Ortmann, 1897:364; Alcock, 1900:345; Laurie, 1906:426; Tesch, 1918:36; Lin, 1949:26.

Materials examined: 1♂, cl. 27 mm cw. 31 mm, fw. 4 mm, 7 Dec. 1985, Pu-Din, Pindong County. 1♂, cl. 34 mm, cw. 37 mm, fw. 5 mm; 1♀, cl. 32 mm, cw. 37 mm, fw. 5 mm, 03 Apr. 1988, Mi-Tou, Kaoshiung County. 7♂♂, cl. 22-37 mm, cw. 26-44 mm, fw. 4-5 mm; 5♀♀, cl. 35-37 mm, cw. 40-41 mm, fw. 5-6 mm, 03 Dec. 1985, Chi-chin, Kaohsiung City.

Coloration: The lateral surface and hepatic and branchial regions of carapace are pale carmine with yellowish olive. Longitudinal midline olive-yellow, lateral parts of intestinal region marked with a brownish black U-shaped marking. Chelipeds and ambulatory legs brownish ochre, with whitish dactylus and palm of chela.

Habitat: This species inhabits sandy

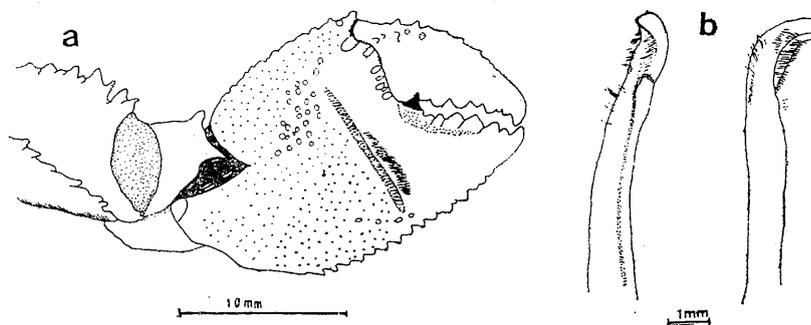


Fig. 2. *Ocypode ceratophthalmus* (Pallas, 1772). a. Inner view of major chela (♂); b. Distal portion of gonopod.

beaches and digs holes above high spring tide levels, sometimes hiding under rocks at ebb tide.

Distribution: From Tokyo Bay, central Japan, Taiwan, and the Hawaiian Islands through Australia and the Indian Ocean to the Red Sea and east coast of Africa.

Remarks: This species is characterized by having a prolonged tubercle at the distal end of the eye, though in females the tubercle is apparently shorter than that found in males. It is further distinguished from *Ocypode cordimana* in having the stridulating apparatus with a line of oval granules on the inner surface of the palm.

***Ocypode stimpsoni* Ortmann, 1897**

(Fig. 3; Plate 1C)

Ocypode convexa, Ortmann, 1893:769; Stimpson, 1907: 109.

Ocypoda stimpsoni Ortmann, 1897:367; Shen, 1932: 268; Sakai, 1934:319; 1935:211; 1965:189; Lin, 1949:26.

Ocypode stimpsoni, Sakai, 1976:599; Miyake, 1983: 161.

Materials examined: 1 ♂, cl. 13 mm, cw. 15 mm, fw. 3 mm; 2 ♀♀, cl. 10 & 14 mm, cw. 12 & 17 mm, fw. 2 & 3 mm, 04 Apr. 1988, Lan-Yan Creeks, I-Lan County. 1 ♀, cl. 23 mm, cw. 27 mm, fw. 4 mm, 08 May 1988, Dan-Shui River, Taipei County. 3 ♂♂, cl. 11-18 mm, cw. 14-20 mm, fw. 3-4 mm; 1 ♀,

cl. 14 mm, cw. 16 mm, fw. 3 mm, 13 Sep. 1988, Wu Creek, Taichung county. 2 ♂♂, cl. 10 & 15 mm, cw. 11 & 17 mm, fw. 2 & 3 mm; 2 ♀♀, cl. 19 & 22 mm, cw. 22 & 28 mm, fw. 3 & 4 mm, 02 Jan. 1988, Mi-Tou, Kaoshiung County. 4 ♀♀, cl. 6-15 mm, cw. 7-17 mm, fw. 1-3 mm, 06 Dec. 1985, Nan-Wan, Pindong County.

Coloration: Carapace yellowish and sometimes covered with brownish olive on lateral or median areas. Ambulatory legs chrome-yellow. Chelae bright orange-yellows.

Habitat: This species inhabits sandy beaches above high tide levels.

Distribution: This species has been recorded from northern Honshu to Kyushu in Japan, along the coasts of Korea facing the Korea Strait and the Yellow Sea, along the China coast south to Hong Kong, and in northern and western Taiwan.

Remarks: This species usually feeds on and digs holes near the carcasses of fishes, shrimps, and organic debris. One crab making an attack on a *Mictyris brevidactylus* wandering on a sandy mud flat was observed by the authors in Taiwan. In the Ogasawara and Ryukyu Islands it is well known that *Ocypode cordimana* is one of the natural enemies of young sea turtles. On the Japanese mainland this species inhabits clean sandy

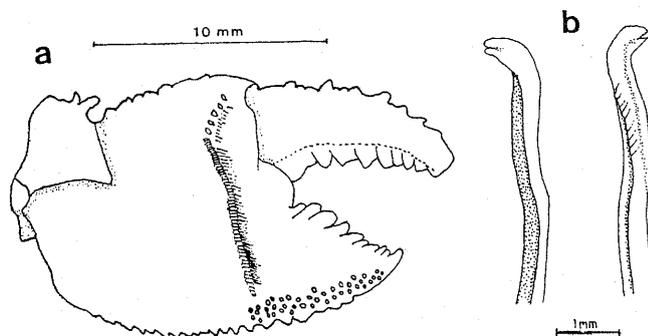


Fig. 3. *Ocypode stimpsoni* Ortmann, 1897. a. Inner view of major chela (♂); b. Distal portion of gonopod.

beaches and has no chances to encounter either other crabs or newly-hatched turtles crawling out from their nests.

Subfamily Macrophthalminae Dana, 1852

Key to genera of the subfamily
Macrophthalminae

1. Anterolateral margins smooth. Surface of ischium of third maxilliped marked with a row of hairs.....
.....*Paracleistostoma*
- Anterolateral margins notched. Hairs on surface of ischium of third maxilliped not aligned in a row....2
2. Ischium of third maxilliped markedly longer than merus. Margins of abdominal somite V oblique in males
.....*Macrophthalmus*
- Ischium of third maxilliped as long as merus. Margins of abdominal somite V weakly concave in males..*Leipocton*

Genus *Paracleistostoma* De Man, 1895

***Paracleistostoma depressum* De Man, 1895**

(Fig. 4; Plate 1D)

Paracleistostoma depressum De Man, 1895:581; Tesch, 1918:63; Tweedie, 1937:157; Manning and Holthuis, 1981:208; Dai *et al.*, 1986:443.

Materials examined: 2♂♂, cl. 8 & 9 mm, cw. 11 & 12 mm, fw. 3 & 4 mm, 24 Sep. 1988, Chu-Wei, Taipei County.

Diagnosis: Carapace subglobose, with deep furrow delimiting gastric, branchial, and cardiac regions. Metabranial region sloping to form a transverse strium. Merus of third maxilliped as long as ischium, which is protruded at inner anterior edge. First two sternum somites separated by a row of granules. Abdomen of male markedly convexed, second to fifth somites united. Gonopod slender, distal portion curved and swollen, tip thin and recurved toward main stem.

