The marine flora and fauna of Hong Kong and southern China III (ed. B. Morton). Proceedings of the Fourth International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 11–29 April 1989. Hong Kong: Hong Kong University Press, 1992.

A NEW SPECIES AND NEW RECORDS OF INTERTIDAL CRABS (CRUSTACEA: BRACHYURA) FROM HONG KONG

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ABSTRACT

One new species and six new records of intertidal crabs are established from Hong Kong, and the presence of two other species included in Shen's 1940 checklist is confirmed. *Indopinnixa mortoni* sp.nov. differs from the only other member of the genus, *I. sipunculana*, by: a differently shaped male abdomen, and in particular the much broader, distally concave telson; a differently shaped male first pleopod, with the apex being recurved; the lack of a distinct tuberculate ridge on each branchial region; and the straight, not conspicuously bilobed front. Other species recorded are *Macrophthalmus tomentosus*, *Dotilla wichmanni*, *Scopimera bitympana*, *Ilyoplax ningpoensis*, *Varuna yui*, *Acmaeopleura toriumii*, *Metaplax takahasii* and *M. elegans*. A key to the genus *Acmaeopleura*, and keys to the Hong Kong species of *Macrophthalmus* and *Metaplax* are presented.

INTRODUCTION

The crab fauna of Hong Kong has been relatively well studied, first by Stimpson (1858; 1907) and later by Balss (1922), Gordon (1931), Shen (1931a; 1931b; 1932b; 1934; 1935; 1940a). Shen (1940a) compiled a checklist of 187 species from Hong Kong, this total has been added to by a few more recent papers. Soh (1978) reviewed the sesarmine shore crabs and described three new species and four additional records. Bones (1982) discussed the taxonomy and ecology of four species of *Macrophthalmus*. Other relevant works include Horikoshi and Takeda (1982), Hill (1982), George (1982) and Manning and Morton (1987). Other papers by Shen (1932a; 1936; 1937) also deal with this general region and should be consulted when studying Hong Kong's crab fauna.

The present paper records one new species and six new records of shore crabs and confirms the presence of two other species which were included in Shen's 1940 checklist without comment. It seems likely that further collecting would probably reveal even more

species as the Hong Kong fauna seems to be a rich one combining many elements of the temperate northern Chinese and Japanese fauna with the more southerly tropical fauna.

Measurements given are of carapace breadth followed by carapace length. Illustrations were done with the aid of a camera lucida. All material is deposited in the collections of the Queensland Museum, Brisbane (QM) or the Western Australian Museum, Perth (WAM), Australia.

Ocypodidae Ortmann, 1894
Macrophthalminae Dana, 1852
Macrophthalmus (*Mareotis*) *tomentosus* Souleyet, 1841
(Plate 1A, B)

Macrophthalmus tomentosus Souleyet, 1841: 243, pl. 3, fig. 8; H. Milne Edwards 1852: 159; A. Milne Edwards 1873: 279; De Man 1888: 122; Alcock 1900: 382, Tesch 1915: 193, pl. 9, fig.12; Kemp 1919: 392; Balss 1922: 146; Tweedie 1937: 163; Sakai 1939: 628; Barnes 1977: 280 (list).

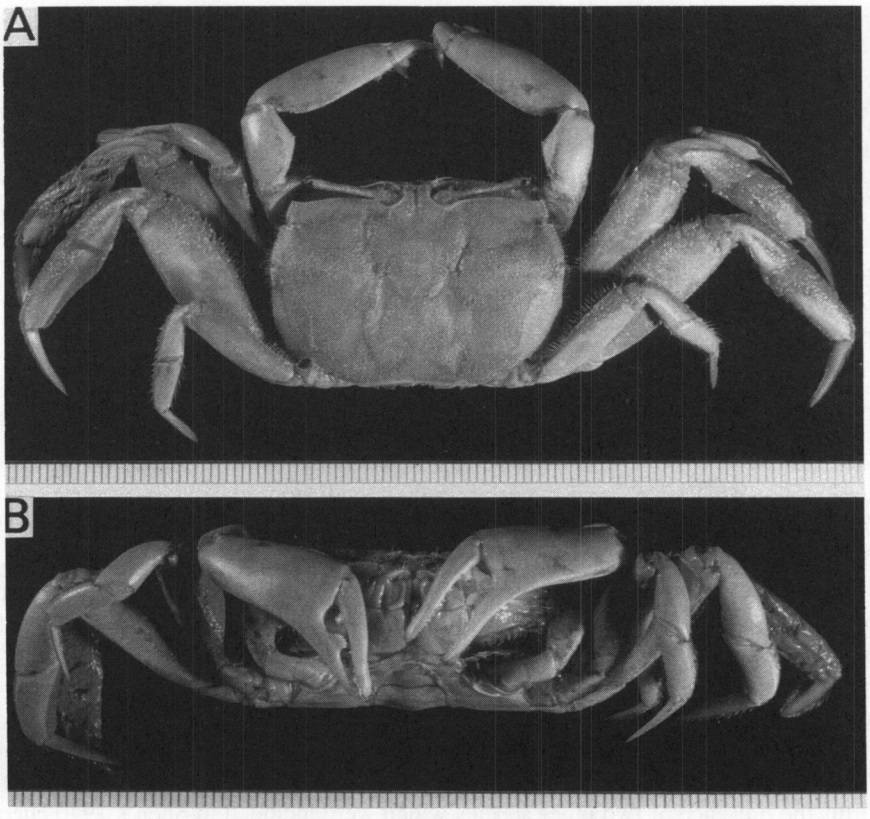

Plate 1. *Macrophthalmus tomentosus* Souleyet, 1841. Male, QM W16483. *A,* dorsal view; *B,* frontal view showing shape of the chelae. Scale in mm.

Macrophthalmus (Mareotis) tomentosus Barnes, 1967: 203 (list); 1970: 229–32, fig. 8; 1971: 17; 1977: 280 (list).

