Guideline to Identification of Deep-Sea Crabs

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Training Workshop on Identification of Deep-Sea Benthic Macroinvertebrate Vulnerable to Fishing Gear
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In

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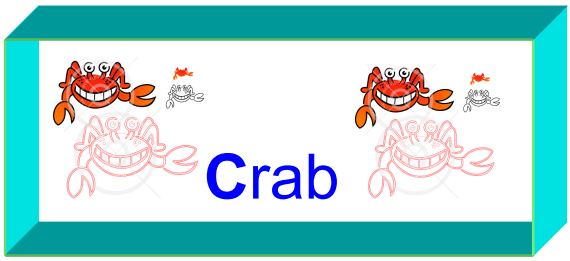


One of the first animals that you are likely to find on a visit to the coast is the “CRAB”. They can be found in many different shapes and sizes, running across the sand at the approach of human feet, under stones and rocks, and pieces of seaweed. Down to under sea at more than 200 m. we still find “THE DEEP SEA CRAB”. One of the most famous deep sea crab is giant spider crab ”*Macrochiera kaemferi*” the biggest crab of the world. The earliest unambiguous crab fossils date from the Jurassic period.

General characteristics :

Crabs are invertebrates, animals without a backbone. The body is consisted of head, thorax and abdomen. The head and thorax are fused to be cephalothorax and covered by an chitinous exoskeleton called **carapace**, an outer shell that both protects them from predators and provides support. Crabs are decapod crustaceans with ten jointed legs, two of which have large and powerful grasping and fighting claws (called pincers or **chelipeds**) and eight **walking legs.** The chelipeds are the first pair of legs on a crab and their most distinguishing structure. The evolution of crabs is characterised by an increasingly robust body, and a reduction in the abdomen. The telson is no longer functional in crabs, and the uropods are absent. Visible on the underside of a crab are the mouthparts or **buccal cavity, sternum** and **abdomen**. The abdomen is not used in locomotion and its appendages retained only for reproduction; in some cases abdominal segments have even become partly fused. The mouthparts are a series of pairs of short legs, specialised to manipulate and chew food. Here the **third maxillipeds** have been fully integrated into the head to form door-like coverings for the mouthparts. The **eyes** which protrude from the front of the carapace are on the ends of short stalks. and the two pair of sensing organs, **antennule** and **antenna**. (Fig. 1)

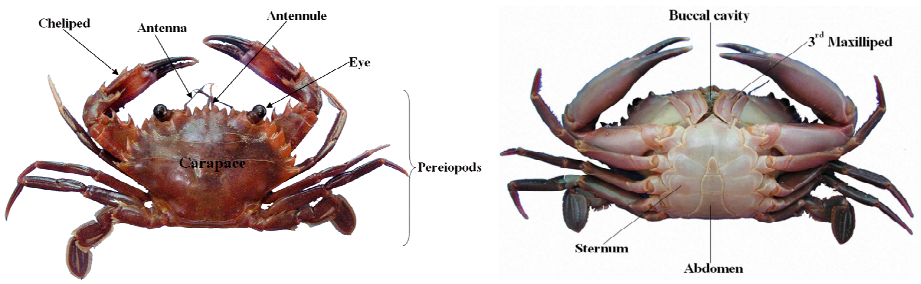


Fig.1 General characteristics of crab

Anatomy

Gills are soft structures plume-like filaments arranged around a central axis. They located in a two lateral cavities under the carapace. There are eight gills on each side of a crab's body. **Heart** is broad in size and located in the lower center part of the body, functioned as pump of the circulatory system. The digestive system of a crab starts at the **mouth** where the mandible cut the food into small pieces. The mouth leads to an **esophagus**, which then leads to the **stomach**. **Stomach** is located in the upper part next to the mouthpart, lined with small hard plates called **gastric mill** which chew and break down swallowed particles of food. Nutrients are then allowed to pass through a filter and adsorbed by the **hepatopancreas** or digestive gland fills most of the area around the stomach. Hepatopancreas is extremely large organ with several functions, including the secretion of digestive enzymes, absorption and storage of digested food. Particles too large to pass through the filter are passed onto the **intestine** and passed out of the animal through the **anus** as fecal material. **Gonad** located on top of the hepatopancreas on either side of the stomach. (Fig. 2)