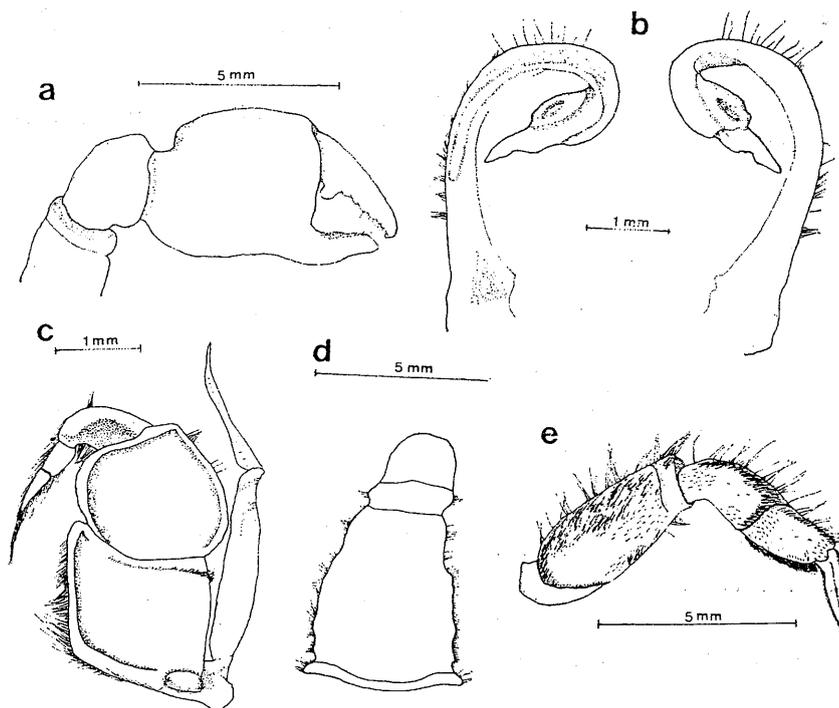


Fig. 4. *Paracleistostoma depressum* De Man, 1895. a. Outer view of chela (♂); b. Distal portion of gonopod; c. Third maxilliped; d. Abdomen of male in dorsal view; e. Fourth ambulatory leg.

Palm of male stout. Fingers with a large gape. Cutting edge of movable finger with a stout tubercle near base. Median pair of ambulatory legs larger than first and fourth legs. Segments of first ambulatory leg short and generally smooth. Second to fourth ambulatory legs covered with hairs on meri, carpi, and propodi; third pair contains densest hairs.

Coloration: Carapace and posterior three ambulatory legs ochre. Chelae and first ambulatory leg yellowish brown.

Habitat: This species is found in muddy to sandy mud substrata in estuaries.

Distribution: This species has been recorded in Fukien, Taiwan, Hainan, Singapore, and along the west coast of the Malay Peninsula.

Remarks: The color of this species is yellowish brown, similar to the color of its habitat and used as camouflage. When alarmed, it always becomes motionless by holding the ambulatory legs.

Genus *Macrophthalmus* Latreille, 1829

Key to subgenera of the genus *Macrophthalmus*

1. First two anterolateral teeth more or less parallel.....(*Macrophthalmus*)
 - First two anterolateral teeth V-shaped, divergent.....2
2. Merus of third maxilliped markedly smaller than ischium. Breadth of carapace about 1.5 times longer than length.....(*Mareotis*)
 - Merus of third maxilliped subequal to ischium. Breadth of carapace about 1.3 times longer than length.....
 -(*Mopsocarcinus*)

Subgenus *Macrophthalmus* Latreille, 1829

Key to Taiwanese species of the subgenus *Macrophthalmus*

1. Dorsal and ventral surfaces of palm

of chela with granules. Distal ends of dorsal margins of meri of second and third ambulatory legs unarmed
.....*Macrophthalmus abbreviatus*

- Dorsal and ventral surfaces of palm of chela smooth. Distal ends of dorsal margins of meri of second and third ambulatory legs armed each with an acute spine...*Macrophthalmus convexus*

Macrophthalmus (*Macrophthalmus*)

abbreviatus Manning &

Holthuis, 1981

(Fig. 5; Plate 1E)

Ocypode (*Macrophthalmus*) *dilatata*, De Haan, 1835: 55.

Macrophthalmus dilatatum, Ortmann, 1893:744; Shen, 1932:220; Sakai, 1934:320; 1976:190; Horikawa, 1940:28; Kamita, 1941:164; Lin, 1949:27; Takeda, 1982:210.

Macrophthalmus (*Macrophthalmus*) *dilatatus*, Sakai, 1976:613.

Macrophthalmus (*Macrophthalmus*) *abbreviatus* Manning and Holthuis, 1981:204; Miyake, 1983:167.

Materials examined: 5♂♂, cl. 9-13 mm, cw. 18-29 mm, fw. 3-4 mm; 1♀, cl. 9 mm, cw. 20 mm, fw. 3 mm, 13 Sep. 1988, San-Tiou-Lon, Yunlin County. 1♀, cl. 7 mm, cw. 14 mm, fw. 2 mm, 5 Oct. 1990, Lu-Kang, Changhua County.

Coloration: Carapace and ambulatory legs olive-bistre. Outer surfaces of chelae rose-bistre.

Habitat: This species lives in sandy mud areas in estuaries near lower tidal levels affected by wave action.

Distribution: This crab ranges from Tokyo Bay and central Japan to Taiwan and along the coasts of Korea and China.

Remarks: This species always erects its eyestalks above the water surface after wave action during incoming tides. It feeds near its burrows, which are covered by water. When disturbed, it quickly returns to the burrow.

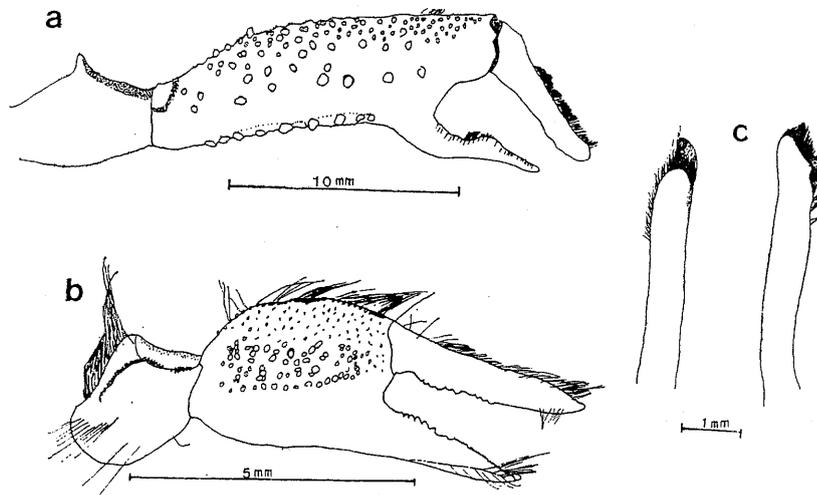


Fig. 5. *Macrophthalmus (Macrophthalmus) abbreviatus* Manning & Holthuis, 1981. a. Outer view of chela (♂); b. Outer view of chela (♀); c. Distal portion of gonopod.