Material examined. QM W16483, 3 ♂ (30.9, 34.6, 37.3 mm) 1 ovig. ♀ (25.3 mm), Mai Po, New Territories, Hong Kong, 16.12.1987, R. Choi.

Remarks. This large species is one of only five known to possess a short horny ridge on the inner margin of the merus of the chelipeds of adult males—the others being *M. pectinipes* Guérin, 1839, *M. erato* De Man, 1888, *M. quadratus* A. Milne Edwards, 1873, and *M. boteltobagoe* (Sakai, 1939). This feature would appear to be a stridulatory structure, although Barnes (1970) comments that this has not been observed in the field. Field and laboratory observations to investigate the use of sound production by *M. tomentosus* and *M. boteltobagoe* (also occurring in Hong Kong) would no doubt prove interesting. *M. tomentosus* is apparently quite common on the very soft mud banks in front of the mangroves at Mai Po.

Distribution. Philippines; Mergui Arch.; Java; New Caledonia; Aroe Islands; Takao, South Formosa; and now Hong Kong.

Species of Macrophthalmus known from Hong Kong. With this record of *M. tomentosus* there are now ten species recorded from Hong Kong which can be accepted with reasonable certainty. Bones (1982) discusses the taxonomy and ecology of four species—*M. convexus* (Stimpson, 1858), *M. boteltobagoe* (Sakai, 1939), *M. latreillei* (Desmarest, 1817) and *M. definitus* Adams and White, 1848. Shen (1940a) reported a further five species—*M. pacificus* Dana, 1851, *M. erato* de Man, 1888, *M. dilatatus* (de Haan, 1835)(now = *M. abbreviatus* Manning and Holthuis, 1981), *M. dentatus* Stimpson, 1858 (type locality = 'Found on muddy bottoms, in 6 fathoms, in the bays near Hong Kong'), and *M. depressus* Rüppell, 1830. Wada and Sakai (1989) recorded their new species, *M. banzai*, from the Mai Po Marshes. The record of *M. depressus* must be treated with doubt as it appears to be otherwise restricted to the Indian Ocean and Red Sea, and therefore is not included in the key provided below. Manning and Holthuis (1981, 201) pointed out that *M. dilatatus* (de Haan, 1835) is a junior homonym of *Ocypode (Cleistostoma) dilatata* de Haan, 1833, and have proposed the replacement name *Macrophthalmus abbreviatus*.

KEY TO *MACROPHTHALMUS* OF HONG KONG

1. Short horny ridge present on inner margin of merus of chelipeds of adult males 2

   No horny ridge on merus of cheliped 4

2. Inner surface of palm of chela with large spine near articulation with carpus .....*M. erato*

   Inner surface of palm of chela without spine 3

3. Carapace distinctly narrowing anteriorly, such that greatest breadth at about level of third tooth; front relatively narrow .....*M. tomentosus*

Carapace not markedly narrowed, greatest carapace breadth about level of first or second tooth; front broad ..... *M. boteltobagoe*

4. Carapace with four or five anterolateral teeth, external orbital tooth the largest and marks the greatest carapace width; carapace surface generally smooth and shiny .... *M. dentatus*

Carapace with two to four anterolateral teeth (if four present, external orbital tooth not marking the greatest carapace width, and carapace surface heavily granular) 5

5. Central region of epistome with a protuberance 6

Central region of epistome straight or excavated 7

6. Inner surface of palm of chela with a spine near articulation with carpus; external orbital angles narrow, elongate and pointed, not projecting beyond second anterolateral teeth. Dactylus of male cheliped strongly deflexed, without marked proximal tooth on cutting edge. Anterior borders of meri with 2–3 feable triangular tubercles; meri of pereopods 2–5 without subdistal spine on anterior border .... *M. abbreviatus*

Inner surface of palm of chela without spines; carapace twice as broad as long, with greatest breadth at the external orbital angles ..... *M. convexus*

7. Concave granular row on each protogastric region; mat of hair on inner palm of chela; fixed finger of male chela with strongly differentiated tooth ..... *M. definitus*

No concave granular row on each protogastric region; inner palm of chela not entirely covered with a mat of hair 8

8. Fixed finger of male chela with a strong tooth; carpus and propodus of third walking leg with a covering of setae on anterior half of ventral surface ..... *M. banzai*

Fixed finger of male chela without a tooth (except in specimens more than 45 mm carapace breadth) 9

9. Carapace smooth to naked eye; inner surface of dactylus of chela not heavily haired ..... *M. pacificus*

Carapace surface heavily granular; inner surface of dactylus of chela heavily haired ..... *M. latreillei*

Dotillinae Stimpson, 1858
Dotilla wichmanni de Man, 1892

Dotilla wichmanni de Man, 1892: 308–14, pl. 18, fig. 8; 1895: 577; Rathbun 1910: 324; Tesch 1918: 45; Kemp 1918: 227, text-fig. 1; 1919: 329–30, fig. 9d; Tweedie 1937: 147; Gordon 1941: 140, fig. 15a; Stephenson 1946: 190–91, fig. 57; Sankarankutty 1961: 115–16, figs. 1d, 3a.

Dotilla wichmanii: Shen, 1940a: 233.

Material examined. WAM246-80, 1 ♂ (6.7 mm) 3 ♀ (7.0, 7.5, 7.6 mm), Sai Wan, Hong Kong, T.L.W., 28.4.1980, L. Bones. QM W16465, 2 ♂ (6.3, 8.1 mm) 1 ♀ (5.7 mm), Sai Wan, Hong Kong, 28.4.1980, L. Bones. WAM250-80, 2 ♂ (8.1, 8.9 mm), Sai Wan, Hong Kong, 28.4.1980, L. Bones, R. George. WAM unreg., 1 ♂ (8.8 mm), Tong Fuk (Lantau), Hong Kong, edge of beach, 30.4.1980, R. W. George.