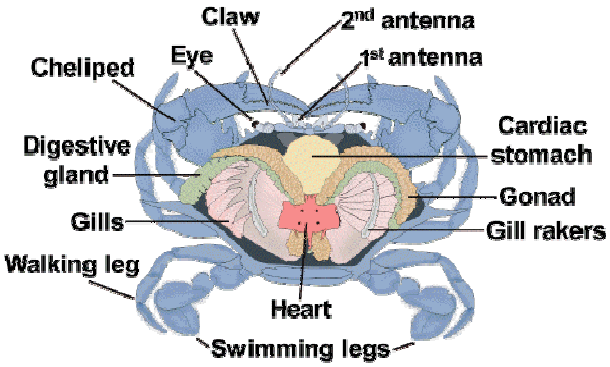


Fig 2. Anatomy of crab

(from : http://www.sms.si.edu/irlfieldguide/CrabBiol.htm

Size :

Crabs vary in size from the smallest crab **"Pea crab"**, a few millimetres wide, to the the biggest crab "**Japanese spider crab"** (*Macrocheira kaempferi*) with a leg span of up to 4 metres (13 ft) and the actual body can reach a size of 37 cm with a weight of 20 kg. The Japanese spider crab are compare as little sea turtles with big legs and just like sea turtles the life expectancy of these sea creatures is estimated at around 100 years. The biggest land crab is the "Coconut crab" (*Birgus latro*), which lives on islands in the Pacific Ocean; it has a leg span up to 2.5 ft (75 cm).

Habitat

Crabs are found in most marine habitats, from coastal area such as coral reef, sandy beach, rocky beach, mangroves and seagrass meadows and down to the cold, lightless abyss, as well as on dry land, mountain and in many freshwater biota. While their larvae are planktonic, adult crabs are found from hitchhiking on pelagic animals and mostly benthic animals.

Growth

Crabs belong to a group of animals known as the Crustacea. The soft body is protected by a exoskeleton called carapace. Unfortunately, this hard shell does not grow. Instead, a soft shell grows inside the crab. Eventually, the crab grows too big and it has to shed its old hard shell. This process is called **"moulting**" or ecdysis and it is a very dangerous time for the crab. The new shell is larger than the old one, but it is soft and takes time to harden. While it remains soft, the crab tries to stay hidden so that it is not attacked by hungry fish and other animals. During the moult, the crab can grow back a lost claw, but it will be smaller than the one that was broken off. The old discarded shell looks like a dead crab, but if you look closely you will find there are holes where the eyes should be. It is hollow inside and it will sometimes float to the surface where it may be washed ashore.

Crab diversity :

About 850 species of crab are freshwater, terrestrial or semi-terrestrial species; they are found throughout the world's tropical and semi-tropical regions. They were previously thought to be a monophyletic group, but are now believed to represent at least two distinct lineages. Ng *et al.* (2008) recorded worldwide brachyuran crab of 6,793 species species and anomuran crabs in the world ranges 1,500-2,000 species. Of these, the largest proportion is found in the Western Central Pacific. Accordingly, Martin and Davis (2001) 84 families are recognized, divided to 13 families of Anomura and 71 families. Out of these, 8 families are found in fresh water 3 occur in the Western Central Pacific.

Fast sheet about crab

1. Crabs are decapod crustaceans which have a very short tail and are covered with a thick shell, or exoskeleton and are armed with a single pair of claws.

2. Crabs are invertebrates (animals without a backbone)… their exoskelton protects them from predators and provides support for their bodies.

3. They have flattened bodies, two feeler antennae, and two eyes located on the end of stalks, and they are 10-legged animals that walk sideways.

4. There are about 6,793 species of crab found in all of the oceans around the world, in fresh water and there are also some terrestrial crabs (ones that live entirely on land)… many live in the tropical regions.

5. Crabs can be as small as the pea crab which is only a few millimeters wide to the Japanese spider crab which can have a leg span up to 4 meters (about 13 feet).

6. Crabs have five pairs of legs (the first pair are known as the claws).

7. Crabs are ominivores (eats both plants and animals) and some feed primarily on algae, others feed on mollusks, worms, crustaceans, fungi, bacteria , and organic non-living material.

8. 1 million tons of crabs are being eaten annually in restaurants and homes all over the world.

9. Marine crabs breathe underwater using gills… land crabs have two cavities that act like lungs and allow them to breathe air.