***Macrophthalmus (Macrophthalmus) convexus* Stimpson, 1858**

(Fig. 6; Plate 1F)

Macrophthalmus convexus Stimpson, 1858:97; 1907:97; Miers, 1880:307; Haswell, 1882:89; Ortmann, 1897:343; Alcock, 1900:378; De Man, 1902:

493; Balss, 1922:45; Tweedie, 1937:163; Sakai, 1939:626; Lin, 1949:27; Takeda, 1982:210.

Macrophthalmus (Macrophthalmus) convexus, Barnes, 1967:211; 1970:222; 1971:9; Sakai, 1976:613; Miyake, 1983:167; Dai *et al.*, 1986:431.

Materials examined: 1♂, cl. 9 mm, cw. 16 mm, fw. 2 mm; 1♀, cl. 6 mm, cw. 9 mm, fw. 1 mm, 06 Sep. 1990, How-Liau, Penghu County.

Coloration: Carapace slate-purple and densely covered with deep claret spots. Thoracic legs greyish lilac, with dactylus carmine rose.

Habitat: This species feeds during ebb tide in wet sandy mud in estuaries small stones.

Distribution: This species has been recorded from the Ryukyu Islands to Taiwan, Guangdong in Mainland China, Malaysia, Australia and Hawaii.

Subgenus *Mareotis* Barnes, 1967

Key to Taiwanese species of the subgenus *Mareotis*

1. Immobile finger of male markedly deflexed.....*Macrophthalmus japonicus*
- Immobile finger of male slightly deflexed, almost straight.....
.....*Macrophthalmus boteltobago*

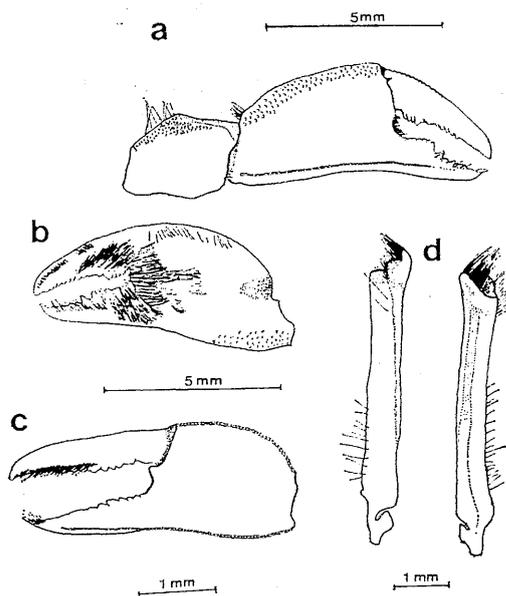


Fig. 6. *Macrophthalmus (Macrophthalmus) convexus* Stimpson, 1858. a. Outer view of chela (♂); b. Inner view of chela (♂); c. Outer view of chela (♀); d. Distal portion of gonopod.

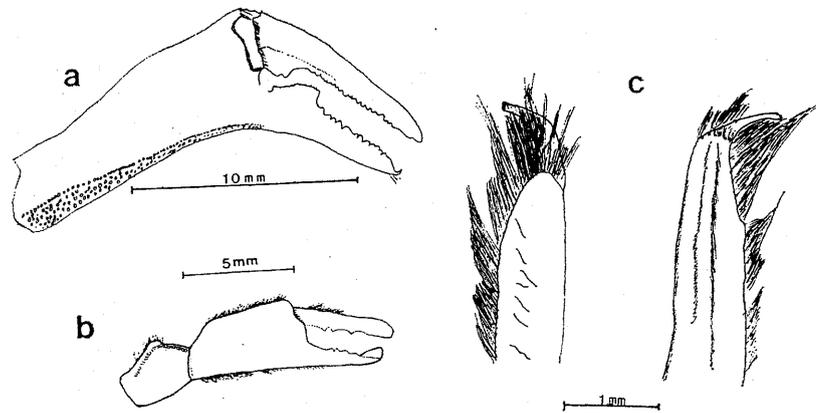


Fig. 7. *Macrophthalmus (Mareotis) japonicus* (De Haan, 1835). a. Outer view of chela (♂); b. Outer view of chela (♀); c. Distal portion of gonopod.

Mabrophthalmus (Mareotis) japonicus
(De Haan, 1835)

(Fig. 7; Plate 1G)

Ocypode (Macrophthalmus) japonica De Haan, 1835: 54.

Macrophthalmus japonicus, Ortmann, 1893: 746; Yokoya, 1928:779; Shen, 1932:215; Sakai, 1934:320; 1935:215; 1965:190; Kamita, 1941: 169; Lin, 1949:27.

Macrophthalmus (Mareotis) japonicus, Barnes, 1967: 224; Sakai, 1976:614; Miyake, 1983:167.

Materials examined: 1 ♀ (ovi.), cl. 13 mm, cw. 19 mm, fw. 3 mm, 06 Sep. 1987, Dan-Shui River, Taipei County. 1 ♂, cl. 14 mm, cw. 23 mm, fw. 2 mm; 1 ♀, cl. 13 mm, cw. 21 mm, fw. 3 mm, 13, Sep. 1988, Wu Creek, Taichung County. 3 ♂♂, cl. 11-12 mm, cw. 17-21 mm, fw. 2-3 mm, 13 Sep. 1988, San-Tiou-Lon, Yunlin County. 1 ♂, cl. 16 mm, cw. 26 mm, fw. 3 mm, 31 Jan. 1988, Buh-Dai, Jiayi County. 3 ♂♂, cl. 12-13 mm cw. 18-21 mm, fw. 2-3 mm; 4 ♀♀, cl. 9-13 mm, cw. 14-19 mm, fw. 2-3 mm, 31 Jan. 1988, Chi-Guh, Tainan County.

Coloration: Body brownish grey, chelae bistre yellow.

Habitat: This crab lives in wet mud near lower tidal levels or in tidal pools during ebb tide.

Distribution: This crab has been recorded from Honshu in Japan, to the

Ryukyu Islands, Taiwan, the Korean Strait, the Yellow River, Fukien, Singapore, and Australia.

Remarks: This species lives in muddy areas. It feeds not far from its burrow, which is full of mire. It is very sensitive and always erects its long eyestalks to look around during feeding activity outside of its burrow, immediately slipping back into its hollow even if only slightly disturbed.

Macrophthalmus (Mareotis) boteltobagoe
Sakai, 1939

(Fig. 8)

Hemiplax boteltobagoe Sakai, 1939:628.

Mocrophthamus (Hemiplax) boteltobagoe, Sakai, 1976: 616.

Macrophthalmus (Mareotis) holthuisi Serene, 1973:99.

Macrophthalmus (Mareotis) boteltobagoe, Barnes, 1977:270.

Remarks: We could not obtain any specimen referable to this species for the present study. In Taiwan, this species has only been recorded on Lan-Yu Island by Sakai in 1939.

The type locality of this species is Lan-Yu Island (Sakai, 1939). There is no record from Taiwan, but Barnes (1977) discussed the systematic status based on materials from Okinawa, and synonymized

M. holthuisi from western New Guinea described by Serene (1973). As rightly commented on by Barnes (*op. cit.*), this species is most closely related to *M. erato* de Man and *M. quadratus* A. Milne Edwards, notwithstanding its protuberant central region of the epistome as in the subgenus *Macrophthalmus*; it is best regarded as a primitive member of the subgenus *Mareotis*.

Distribution: The Yaeyama islets in the southern Ryukyu Islands, Taiwan, and western New Guinea.