Remarks. D. wichmanni is probably moderately common in suitable habitats around Hong Kong. It is superficially similar to *Scopimera* species, and has probably been confused with them in the past. *Dotilla* is easily separated from *Scopimera* by: no brush of hairs between the bases of the walking legs; the fourth segment of the abdomen overlaps the fifth and bears a thick brush of hairs distally in both sexes; and the lateral walls of the carapace bear deep longitudinal grooves. From the samples examined it appears to occur sympatrically or in the near vicinity of both *Scopimera bitympana* and *Scopimera intermedia.*

Distribution. Celebes, Makassar and Atjeh in Sumatra (de Man); Talaut Is. (Tesch); Gulf of Siam (Rathbun); Andamans (Kemp, Sankarankutty) Singapore and the east coast of the Malay Peninsula (Tweedie). The present specimens confirm Shen's (1940a) undocumented record from Hong Kong.

Scopimera bitympana Shen, 1930

Scopimera bitympana Shen, 1930: 227–31, figs. 1, 2; 1932: 262–67, pl. 10, fig. 7, text-figs. 161–63; Sakai 1939: 639, text-fig. 107a, b; 1976: 621–22, text-fig. 340a, b; Kamita, 1941: 178, text-fig. 98a, b, c.

Material examined. QM W16464, 2 ♂ (8.5, 9.2 mm) 1 ♀ (10.8 mm), Sai Wan, Hong Kong, T.L.W., 28.4.1980, L. Bones. WAM249-80, 1 ♂ (about 9.7 mm, damaged), Sai Wan, Hong Kong, 28.4.1980, L. Bones.

Remarks. This is a relatively well-known species, but it has not previously been recorded from Hong Kong. It is immediately separable from other species by the inner proximal surface of the arm of the cheliped bearing two ovoid tympana instead of only one. It appears to live sympatrically with *Dotilla wichmanni* as two specimen lots that I have examined contained both species.

Distribution. Peichihli Bay, North China; Yellow Sea side of Korea; Formosa; and now Hong Kong.

Ilyoplax ningpoensis Shen, 1940

Ilyoplax ningpoensis Shen, 1940b: 257, figs. 6–9; Serène and Lundoer, 1974: 4, 9.

Material examined. QM W16482, 3 ♂ (9.9 × 6.8, 9.9 × 6.9, 6.8 × 4.7 mm), 3 ♀ (7.7 × 5.3, 7.7 × 5.3, 6.8 × 4.7 mm), Mai Po, New Territories, Hong Kong, mud flats, 16.12.1987, R. Choi.

Remarks. This species can be recognized by the following combination of characters: carpus of the male cheliped unarmed; male abdomen constricted at the fifth segment, and with seven distinct segments; epistomial margin with a median lobe; front of usual form, not remarkably narrow; legs 2–4 with tympani on dorsal and ventral faces of meri, but only on ventral face of fifth leg; male cheliped without longitudinal carinae on lower surface of palm; orbits transverse; carapace without notch behind exorbital angle.

Distribution. This species was previously only known from the type locality, Ningpo, Chekiang Province; and Changlo, Muihwa, Fukien Province (Shen 1940b). This record marks a small southerly range extension.

Grapsidae Dana, 1851
Varuninae Alcock, 1900
Varuna yui Hwang and Takeda, 1986

Varuna yui Hwang and Takeda, 1986: 11–18, figs. 1A–C, 2A–H; Ng 1988: 116.

Material examined. QM W16484, 4 ♂ (9.0, 11.3, 13.1, 13.6 mm c.b.), Hoi Ha Wan, Hong Kong, 19.4.1989, under rocks in freshwater stream and from the marsh behind the littoral zone, coll. P. Davie.

Remarks. The present series of specimens agree closely with the original description and figures. Ng (1988) expressed some doubt as to the validity of this species but comparison with a wide range of typical *Varuna litterata* in the Queensland Museum collections convinces me that this is a good species. In particular the penultimate segment of the male abdomen is conspicuously narrower and the apex of the first male pleopod is quite differently lobulated. Other features such as the less defined carapace regions and the narrower posterolateral facet are less distinctive on their own but still appreciable.

Distribution. Taiwan (type locality), the Philippines (Hwang and Takeda 1986) and now recognized from Hong Kong.

Acmaeopleura toriumii Takeda, 1974

Acmaeopleura toriumii Takeda, 1974: 17–20, figs. 2, 3.

Material examined. QM W16485, 3 ♀ (3.5–4.3 mm c.b.) 4 ♂ (2.2–4.2 mm) Starfish Bay, Wu Kai Sha, mud and coarse sand, associated with burrows of *Upogebia major* and the echiurid *Ochetostoma erythrogrammon*, coll. P. Davie, 15.4.1989.

Remarks. The present specimens agree in all respects with the description of Takeda (1974). This record represents a considerable southerly range extension, as this species was previously known only from the type series from Mutsu Bay, northern Japan (latitude 41°N). This genus is represented by four other species from the West Pacific: *A. parvula* Stimpson, 1858 (from Sagami Bay in Japan to the south coast of Korea); *A. rotunda* Rathbun, 1909 (from the Gulf of Siam); *A. balssi* Shen, 1932a (Shantung Peninsula in North China, Toyama Bay and Inland Sea of Japan); and *A. depressa* Sakai, 1965 (Sagami Bay).

Only *A. rotunda* is known to occur south of Korea and it is a poorly known species described from a single juvenile male only. Crosnier (1965) and Ghani and Tirmizi (1991) have recorded female specimens of *A. balssi* from Madagascar and the northern Arabian Sea, but further corroboration is required before the identity of these specimens can be accepted. In particular male specimens need to be checked for the characteristic stridulatory sub-orbital crest.