10. After they mate, the blue crab and others, deposit two million eggs amd in a two week period the eggs will develop into larva.

Feeding

Many crabs are omnivores (plant- and meat-eaters),others are carnivores (meat-eaters), and some are herbivores (plant-eaters). feeding primarily on algae, and taking any other food, including molluscs, worms, other crustaceans, fungi, bacteria and detritus, depending on their availability and the crab species. The various chelipeds shape and pattern are varied in crab which feeding different.

Fig 3. Various shape of cheliped for feeding

a. Spoon-tip : feed algae
b. Meat eater
c. Bivalve eater
d. plant- and meat-eaters
e. Meat eater

Reproduction

Like all crustaceans the sexes are separate and the size of the abdomen distinguishes them: in males it is **triangular** and inset into the underside. In females it is **broad and round** and most obvious when the eggs are being carried. Males often have larger claws, a tendency which is particularly pronounced in the

fiddler crabs. This is due to the fact that female crabs brood fertilized eggs on their pleopods. the gonopores (sexual openings) are found on the legs. However, since crabs use the first two pairs of pleopods (abdominal appendages) for sperm transfer, this arrangement has changed. As the male abdomen evolved into a narrower shape, the gonopores have moved towards the midline, away from the legs, and onto the sternum. A similar change occurred, independently, with the female gonopores. The movement of the female gonopore to the sternum. (Fig. 4) Female crabs usually lay their eggs shortly after copulating but can also store sperm for many months. The eggs are fertilized as they are laid by passing through the chamber holding the sperm. Eggs are brooded in a mass attached to hair on the female's abdomen. (Fig. 5) They are cared for several months before the eggs hatch into tiny swimming crab larvae which are released to take their chances in the sea. Once developed the egg hatches into a tiny larva called a **zoea**. Release of the zoea is aided by the female wafting her abdomen to and fro. The crab larvae spends its life swimming in the plankton moulting from zoea to **megalopa** until it reaches a stage ready to settle on the sea floor again. After a few months, the larvae that have survived fall to sea bottom and turn into tiny adult crabs and starts theirs life bottom dwellers. (Fig. 6)

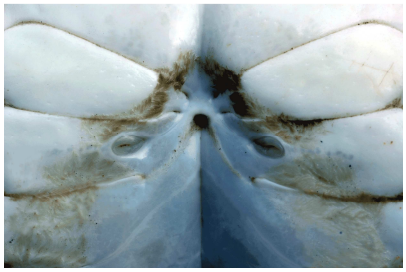


Fig. 4 The movement of the female gonopore to the sternum

Fig. 5 Eggs are attached on the female's abdomen.

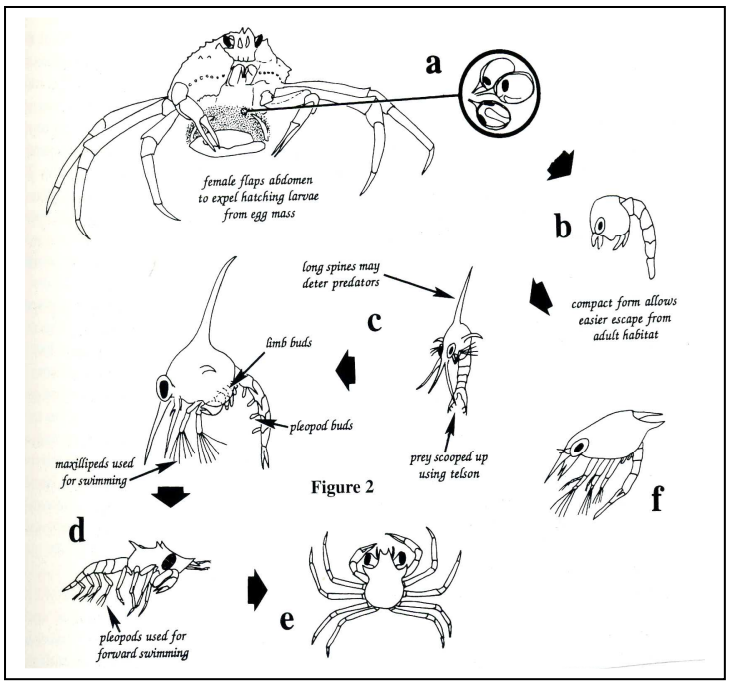


Fig 6. Larval development of brachyuran crab (a) eggs; (b) prezoea; (c) zoea; (d) megalops; (e) first juvenile instar; (f) typical zoea of anomuran crab (from : Jensen, 1995)