Subgenus *Mopsocarcinus* Barnes, 1967

***Macrophthalmus (Mopsocarcinus) boscii*
Audouin & Savigny, 1825**

(Fig. 9; Plate 1H)

Macrophthalmus boscii Audouin and Savigny, 1825,
plat 2, fig. 1. (not seen)

Cleistostoma boscii, Dana, 1852:313.

Euplax boscii, H. Milne Edwards, 1852:160; A. Milne
Edwards, 1873:281; Tesch, 1918:60; Sakai,
1939:630; Lin, 1949:27.

Chaenostoma orientale, Stimpson, 1858:97; 1907:98.

Macrophthalmus bosci, Crosnier, 1965:134; Takeda,
1982:211.

Macrophthalmus (Mopsocarcinus) boscii, Barnes, 1967:
227; 1970:241; 1971:30; Sakai, 1976:615;
Miyake, 1983:168; Dai *et al.* 1986:437.

Materials examined: 2♂♂, cl. 5 & 7 mm,

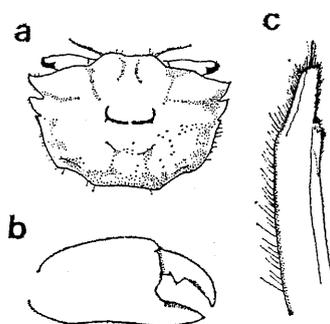


Fig. 8. *Macrophthalmus (Mareotis) botelobagoe* Sakai, 1939. (after Sakai, 1976) a. Dorsal view of carapace (♂); b. Chela; c. Distal portion of gonopod.

cw. 6 & 9 mm, fw. 1 & 2 mm; 2♀♀, cl. 5 & 8 mm, cw. 6 & 10 mm, fw. 1 & 2 mm, 02 Sep. 1990, Fon-Kwei, Penghu County. 1♂, cl. 5 mm, cw. 6 mm, fw. 1 mm, 03 Sep. 1990, Wan-Ann, Penghu County. 2♂♂, cl. 4 & 6 mm, cw. 6 & 7 mm, fw. 1 & 2 mm; 5♀♀, cl. 4-7 mm, cw. 5-9 mm, fw. 1-3 mm, 05 Sep. 1990, Chi-Bey, Penghu County.

Coloration: Carapace milky white, scattered with pale orange spots. Ambulatory legs milky white and covered with yellowish brown bands on merus and propodus.

Habitat: This species feeds on coral reefs and rocks which are covered with seaweed.

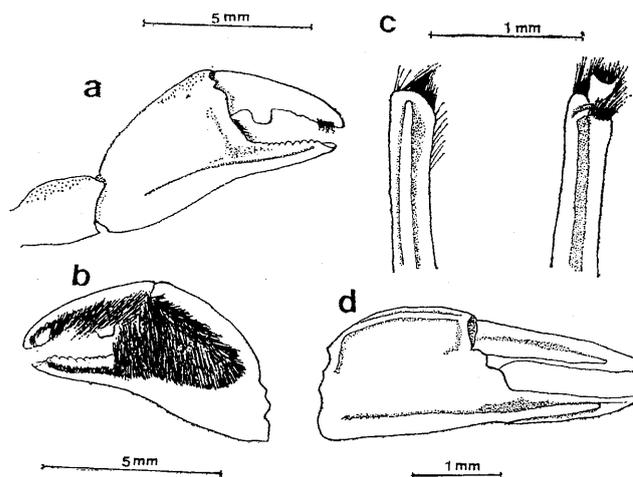


Fig. 9. *Macrophthalmus (Mopsocarcinus) boscii* Audouin & Savigny, 1825. a. Outer view of chela (♂); b. Inner view of chela (♂); c. Distal portion of gonopod; d. Outer view of chela (♀).

Distribution: This species is distributed throughout the Ryukyus, Taiwan, Malaysia, Indonesia, Australia, Hawaii, the Red Sea, Madagascar, and the east coast of Africa.

Genus *Leipocten* Kemp, 1915

***Leipocten sordidulum* Kemp, 1915**

(Fig. 10)

Leipocten sordidulum Kemp, 1915:244 (not seen); Tweedie, 1937: 162; Sakai, 1939:635; 1976:619; Lin, 1949:27; Barnes, 1967:249; Manning and Holthuis, 1981:207; Dai *et al.*, 1986:445.

Materials examined: 1 ♂, cl. 5 mm, cw. 6 mm, fw. 2 mm; 1 ♀, cl. 5 mm, cw. 6 mm, fw. 3 mm, 09 Nov. 1988, Pei-Men, Tainan County.

Coloration: The color of this species can be referred to Fukui *et al.* (1989 fig. 9). Carapace olive-yellow and marked with brownish red spots. Ambulatory legs greenish yellow.

Habitat: This species lives in the sandy mud of estuaries.

Distribution: This species has been recorded in Taiwan, Fukien, Malaysia, Indonesia, and Australia.

Remarks: Two preserved specimens were borrowed from the Provincial Museum of Taiwan for examination.

Subfamily Scopimerinae Alcock, 1900

Key to genera of the subfamily Scopimerinae

1. Outer surfaces of meri of chelipeds and ambulatory legs without tympanum. Ischium of third maxilliped subequal to merus.....*Ilyoplax*
- Outer surfaces of meri of chelipeds and ambulatory legs with oval tympana. Ischium of third maxilliped different in length from merus.....2
2. Ischium of third maxilliped longer than merus. Carapace subglobose.....*Scopimera*
- Ischium of third maxilliped shorter than merus. Carapace subquadrate.....*Tmethypocoelis*

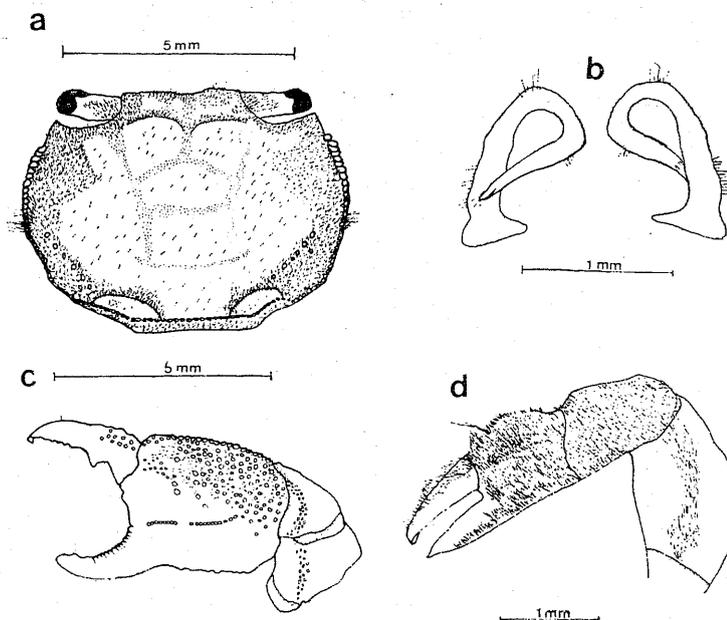


Fig. 10. *Leipocten sordidulum* Kemp, 1915. a. Dorsal view of carapace (♂); b. Distal portion of gonopod; c. Outer view of chela (♂); d. Outer view of chela (♀).

Genus *Ilyoplax* Stimpson, 1858

Key to Taiwanese species of the genus *Ilyoplax*

- 1. Upper orbital margin markedly oblique. Carapace strongly narrowing backward.....*I. integra*
- Upper orbital margin transverse. Carapace not strongly narrowing backward.....2
- 2. Base of inner surface of carpus armed with granules. Distal end of ambulatory leg IV wider than base.....*I. formosensis*
- Base of inner surface of carpus armed with an enlarged tubercle. Distal end of ambulatory leg IV narrower than base.....*I. tansuiensis*

Ilyoplax integra (Tesch, 1918)

(Fig. 11)

Tympanomerus integer Tesch, 1918:54.