Species of *Acmaeopleura* are in general not noted for occurring symbiotically with other animals although Sakai (1976, 644) notes that some specimens of *A. balssi* from Ujina, Japan were found associated with annelids. The original description of *A. toriumii* did not contain any habitat information. The present specimens were all found lying in the mud tunnels of either *Upogebia major* or *Ochetostoma erythrogrammon* but it was difficult to ascertain if they were definitely associated with either one or the other as the burrows were tightly networked.

KEY TO THE SPECIES OF *ACMAEOPLEURA*

(Expanded after Sakai 1976)

1. Carapace depressed; epimeron cannot be seen in dorsal view 2

   Carapace moderately convex, broadest across the middle of the carapace; epimeron can be seen in dorsal view 3

2. Carapace smooth, broadened anteriorly, marginally tomentose. Chela of male with a patch of soft hair in proximal part of gape ..... *A. parvula*

   Carapace rough, very thickly punctate, broadest medially. No patch of hairs in gape of male chela ..... *A. depressa*

3. Carapace and chelipeds granular; carapace as long as broad ..... *A. rotunda*

   Carapace and chelipeds smooth and microscopically punctate; carapace wider than long 4

4. Mature size > 15 mm across the carapace; chela without tuft of hairs proximally in gape; suborbital crest of males composed of two elongate crests and one tubercle at the lateral end ..... *A. balssi*

   Mature size < 10 mm across the carapace; chela with a small tuft of hairs proximally in gape; suborbital crest of males composed of a series of nine contiguous rounded tubercles ..... *A. toriumii*

Sesarminae Dana, 1852
Metaplax H. Milne Edwards, 1852

Metaplax H. Milne Edwards, 1852: 161; De Man 1888: 153; Alcock 1900: 430; Tesch 1918: 115; Balss 1922: 153; Sakai 1939: 648, 698; 1976: 673.
Rhaconotus Gerstaeker, 1856: 142; Kingsley 1880: 213.

Remarks. Metaplax longipes Stimpson, 1858, was originally described from Hong Kong, but is still poorly known. The present collection contains two additional species. *M. elegans* has been previously reported (Shen 1940) but without comment. *M. takahasii* has been previously unknown from Hong Kong. The key given can be used to distinguish them.

KEY TO THE SPECIES OF *METAPLAX* OF HONG KONG

1. Infra-orbital ridge of the male with less than 20 lobules or teeth 2

   Infra-orbital ridge of the male with more than 40 lobules or teeth; merus of walking legs with 8–9 spines along upper border ..... *M. elegans*

2. Infra-orbital ridge with about 9 teeth; four lateral teeth behind the external orbital angle ..... *M. takahasii*

   Infra-orbital ridge with 15–17 lobules and teeth; three lateral teeth behind external orbital angle ..... *M. longipes*

Metaplax takahasii Sakai, 1939
(Plate 2A)

Metaplax takahasii Sakai, 1939: 698, text-fig. 127; 1976: 673, text-fig. 371.

Material examined. QM W16467, 5 ♂ (9.6 × 6.9–15.2 × 11.2 mm) 2 ♀ (9.7 × 7.0; 9.7 × 7.1 mm), Mai Po, New Territories, Hong Kong, mudflats, 16.12.1987, R. Choi.

Remarks. These specimens agree closely with the descriptions and figures of Sakai (1939; 1976). Apparently no specimens of this species have been reported since the type series was collected.

Distribution. Previously only known from the type-locality, Tan-shui, Formosa. Now from Hong Kong.

Metaplax elegans de Man, 1888
(Plate 2B)

Metaplax elegans de Man, 1888: 164–66, pl. 11, figs. 4–6; 1895: 596, pl. 14, fig. 14;

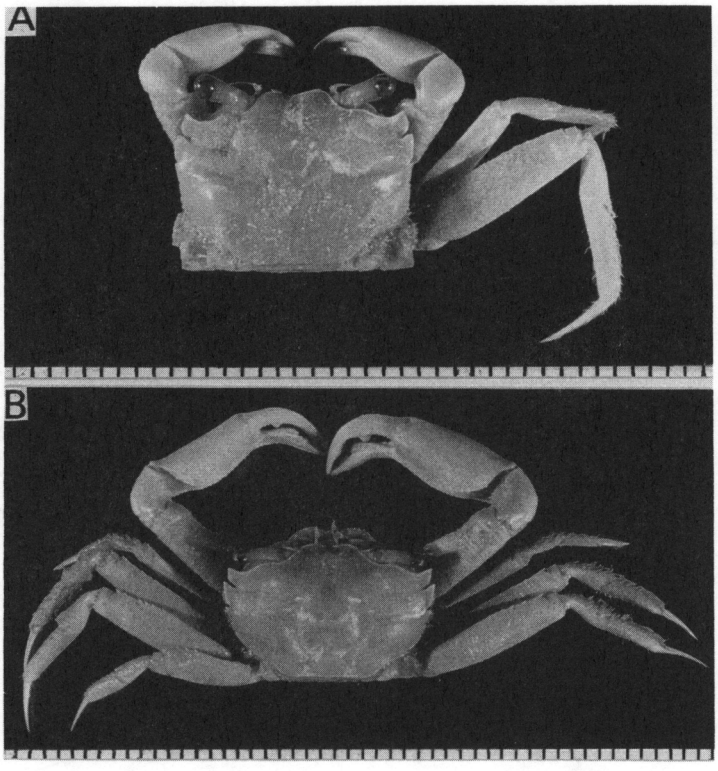

Plate 2. *A, Metaplax takahasii* Sakai, 1939; male, QM W16467. *B, Metaplax elegans* de Man, 1888. male, QM W16466. Scale in mm.

Alcock 1900: 434; Nobili 1903: 28; Rathbun 1910: 329; Tesch 1918: 117; Tweedie 1936: 69; 1950: 353–54; Shen 1940a: 236.

Metaplax crassipes de Man, 1892: 325, pl. 19, fig. 12.