Behaviour

Crabs are mostly active animals with complex behaviour patterns. Crabs typically walk sideway (a behaviour which gives us the word *crabwise*). This is because of the articulation of the legs which makes a sidelong gait more efficient. However, some crabs walk forwards or backwards, including raninids, *Libinia emarginata* and *Mictyris platycheles*. Some crabs, notably the Portunidae and Matutidae, are also capable of swimming. Fiddler crabs can communicate by drumming or waving their pincers. Crabs tend to be aggressive towards one another and males often fight to gain access to females. On rocky seashores, where nearly all caves and crevices are occupied, crabs may also fight over hiding holes. Crabs are known to work together to provide food and protection for their family, and during mating season to find a comfortable spot for the female to release her eggs. The claws are used for feeding, excavating burrows, defense (or aggressive behavior), and signaling (a sort of crab language fending off competing crabs for territory, keeping predators at bay, and most importantly, attracting the opposite sex).

Fisheries

Crabs make up 20% of all marine crustaceans caught, farmed, and consumed worldwide, amounting to 1½ million tonnes annually. One species accounts for one fifth of that total: *Portunus trituberculatus*. Other commercially important taxa include *Portunus pelagicus*, several species in the genus *Chionoecetes*, the blue crab (*Callinectes sapidus*), *Charybdis spp.*, *Cancer pagurus*, the Dungeness crab (*Metacarcinus magister*) and *Scylla serrata*, each of which yields more than 20,000 tonnes annually. The deep sea crabs which commercially important are Alaskan king crab *Paralithodes camtschaticus* and snow crab *Chionoecetes opillio*.

Fig 7. Giant trap for catching Alaskan king crab
(from :http://tv.ign.com/articles/866/866201p1.html)

Classification

According to Martin and Davis (2001) the crabs are classified as;

Phylum Arthropoda

Subphylum Crustacea

Class Malacostraca

Subclass Eumalocostraca

Superorder Eucarida

Order Decapoda

Suborder Dendrobranchiata

Suborder Pleocyemata

Infraorder Anomura

Infraorder Brachyura

Like the shrimps and lobsters, crabs belong to the order Decapoda (= “ten-legged”, referring to the 10 thoracic appendages normally present in these crustaceans). Crabs can be classified into 2 main groups,

1. **Brachyuran crabs** (infraorder Brachyura of Brachyura, or true crabs) have squat, broad and compact body. The carapace is symmetrical and dorsovental laying, “True crabs” can easily be separated from the so-called “false crabs” belonging to the infraorder Anomura by having 4 pairs of well-developed walking legs. which typically have a very short projecting "tail", or where the reduced abdomen is entirely hidden under the thorax. The antenna are located between two eyes. The gills are phyllobranchia type. They are what most people understand to be a typical crustacean with four pairs of walking legs and two clawed arms. (Fig. 8b)
2. **Anomuran crabs** (infraorder Anomura). Anomuran crabs always have only 3 pairs of walking legs clearly visible, while the fourth (last) pair is very small, normally tucked under the body and hardly noticeable. However, this is just a general rule rather than a distinct separating character as there are a number of true crabs which have their fourth pair of legs greatly reduced as well (e.g. Dynomenidae and Retroplumidae) or even completely reduced (Hexapodidae). Besides the large Coconut crab *Birgus latro* and the Alaskan king crab *Paralithodes camtschaticus* which are of some commercial importance, almost none are utilized as food, either being too rare or too small. Hermit crabs, squat lobsters, porcelain crabs and mole crabs are the member of anomura. (Fig. 8a)