Ilyoplax integra, Tweedie, 1937:150; Sakai, 1939:640; 1976:623; Lin, 1949:27.

Remarks: We could not obtain any specimen referable to this species, which was recorded on Lan-Yu Island by Sakai

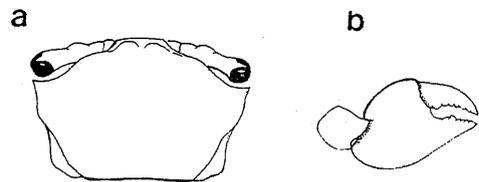


Fig. 11. *Ilyoplax integra* (Tesch, 1918) (after Sakai, 1976). a. Dorsal view of carapace (♂); b. Outer view of chela (♂).

(1939). It is only known from Lan-Yu Island and Kei Island (Tesch, 1918).

Ilyoplax formosensis Rathbun, 1921

(Fig. 12; Plate 2A)

Ilyoplax formosensis Rathbun, 1921:156; Maki and Tsuchiya, 1923:214; Sakai, 1976:624; Dai et al., 1986:449.

Materials examined: 1 ♂, cl. 5 mm, cw. 8 mm, fw. 2 mm, 28 Feb. 1988; 1 ♀, cl. 7 mm, cw. 9 mm, fw. 3 mm, 08 May 1988; 1 ♀, cl. 6 mm, cw. 9 mm, fw. 3 mm, 14 Sep. 1988, Dan-Shui River, Taipei County.

Coloration: Carapace olive-grey. Tip of dactylus of chela whitish. Base of dactylus and palm marked with reddish orange. Ambulatory legs brown.

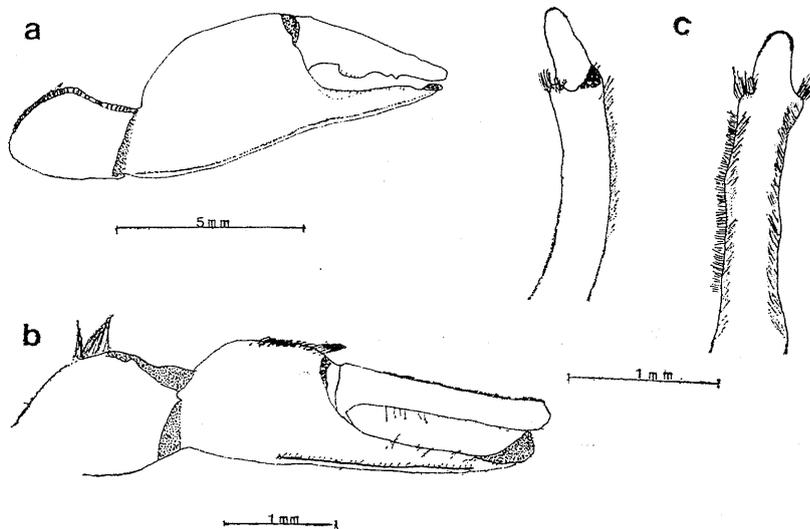


Fig. 12. *Ilyoplax formosensis* Rathbun, 1921. a. Outer view of chela (♂); b. Outer view of chela (♀); c. Distal portion of gonopod.

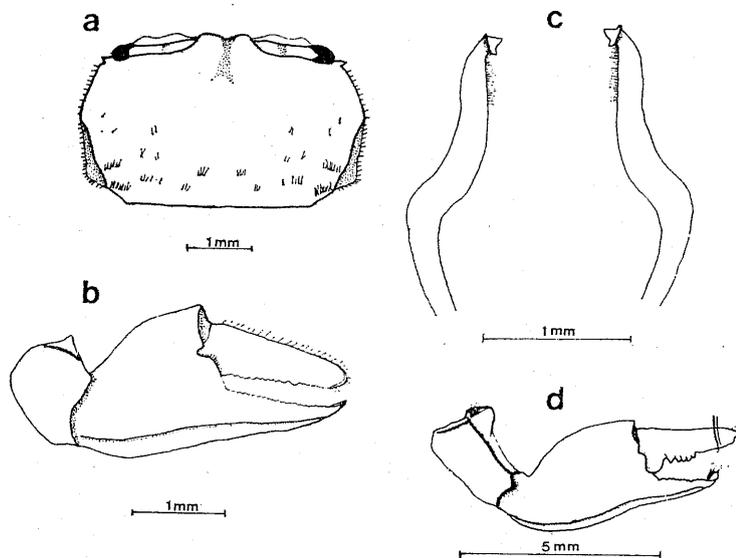


Fig. 13. *Ilyoplax tansuiensis* Sakai, 1939. a. Dorsal view of carapace (♂); b. Outer view of chela (♀); c. Distal portion of gonopod; d. Outer view of chela (♂).

Habitat: Sandy mud in estuarines, particularly in mangrove swamps.

Distribution: Only known from the estuary of the Dan-shui River of Taiwan.

***Ilyoplax tansuiensis* Sakai, 1939**

(Fig. 13)

Ilyoplax tansuiensis Sakai, 1939:642; 1976:625; Lin, 1949:27; Dai *et al.*, 1986:450.

Materials examined: 1 ♂, cl. 4 mm, cw. 7 mm, fw. 2 mm; 1 ♀, cl. 3 mm, cw. 5 mm, fw. 2 mm, 11 Nov. 1988, Wan-Liau, Jiayi County.

Coloration: Same as in *I. formosensis*.

Habitat: Sandy mud at river mouths.

Distribution: This species was known from Taiwan and mainland China.

Genus *Scopimera* Da Haan, 1833

Key to Taiwanese species of *Scopimera*

- 1. Merus of chela with two oval tympana*S. bitympana*
- Merus of chela with one oval tympana2

- 2. Cardiac region armed with granules. Ventro-outer surface of palm of male with 9-11 rows of granules.....*S. longidactyla*
- Cardiac region smooth. Ventro-outer surface of palm of male without granule*S. globosa*

***Scopimera bitympana* Shen, 1930**

(Fig. 14; Plate 2B)

Scopimera bitympana Shen, 1930:227; 1932:262; Sakai, 1939:639; 1976:621; Kamita, 1941:178; Lin, 1949:27; Dai *et al.*, 1986:455.

Materials examined: 7 ♂♂, cl. 6 & 7 mm, cw. 8-9 mm, fw. 1 mm; 11 ♀♀, cl. 5-6 mm, cw. 7-8 mm, fw. 1 mm, 07 Dec. 1990, Wu Creek, Taichung County.

Coloration: Body grey, with few white spots. Ambulatory dactyli milky white.

Habitat: Sandy fords of estuaries during ebb tide (salinity about 9 ppt).

Distribution: This species has been recorded along the Yellow Sea coast of mainland China, Korea, Po Hai, the Taiwan Strait, and Hainan.