Material examined. QM W16466, 2 ♂ (15.1 × 9.8; 13.7 × 8.8 mm), 4 ♀ (11.5 × 8.6–12.4 × 8.9 mm), Mai Po, New Territories, Hong Kong, mudflats, 16.12.1987, R. Choi.

Remarks. These specimens were compared with two smaller specimens from Brunei in the collections of the Queensland Museum. It appears that as these crabs grow, the walking legs become relatively longer and more slender and the spines along the dorsal margin of the merus of the males become a little less prominent.

Distribution. Mergui Archipelago, Godavari Delta, east India, Penang, Malacca, Atjeh, Pontianak, Samarinda, Macassar (*fide* Tesch 1918). Singapore and Port Swettenham, Selangor (Tweedie 1936). Labuan (Tweedie 1950). The present specimens confirm Shen's (1940a) undocumented record from Hong Kong.

Pinnotheridae De Haan, 1833
Pinnothereliinae Alcock, 1900
Indopinnixa mortoni sp.nov.
(Fig. 1A–G)

Material examined. Holotype: QM W16480, 1 ♂ (3.5 × 2.0 mm), Hoi Ha Wan, New Territories, Hong Kong, apparently commensal with a large capitellid polychaete species, in mud tube in sandy-mud substrate between rocks, about mid- to lower tidal level, 17.4.1989, P.Davie. Allotype: QM W16481, 1 ♀ (3.2 × 1.8 mm), data as for holotype.

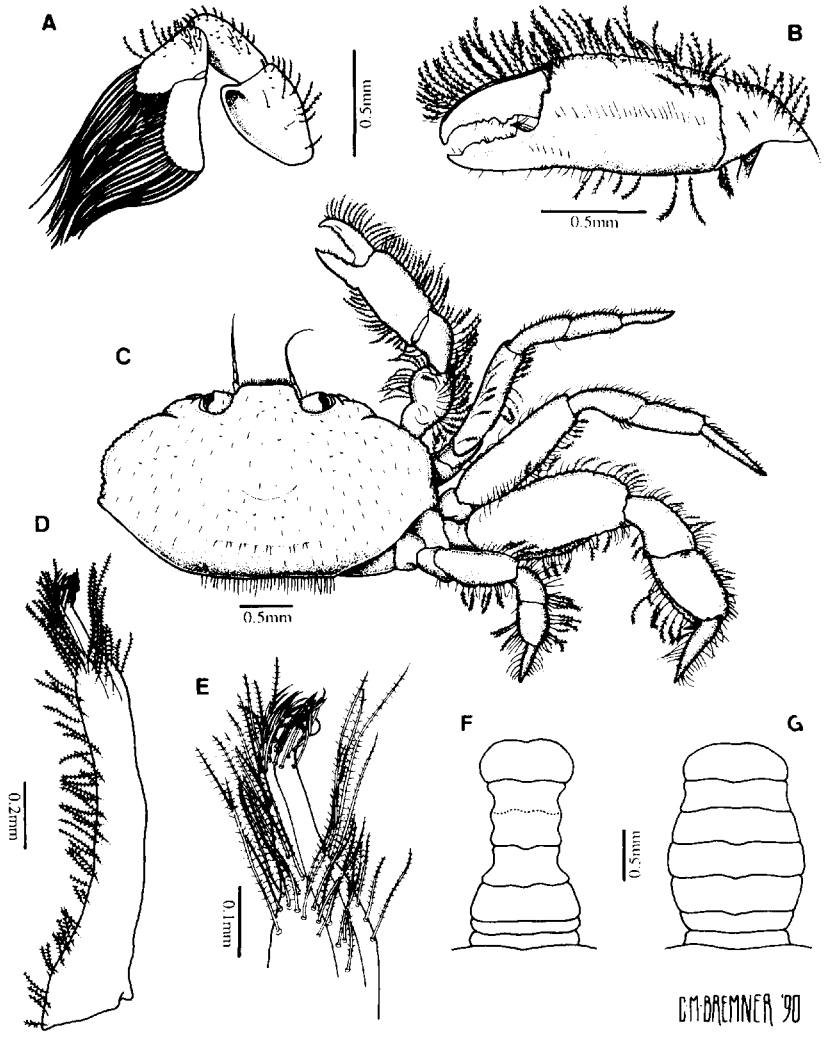

Fig. 1. *Indopinnixa mortoni* sp.nov. *A–F*, holotype male, *G*, allotype female. *A*, third maxilliped; *B*, outer face of left chela; *C*, dorsal view of carapace and right pereiopods; *D*, *E*, male first pleopod; *F*, male abdomen; *G*, female abdomen.

Description. Carapace of both male and female about 1.75 times broader than long; surface punctate dorsally, shiny, but with covering of small fine setae. Regions poorly defined; distinct transverse gastro-cardiac groove; cardiac region a little swollen but not bearing a strongly defined transverse ridge. Anterolateral margins defined by a crest of sharp granules commencing on lateral wall above base of third walking leg and finishing just behind a swollen hepatic lobe beside the orbit. Posterolateral margin a smooth raised rim becoming granular above bases of second and third walking legs; posterior margin straight. Frontal margin straight, rounded laterally, but with moderately swollen post-frontal lobes; front about one-sixth maximum carapace width. Orbit with margin nearly smooth, uninterrupted, but with one or two small granules at outer edge; ocular peduncle short and stout. Sub-hepatic region and pterygostome smooth, minutely punctate. Epistome narrow. Antenna lying in orbital hiatus.

Chelipeds sub-equal, slightly stouter in the male than the female; fingers pointed, just crossing at tips; dactyl about three-quarters length of palm; microscopically granular near upper border of dactyl and palm; upper portion of chela with thick long feathered setae; outer face of palm with a medial, fine ridge bearing a row of setae; lower half of palm bare except for a fringe of setae on ventral margin; fingers without pronounced gape, dentition as figured; other segments unarmed except for a few granules and a thick coverage of long feathered setae.