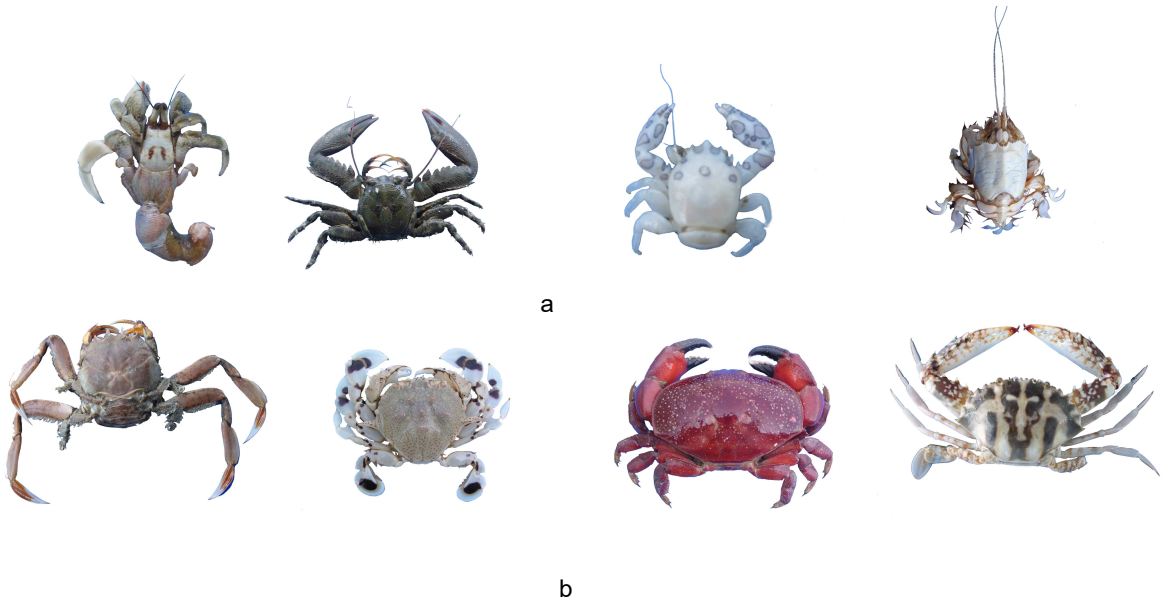


Fig. 8 Some types of Anomuran crabs (a) and brachyuran crabs (b)

Characters useful for identification

Ng (1998) defenited the characters useful for crab identification in FAO guide as follows (Fig. 9); The teeth of the **anterolateral margins** of the **carapace** are also known as the epibranchial teeth. The **first anterolateral tooth** is often called the “external orbital” or “exo-orbital” angle (or tooth) and is counted separately from the following **anterolateral teeth** by many authors. The **frontal margin** (or **front)** becomes elongate and/or spiniform in many crabs such as the homolids (deep-water porter crabs) and majids (spider crabs), and is then frequently called a **rostrum**. (Fig. 9) The maximum **carapace width** is used as principal measurement indicating the size of a crab, measured as the greatest distance between the lateral margins of the carapace.