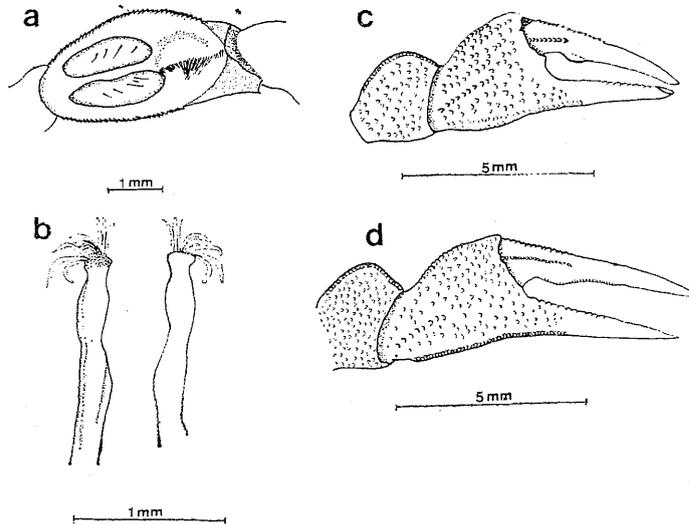


Fig. 14. *Scopimera bitympana* Shen, 1930. a. Inner surface of merus of chela (♂); b. Distal portion of gonopod; c. Outer view of chela (♂); d. Outer view of chela (♀).

***Scopimera longidactyla* Shen, 1932**

(Fig. 15; Plate 2C)

Scopimera longidactyla Shen, 1932:259; Sakai, 1976: 621; Dai *et al.*, 1986:453.

Scopimera globosa longidactyla, Sakai, 1939:638; Kamita, 1941:177; Lin, 1949:27.

Materials examined: 2♂♂, cl. 6 & 7 mm, cw. 9 mm, fw. 1 mm, 11 Nov. 1988, Buh-Dai, Jiayi county. 9♂♂, cl. 4-8 mm, cw. 6-10 mm, fw. 1 mm, 02 Sep. 1990, Fon-Kuei, Penghu County. 1♂, cl. 5 mm, cw. 8 mm, fw. 1 mm, 27 Sep. 1990, Uen-Ann, Hsinchu County.

Coloration: Bistre-brown all over.

Habitat: Sandy mud areas high tide levels in estuaries.

Distribution: This species has been recorded in Po Hai, the Yellow Sea, the East Sea, and on Taiwan.

Remarks: This species usually can be found in the same habitat as *S. globosa*, but in fewer numbers.

***Scopimera globosa* (De Haan, 1835)**

(Fig. 16; Plate 2D)

Ocypode (Scopimera) globosa De Haan, 1835:53.

Scopimera globosa, Ortmann, 1894:747; Tesch, 1918: 46; Parisi, 1918:97; Balss, 1922:145; Yokoya, 1928:779; She, 1932:253; Sakai, 1934:320;

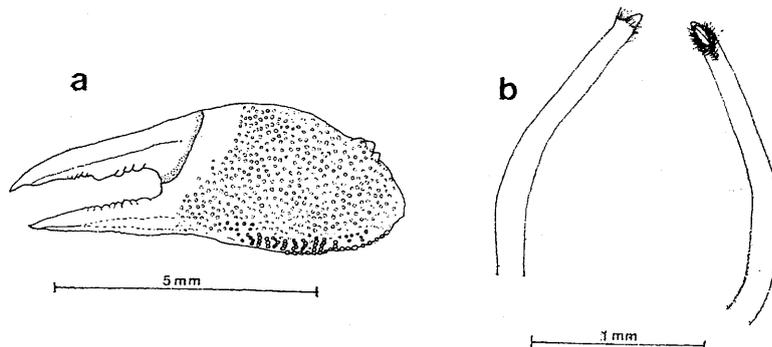


Fig. 15. *Scopimera longidactyla* Shen, 1932. a. Outer view of chela (♂); b. Distal portion of gonopod.

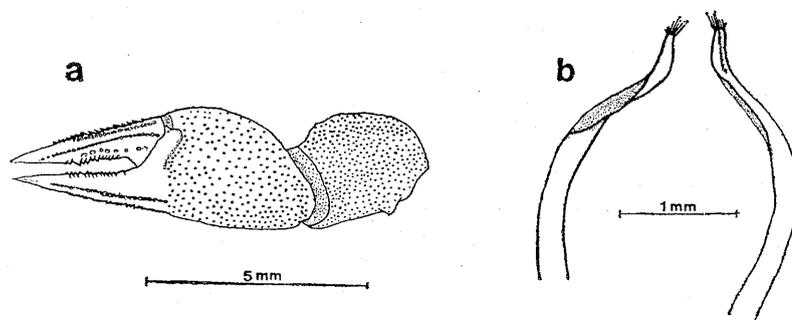


Fig. 16. *Scopimera globosa* (De Haan, 1835). a. Outer view of chela (♂); b. Distal portion of gonopod.

1935:214; 1939:636; 1965:191; 1976:621; Kamita, 1941:175; Miyake, 1983:168; Dai *et al.*, 1986:452.

Scopimera tuberculata, Stimpson, 1858:98.

Materials examined: 1 ♂, cl. 7 mm, cw. 11 mm, fw. 1 mm; 1 ♀, cl. 5 mm, cw. 7 mm, fw. 1 mm, 07 Nov. 1988, Pei-Men, Tainan County. 3 ♂♂, cl. 5-8 mm, cw. 8-10 mm, fw. 1-2 mm; 3 ♀♀, cl. 4-6 mm, cw. 6-8 mm, fw. 1 mm, 29 Sep. 1989, Jinmen. 13 ♂♂, cl. 5-7 mm, cw. 6-8 mm, fw. 1 mm; 5 ♀♀, cl. 4-5 mm, cw. 5-6 mm; fw. 1 mm, 04 Sep. 1990, Te-Shen, Peng-hu County. 2 ♂♂, cl. 6 mm, cw. 8 mm, fw. 1 mm, 27 Sep. 1990, Uen-Ann, Hsinchu County.

Coloration: Mostly greenish black, with distal part of dactylus of chela light brown.

Habitat: Sandy mud near lower tidal levels in estuaries.

Distribution: This species has been reported in Japan, along the western coast of Korea, and in the Ryukyu Islands and Taiwan, as well as Guangdong, Fukien, and the Shandong Peninsula of China.

Remarks: Round sandy mud particles are found near their burrows. These sand particles are accumulated through the use of their mouth parts. Their actions become vigorous from ebb tide until the tide covers their burrows.

Genus *Tmethypocoelis* Koelbel, 1897

Tmethypocoelis ceratophora (Koelbel, 1897)

(Fig. 17; Plate 2F)

Dioxipe ceratophora Koelbel, 1897:714 (not seen).

Tympanomerus ceratophorus, Tesch, 1918:50.

Tmethypocoelis ceratophora, Shen, 1935:35; Miyake, 1963:70; 1983:168; Sakai, 1976:626; Dai *et al.*, 1986:452.

Materials examined: 4 ♂♂, cl. 4-5 mm, cw. 6-7 mm, fw. 1-2 mm, 08 May 1988, Dan-Shui River, Taipei County. 4 ♂♂, cl. 5 mm, cw. 8 mm, fw. 2 mm, 01 Jul. 1988, Lan-Yan Creek, I-Lan County.

Coloration: This crab is cinnamon except for the postgastric regions and laterals; chela buff.

Habitat: This crab digs burrows in sandy mud near high tide levels.

Distribution: This species has been recorded from the southern Amami Islets of the Ryukyus through Taiwan, Hong-Kong, Guangdong, and Lombok in Indonesia.