First two walking legs of similar form, slender, shorter than third; second slightly longer and stouter than first; meri with small granules along lower margin; dactyli relatively straight, simply pointed. Third walking leg much stouter; merus about 2.2 times longer than high; total length of leg about 1.3 times carapace breadth; carpus, propodus and dactylus all of similar length; lower margin of merus with large rounded granules; upper margins of merus, carpus and propodus with small pointed granules. Fourth walking leg much smaller than others, merus about half length of merus of third walking leg. Walking legs all fringed with plumose setae on dorsal and ventral margins.

Third maxilliped with merus relatively broad, length about 1.4 times breadth, inner distal margin expanded; propodus spatulate and laterally produced; dactylus a flat blade about 2.4 times longer than wide; propodus and dactylus bearing very long combs of setae.

Male abdomen with fifth and sixth segments fused although suture still partially evident; telson very broad, margins rounded laterally and concave distally; fused segments five and six narrower than telson, with margins sinuous; fourth segment with lateral margins concave, broader basally; first, second and third segments of similar width, first and second segments narrow. Anterior portion of sternum excavated so that telson enters the mouth-field and reaches to a point slightly in advance of the base of the third maxilliped. Female abdomen seven segmented, broad, without constrictions.

First male pleopod with distal fifth abruptly narrowed; tip broad and moderately recurved; setation as illustrated.

Habitat. It seems that this species lives commensally in the mud tubes of a large capitellid polychaete (as yet unidentified). This species was common in the collecting site although similar tubes made by the echiurid *Ochetostoma erythrogrammon* were also present. After the novelty of *I. mortoni* was recognized subsequent more careful attempts to collect it and definitely determine its host were unsuccessful.

Etymology. The name is to honour Prof. Brian Morton for the great contribution he has made to the study of marine biology in Hong Kong.

Remarks. This is only the second species of *Indopinnixa* to be described, the other being *I. sipunculana* Manning and Morton, 1987. *Indopinnixa* is primarily separated from *Pinnixa* by having the fifth and sixth abdominal segments fused. *I. mortoni* sp.nov. differs from *I. sipunculana* by: a differently shaped male abdomen, and in particular the much broader, distally concave telson; a different shaped male first pleopod, with the apex being recurved; the lack of a distinct tuberculate ridge on each branchial region; and the straight, not conspicuously bilobed front.

I. mortoni also resembles several *Pinnixa* species. It can be easily separated from *P. tumida* Stimpson, 1858, and *P. rathbuni* Sakai, 1934, as both of those species have the propodus and dactylus of the third maxilliped relatively slender and less spatulated; in the case of *P. tumida* the propodus and dactylus are of almost the same length and lie side by side. *P. rathbuni* is a large (> 20 mm c.b.), free living, subtidal species. Of the other three species of Indo-West Pacific *Pinnixa*, *P. balanoglossana* Sakai, 1934 has the propodus of the third maxilliped much more elongated and the merus much broader and longer; *P. haematosticta* Sakai, 1934, is a relatively broader species, has a strong transverse ridge posteriorly, and has a more elongate merus on the third maxilliped; *P. penultipedalis* Stimpson, 1858, differs by having a smooth glossy carapace, a sharp transverse ridge posteriorly, a small palm on the cheliped and a very broad merus on the third walking leg (height 0.8 times length). Shen (1937) recorded *P. penultipedalis* from northern China although Manning and Morton (1987) cast doubt on the validity of his identification. Shen's species cannot be conspecific with *I. mortoni* as it is noticeably broader (breadth 2.2 times length), has longer eyes, and the merus of the third maxilliped is much higher. An undescribed species recorded by Barnard (1955) from Mozambique as *P. penultipedalis* is also different from all other species of *Pinnixa* and *Indopinnixa* by having three abdominal segments fused. *Pinnixa brevipes* H. Milne Edwards, 1853, is considered to not be a valid *Pinnixa* (see Manning and Morton 1987, 546 and Serène 1964, 277); Schmitt, McCain and Davidson (1973) give a complete list of references relating to all aspects of the taxonomy and biology of *Pinnixa* and other pinnotherids.

REFERENCES

Alcock, A. 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catametopa, or Grapsoidea. *Journal of the Asiatic Society of Bengal* 69(2) no. 3:279–456.

Balss, H. 1922. Diagnosen neuer japanischer Decapoden. *Zoologischer Anzeiger* 54(1–2) part I: 1–6.

Barnard, K. H. 1955. Additions to the Fauna-list of South African Crustacea and Pycnogonida. *Annals of the South African Museum* 43(1):1–107, figs. 1–53.

Barnes, R. S. K. 1967. The Macrophthalminae of Australasia; with a review of the evolution and morphological diversity of the type genus *Macrophthalmus* (Crustacea: Brachyura). *Transactions of the Zoological Society of London* 31:195–262.

Barnes, R. S. K. 1970. The species of *Macrophthalmus* (Crustacea: Brachyura) in the collections of the British Museum (Natural History). *The Bulletin of the British Museum (Natural History) Zoology* 20(7): 205–51.

Barnes, R. S. K. 1971. Biological results of the Snellius Expedition XXIII. The genus *Macrophthalmus* (Crustacea, Brachyura). *Zoologische Verhandelingen. Leiden* 115:1–40.

Barnes, R. S. K. 1977. Concluding contribution towards a revision of, and key to, the genus *Macrophthalmus* (Crustacea: Brachyura). *Journal of Zoology. Proceedings of the Zoological Society of London* 182:267–80.

Bones, L. 1982. The taxonomy and ecology of four species of *Macrophthalmus* (Crustacea: Decapoda) in Hong Kong. In *The marine flora and fauna of Hong Kong and southern China* (ed. B. Morton and C. K. Tseng). 687–704. Proceedings of the First International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong. 18 April–10 May 1980. Hong Kong: Hong Kong University Press.