Remarks: This crab is a tiny species, with carapace length not exceeding 10 mm. It lives in estuaries near high tidal levels, and always erects its eyestalks and waves its chelae up and down in a salute-like manner during ebb tide. Thus, it is commonly called the "Buddha Worship Crab" in Taiwan. This crab is

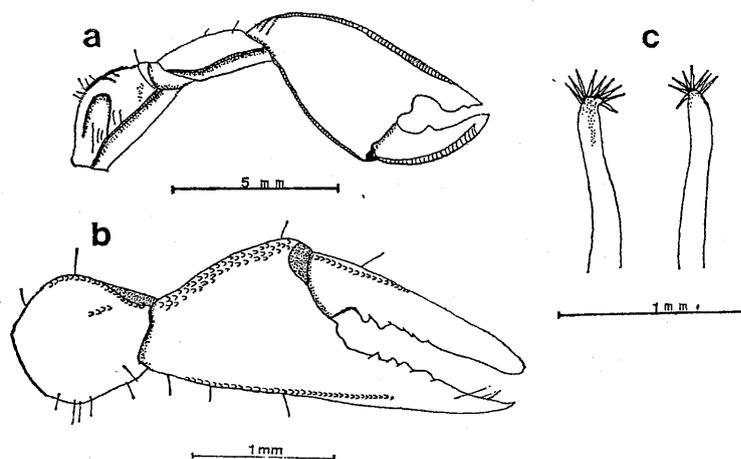


Fig. 17. *Tmethypocoelis ceratophora* (Koelbel, 1897). a. Outer view of chela (δ); b. Outer view of chela (♀); c. Distal portion of gonopod.

relatively fearless; although it will return to its burrow when frightened, it comes out shortly afterwards and waves its chelae as usual.

Family Mictyridae Dana, 1852

Genus *Mictyris* Latreille, 1806

Mictyris brevidactylus Stimpson, 1858

(Fig. 18; Plate 2G)

Mictyris brevidactylus Stimpson, 1858:99; Takeda, 1978:31; Miyake, 1983:158.

Myctiris longicarpus, Ortmann, 1893:748. [not Latreille, 1806]

Mictyris longicarpus, Tesch, 1918:42; Sakai, 1934:322; 1935:222; Dai *et al.*, 1986:415. [not Latreille, 1806]

Materials examined: 3 $\delta\delta$, cl. 10-12 mm, cw. 8-9 mm, fw. 2 mm, 15 Feb. 1988, Dan-Shui River, Taipei County. 2 $\delta\delta$, cl. 14 & 16 mm, cw. 13 & 15 mm, fw. 2 mm, 13 Mar. 1984, Lu-Kang, Changhua County. 13 $\delta\delta$, cl. 13-17 mm, cw. 12-15 mm, fw. 2-3 mm; 3 ♀♀ , cl. 13-14 mm, cw. 11-12 mm, fw. 2 mm, 23 Nov. 1984, Wen-Kang, Jiayi County. 2 $\delta\delta$, cl. 11 & 13 mm, cw. 10 & 11 mm, fw. 2 mm, 31 Jan. 1988, Chi-Gu, Tainan County.

Coloration: Carapace azure. Setae on posterior border of carapace dull scarlet. Major chela and most parts of

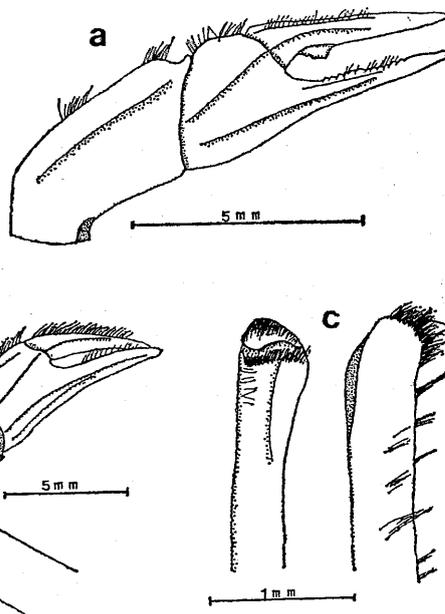
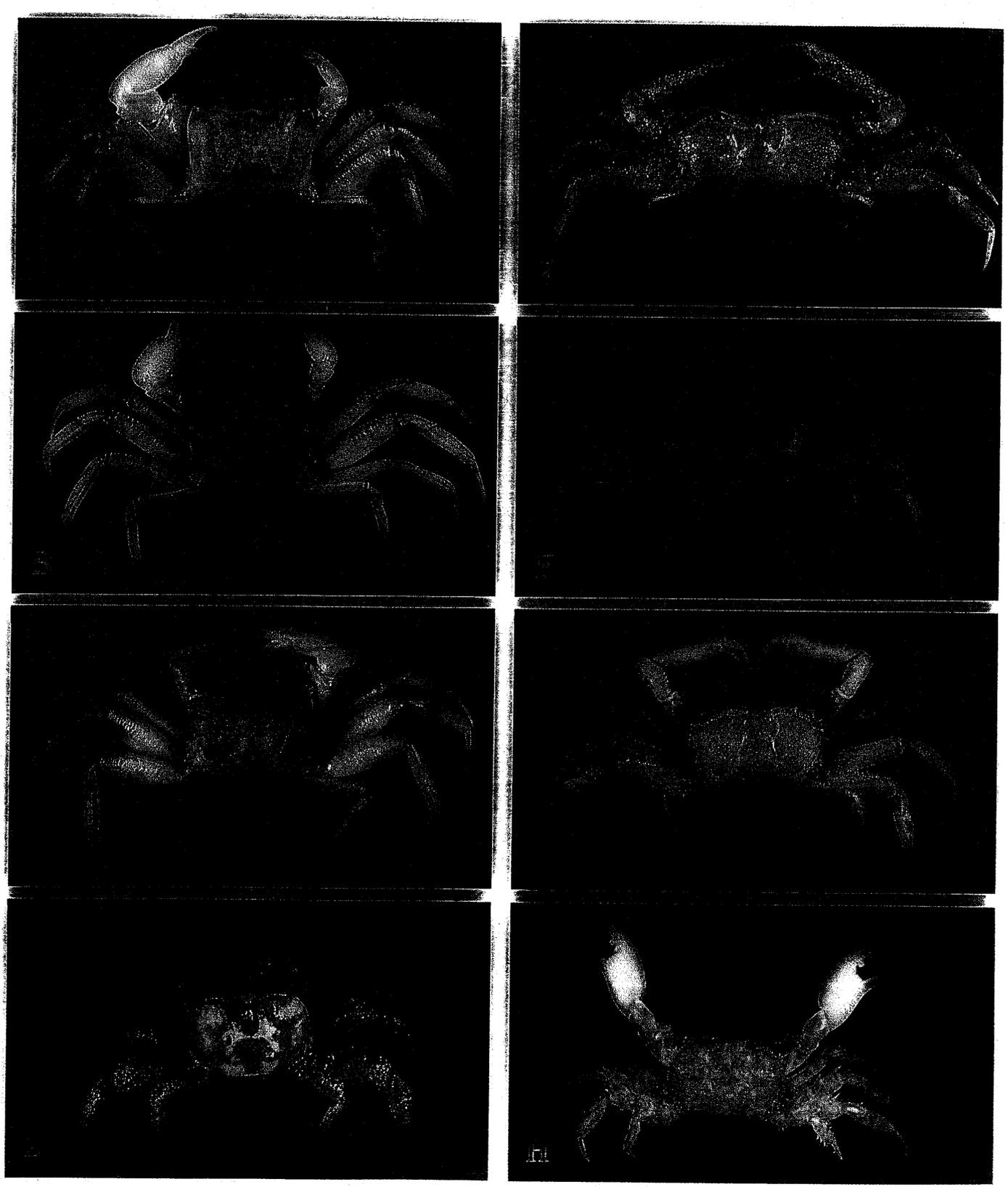


Fig. 18. *Mictyris brevidactylus* Stimpson, 1858. a. Outer view of chela (δ); b. Outer view of chela (♀); c. Distal portion of gonopod.

ambulatory legs whitish, basal halves of meri somewhat reddish. One specimen was found to be pale yellow all over the body.