George, R. W. 1982. The distribution and evolution of the ghost crabs (*Ocypode* spp.) of Hong Kong with a description of a new species. In *The marine flora and fauna of Hong Kong and southern China* (ed. B. Morton and C. K. Tseng), 185–94. Proceedings of the First International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 18 April–10 May 1980. Hong Kong: Hong Kong University Press.

Gerstaecker, Ad. 1856. Carcinologische Beiträge (mit 3 Taf.). In *Archiv für Naturgeschichte. Berlin* 22. Bd.1, 101–62.

Ghani, N. and Tirmizi, N. M. 1991. *Acmaeopleura balssi* Shen, 1932: a grapsid genus and species hitherto unknown from the northern Arabian Sea (Decapoda, Brachyura). *Crustaceana* 61(1): 93–95.

Gordon, I. 1931. Brachyura from the coasts of China. *Journal of the Linnean Society of London* 37(254):525–58, figs. 1–36.

Gordon, I. 1941. Notes on some Indo-Pacific crabs (Crustacea, Decapoda). *Proceedings of the Linnean Society of London* 153(1): 123–40, text-figs. 1–15.

Hill, D. S. 1982. The Leucosiidae (Crustacea: Decapoda) of Hong Kong. In *The marine flora and fauna of Hong Kong and southern China* (ed. B. Morton and C. K. Tseng), 195–206. Proceedings of the First International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 18 April–10 May 1980. Hong Kong: Hong Kong University Press.

Horikoshi, M. and Takeda, M. 1982. An assemblage of small crustaceans in shallow subtidal depths at the entrance to Tolo Channel, Hong Kong. In *The marine flora and fauna of Hong Kong and southern China* (ed. B. Morton and C. K. Tseng), 619–26. Proceedings of the First International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 18 April–10 May 1980. Hong Kong: Hong Kong University Press.

Hwang, J. -J. and Takeda, M. 1986. A new freshwater crab of the family Grapsidae from Taiwan. *Proceedings of the Japanese Society of Systematic Zoology. Tokyo* 33:11–18.

Kamita, T. 1941. Studies of the decapod crustaceans of Chosen. Pt.1. Crabs. *The Fisheries Society of Chosen, Keijo:* 1–289, text-figs. 1–146, 1 map.

Kemp, S. 1918. Crustacea Decapoda and Stomatopoda. Zoological results of a tour in the Far East. *Memoirs of the Asiatic Society of Bengal* 6:217–97, figs. 1–12.

Kemp, S. 1919. The Indian species of *Macrophthalmus*. *Records of the Indian Museum* 5(25): 383–96.

Kingsley, J. S. 1880. Carcinological notes. IV. Synopsis of the Grapsidae, pp. 187–124. *Proceedings of the Academy of Natural Sciences of Philadelphia for 1879*: 34–37.

Man, J. G. de. 1888. Report on the Podophthalmous Crustacea of the Mergui Archipelago, collected for the Trustees of the Indian Museum, Calcutta, by Dr John Anderson, F.R.S., Superintendent of the Museum. Parts III–V. *Journal of the Linnean Society of London* 22(138–40): 129–76, pls. 9–19.

Man, J. G. de. 1892. Decapoden des Indischen Archipels. In *Zool. Ergebn. einer Reise nach Nierderl. Ost-Indien* (Max Weber), 2:265–527, pls. 15–29. Leiden: E. J. Brill.

Man, J. G. de. 1895. Bericht über die von herrn Schiffscapitän Storm zu Atjeh, an den westlichen Küsten von Malakka, Borneo und Celebes sowie in der Java-See gesammelten Decapoden und Stomatopoden. *Zoologische Jahrbücher. Jena (Abteilung für Systematik)* 8:485–609, figs. 1–15.

Manning, R. B. and Holthuis, L. B. 1981. West African brachyuran crabs (Crustacea: Decapoda). *Smithsonian Contributions to Zoology* 306:i–xii, 1–379, figs. 1–88, 2 app.

Manning, R. B. and Morton, B. 1987. Pinnotherids (Crustacea: Decapoda) and leptonaceans (Mollusca: Bivalvia) associated with sipunculan worms in Hong Kong. *Proceedings of the Biological Society of Washington* 100(3):543–51.

Milne Edwards, H. 1852. Observations sur les affinitiès zoologiques et la classification naturelle des crustacés. *Annales des Sciences Naturelles. Paris* (3)18:109–66.

Milne Edwards, A. 1873. Recherches sur la faune carcinologique de la Nouvelle-Calédonie. Deuxième Partie. *Nouvelles Archives du Muséum d'Histoire Naturelle. Paris* 9:155–332, pls. 4–18.

Ng, P. K. L. 1988. *The freshwater crabs of Peninsular Malaysia and Singapore*. 152 pp. Singapore: Shing Lee Publishers.

Nobili, G. 1903. Crostacei di Singapore. *Bollettino di Musei di Zoologia ed Anatomia Comparata della R. Università di Torino* 18(455):1–39, 1 pl.

Rathbun, M. J. 1909. New crabs from the Gulf of Siam. *Proceedings of the Biological Society of Washington* 22:107–14.

Rathbun, M. J. 1910. The Danish Expedition to Siam 1899–1900. V. Brachyura. *Kongelige Danske Videnskabernes. Selskabs Skrifter. Kjobenhavn* 7(4): 301–68 (1–68), text-figs. 1–44, pls. 1–2, 1 map.

Sakai, T. 1939. *Studies on the crabs of Japan. IV. Brachygnatha, Brachyrhyncha*. 365–741, text-figs. 1–129, pls. 42–111, 6 tables. Tokyo: Yokendo.

Sakai, T. 1976. *Crabs of Japan and the adjacent seas*. 3 vols. i–xxix + 1–773, text-figs. 1–379, maps 1–3 (English); 1–16, pls. 1–251 1–461, text-figs. 1, 2 (Japanese). Tokyo: Kodansha.

Sankarankutty, C. 1961. On some crabs (Decapoda—Brachyura) from the Laccadive Archipelago. *Journal of the Marine Biological Association of India* 3(1–2): 120–36, figs. 1, 2.

Schmitt, W. L., McCain, J. C. and Davidson, E. S. 1973. Decapoda I: Brachyura I: Fam. Pinnotheridae. In *Crustaceorum catalogus* (ed. H. -E. Gruner and L. B. Holthuis), 3:1–160.

Serène, R. 1964. Papers from Dr. Th. Mortensen's Pacific Expedition 1914–1916. 80. Goneplacidae et Pinnotheridae. Récoltes par le Dr. Mortensen. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjobenhavn* 126:181–282, text-figs. 1–22, pls. 16–24.

Serène, R. and Lundoer, S. 1974. Observations on the male pleopod of the species of *Ilyoplax* Stimpson with a key to the identification of the species. *Phuket Marine Biological Center Research Bulletin* 3:1–10.

Shen, C. -J. 1930. A new *Scopimera* from North China. *Bulletin of the Fan Memorial Institute of Biology. Peiping* 1(14): 227–31.

Shen, C. -J. 1931a. The crabs of Hong Kong. Part 1. *Hong Kong Naturalist* 2(2): 92–110, text-figs. 1–11, pls. 4–10.

Shen, C. -J. 1931b. The crabs of Hong Kong. Part 2. *Hong Kong Naturalist* 2(3): 185–97, figs. 1–13, pls. 12–14.

Shen, C. -J. 1932a. The Brachyura Crustacea of North China. *Zoologia Sinica Ser. A. Invertebrates of China*, 9 (1): i–x + 1–320, text-figs. 1–171, pls. 1–10, 1 map.

Shen, C. -J. 1932b. The crabs of Hong Kong. Part 3. Family Portunidae. *Hong Kong Naturalist* 3(1): 32–45, text-figs. 1–10, pls. 6–9.

Shen, C. -J. 1934. The crabs of Hong Kong. Part 4. Family Portunidae (cont.). *Hong Kong Naturalist* Suppl. no. 3: 37–56, text-figs. 1–18.

Shen, C. -J. 1935. On some new and rare crabs of the families Pinnotheridae, Grapsidae and Ocypodidae from China. *Chinese Journal of Zoology* 1:19–40, text-figs. 1–15.

Shen, C. -J. 1936. On a collection brachyuran Decapoda from Hainan Island with descriptions of three new species. *Chinese Journal of Zoology. Nanking* 2:63–80, text-figs. 1–4.

Shen, C. -J. 1936. Additions to the fauna of brachyuran Crustacea of North China. *Contributions from the Institute of Zoology. National Academy of Peiping* 3(3): 59–76, text-figs. 1–4.

Shen, C. -J. 1937. Second addition to the fauna of brachyuran Crustacea of North China, with a check list of the species recorded in this particular region. *Contributions from the Institute of Zoology. National Academy of Peiping* 3(6): 277–314, 11 text-figs.

Shen, C. -J. 1940a. The brachyuran fauna of Hong Kong. *Journal of the Hong Kong Fisheries Research Station* 1(2): 211–42.

Shen, C.-J. 1940b. Four new species of Brachyura from Chinese Seas. *Journal of the Hong Kong Fisheries Research Station* 1(2): 255–62.

Soh, C. L. 1978. On a collection of sesarmine crabs (Decapoda, Brachyura, Grapsidae) from Hong Kong. *Memoirs of the Hong Kong Natural History Society* 13:9–22, 4 pls.

Souleyet, L. F. A. 1841. Crustacés. In *Voyage autour du monde exécuté pendant les années 1836 sur la corvette 'La Bonite', commandée par M. Vaillant* (F. Eydoux and L. F. A. Souleyet), 1:219–24. Paris.

Stephensen, K. 1946. The Brachyura of the Iranian Gulf. *Danish Scientific Investigations in Iran. Copenhagen* 4:57–237, text-figs. 1–60.

Stimpson, W. 1858. Prodromus descriptionis animalium evertebratorum quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit W. Stimpson. Pars. IV. Crustacea Cancroidea et Coryoidea. *Proceedings of the Academy of Natural Sciences of Philadelphia* 10:31–40.

Stimpson, W. 1907. Report on the Crustacea (Brachyura and Anomura) collected by the North Pacific Exploring Expedition, 1853–1856. *Smithsonian Miscellaneous Collections* 49(3): 1–240, pls. 1–26.

Takeda, M. 1974. Accounts of some rare crabs from Mutsu Bay, with description of a new grapsid from Onagawa Bay. *The Bulletin of the Marine Biological Station of Asamushi Tôhoku University* 15(1): 13–21.

Tesch, J. J. 1915. The Catametopous genus *Macrophthalmus* as represented in the collection of the Leiden Museum. *Zoölogische Mededeelingen. Leiden* 1:149–204.

Tesch, J. J. 1918. The Decapoda Brachyura of the Siboga-Expedition. I. Hymenosomidae, Retroplumidae, Ocypodidae, Grapsidae, and Gecarcinidae. *Siboga-Expeditie. Leiden* Monogr. 39c, livr. 82:1–148, pls. 1–6.

Tweedie, M. W. F. 1936. On the crabs of the Family Grapsidae in the collection of the Raffles Museum. *Bulletin of the Raffles Museum* 12:44–70.

Tweedie, M. W. F. 1937. The crabs of the Family Ocypodidae in the collection of the Raffles Museum. *Bulletin of the Raffles Museum* 13:140–70.

Tweedie, M. W. F. 1950. Grapsoid crabs from Labuan and Sarawak. *Sarawak Museum Journal* 5(2): 338–69.

Wada, K. and Sakai, K. 1989. A new species of *Macrophthalmus* closely related to *M. japonicus* (de Haan) (Crustacea: Decapoda: Ocypodidae). *Senckenbergiana Maritima. Frankfurt a.M.* 20(3/4): 131–46.