Habitat: Open sandy mud areas at estuaries near lower tidal levels.

Distribution: Western Pacific Ocean



from the northern Ryukyu Islands, Taiwan, and the Philippines to Hong Kong.

Remarks: Previously this species was erroneously referred to as *M. longicarpus* Latreille, 1806 in Japan. Rathbun also

identified Maki and Tsuchi's (1923) Taiwanese specimens as *M. brevidactylus*.

Takeda later (1978) studied the geographical distribution of this genus and compared the three Australian species

Table 1
Distribution of Taiwanese species of ocypodid and mictyrid crabs in the Far East

	Taiwan	China	Japan		Korea
			Ryukuu	Mainland	
<i>Uca borealis</i>	+	+			
<i>U. formosensis</i>	+				
<i>U. arcuata</i>	+	+		+	+
<i>U. dussumieri</i>	+	+	+		
<i>U. coarctata</i>	+		+		
<i>U. crassipes</i>	+	+	+		
<i>U. triangularis</i>	+	+	+		
<i>U. lactea</i>	+	+		+	+
<i>Ocypode cordimana</i>	+	+	+	+	
<i>O. ceratophthalmus</i>	+	+	+	+	
<i>O. stimpsoni</i>	+	+		+	+
<i>Paracleistostoma depressum</i>	+	+			
<i>Macrophthalmus abbreviatus</i>	+	+			+
<i>M. convexus</i>	+	+	+		
<i>M. japonicus</i>	+	+	+		+
<i>M. boteltobagoe</i>	+		+		
<i>M. boscii</i>	+		+		
<i>Leipocten sordidulum</i>	+	+			
<i>Ilyoplax integra</i>	+				
<i>I. formosensis</i>	+				
<i>I. tansuiensis</i>	+	+			
<i>Scopimera bitympana</i>	+	+			+
<i>S. longidactyla</i>	+	+			+
<i>S. globosa</i>	+	+	+	+	+
<i>Tmethypocoelis ceratophora</i>	+	+	+		
<i>Mictyris brevidactylus</i>	+	+	+		

- Plate 1. A. *Ocypode cordimana* Desmarest, 1825 (♂, cl. 18 mm, cw. 22 mm, fw. 3 mm);
 B. *Ocypode ceratophthalmus* (Pallas, 1722) (♀, cl. 34 mm, cw. 37 mm, fw. 5 mm);
 C. *Ocypode stimpsoni* Ortmann 1897, (♂, cl. 13 mm, cw. 15 mm, fw. 3 mm);
 D. *Paracleistostoma depressum* De Man, 1895 (♂, cl. 9 mm, cw. 12 mm, fw. 4 mm);
 E. *Macrophthalmus (Macrophthalmus) abbreviatus* Manning & Holthuis, 1981 (♂, cl. 12 mm, cw. 25 mm, fw. 4 mm);
 F. *Macrophthalmus (Macrophthalmus) convexus* Stimpson, 1858 (♂, cl. 9 mm, cw. 16 mm, fw. 2 mm);
 G. *Macrophthalmus (Mareotis) japonicus* (De Haan, 1835) (♂, cl. 16 mm, cw. 26 mm, fw. 3 mm);
 H. *Macrophthalmus (Mopsocarcinus) boscii* Audouin & Savigny, 1825 (♂, cl. 7 mm, cw. 9 mm, fw. 2 mm).



Plate 2. A. *Ilyoplax formosensis* Rathbun, 1921 (♂, cl. 5 mm, cw. 8 mm, fw. 2 mm);
 B. *Scopimera bitympa* Shen, 1930 (♂, cl. 6 mm, cw. 7 mm, fw. 1 mm, fw. 1 mm);
 C. *Scopimera longidactyla* Shen, 1932 (♂, cl. 7 mm, cw. 8 mm, fw. 2 mm);
 D. *Scopimera globosa* (De Haan, 1835) (♂, cl. 7 mm, cw. 11 mm, fw. 1 mm);
 E. *Tmethypocoelis ceratophora* (Koelbel, 1897) (♂, cl. 5 mm, cw. 8 mm, fw. 2 mm);
 F. *Mictyris brevidactylus* Stimpson, 1858 (♂, cl. 13 mm, cw. 11 mm, fw. 2 mm).

with the Japanese "*M. logicarpus*". It was found that the Japanese "*M. longicarpus*" was identical to "*M. brevidactylus*". This crab always congregates in sandy mud during ebb tide, and is therefore called the

"soldier crab". This crab is extremely wary; it burrows into the mud by means of a circular movement of its body when an intruder comes closer than about 20-30 m.

DISCUSSION

Crabs of the families Ocypodidae and Mictyridae are easily found in estuaries and littoral zones in Taiwan. Table 1 shows the distribution of Taiwanese species of the families Ocypodidae, except for the genus *Uca* which was reported on in 1989, and Mictyridae in the Far East.

It is not difficult to notice that the Taiwan species are very similar to those found in mainland China, since the latitude of Taiwan is similar to the east coast of mainland China, and since both sides of the Taiwan Strait are affected by the Kuroshio Current.

With regard to the habitats of these crabs, mictyrid and most of the ocypodid crabs live sandy mud areas; however, *Ocypode* species live on sandy bottoms, while some *Macrophthalmus* species live on coral reefs which are covered with seaweed and affected by tides. In the genera Ocypodidae, *Ocypode*, *Scopimera*, and *Tmethypocoelis* all live at high tide levels. The crabs have hairy-ridged pouches between the coxae of ambulatory legs II and III; these pouches are sometimes also present on leg(s) I and/or II. This allows these crabs to remain exposed to air for longer periods of time.

Barnes (1967) separated the genus *Macrophthalmus* into six subgenera—*Tasmanoplax*, *Macrophthalmus*, *Mopsocarcinus*, *Hemiplax*, *Mareotis* and *Venitus*—by observing whether the central region of the epistome was straight or not. Barnes (1977) also examined *Macrophthalmus boteltobagoe* and was puzzled by its combination of features; as a result, *M. boteltobagoe* was transferred from *Hemiplax* to the subgenus *Mareoties* as a new combination, notwithstanding its protuberant central epistome region. Following Barnes (1967), five Taiwanese *Macrophthalmus* species can be grouped into three subgenera: *Macrophthalmus*, *Mareotis*, and *Mopsocarcinus*. Such a grouping seems to coincide with the habitats of these crabs.

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臺灣產沙蟹科及和尚蟹科之研究

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本文報導臺灣產沙蟹科及和尚蟹科之蟹類，並整理此二科在臺灣曾記錄之種類，其中沙蟹科計有 8 屬 25 種（含已報導之招潮蟹屬），和尚蟹科則僅有 1 屬 1 種。

本文除製編檢索表外，另附有照片、繪製各種類之重要形態及描述重要之生態特徵，以供日後查定之參考依據；且比較臺灣此二科蟹類在遠東地區之分佈，以期探討蟹類分佈和地理之關係。