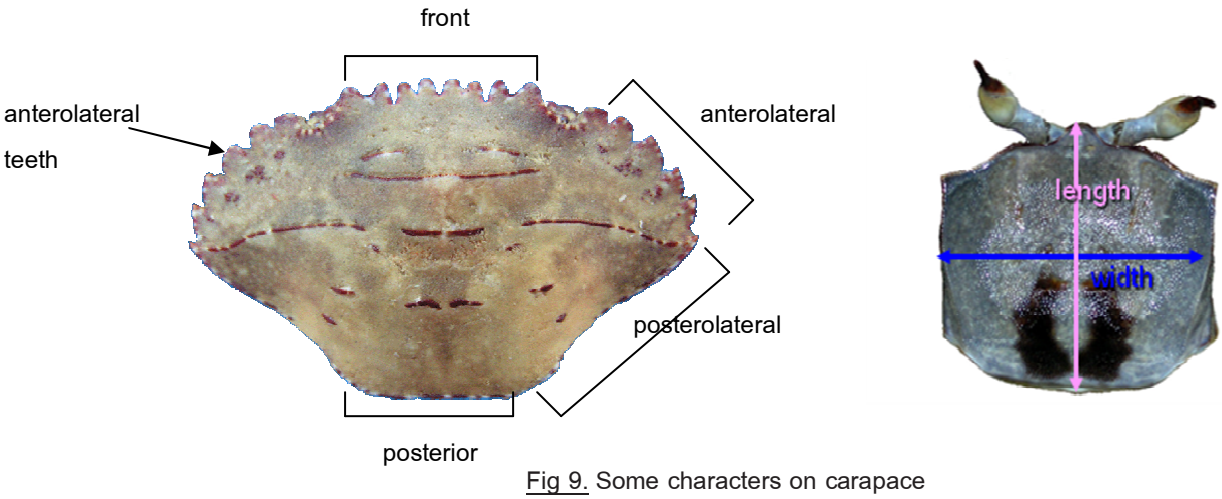


Fig 9. Some characters on carapace

The **buccal cavern** (location of the mouthparts), is bordered on both sides by the **pterygostomial regions**, and above by the **epistome**. The calcareous plate inside the buccal cavern is called the **endostome**. (Fig. 10) Usually, only the anterior part of the endostome is visible, even when the mouthparts are moved aside. The outer mouth parts or **third maxillipeds** are often just referred to as **"the mouthparts"**, even though there are actually 6 pairs of feeding appendages. Underneath the third maxillipeds, the **second maxillipeds** and **first maxillipeds** are located, normally covered by the third maxillipeds in life. Two smaller feeding appendages are situated below the 3 pairs of maxillipeds: the first **maxilla** (or maxilla) and second maxilla (or **maxillules**). Finally, the mouth is bordered by a pair of well-calcified, jaw-like, and highly modified appendages, the **mandibles**. (Fig. 10)

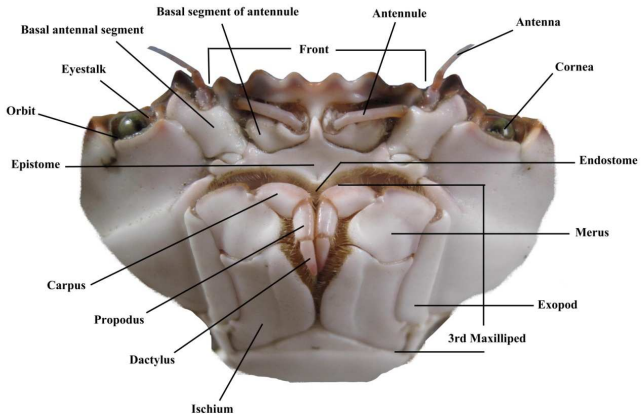


Fig 10. Some characters of mouthparts

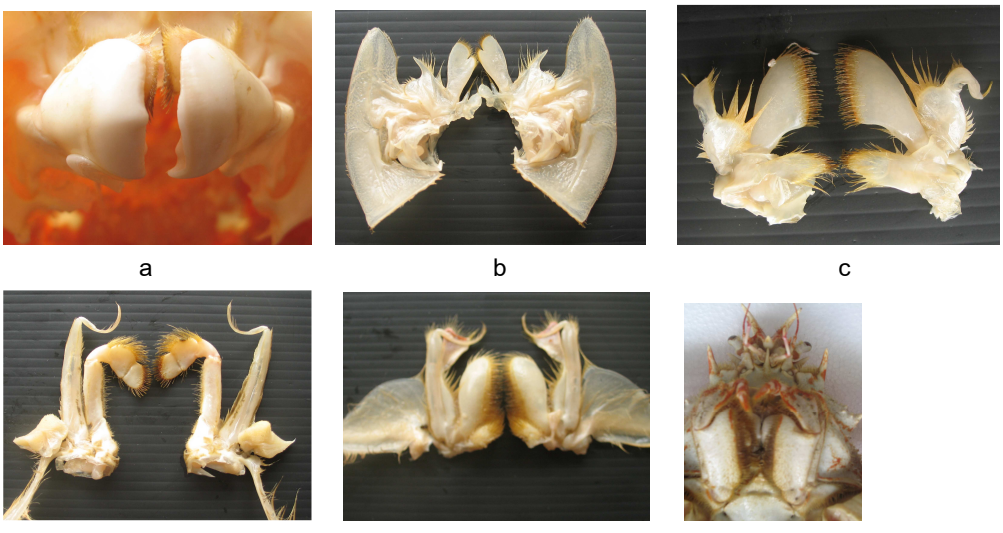


Fig. 11 The thoracic appendages as parts of mouthparts

a. mandible b. first maxilla
c. second maxilla d. first maxiiliped
e. second maxiiliped f. third maxillpiped

The 5 pairs of locomotory appendages of a crab (the pereiopods) are made up of a pair of usually powerful **chelipeds** (legs carrying a **chela** or **pincer**) and normally of 4 pairs of **walking** (or ambulatory) **legs**. For the present contribution, the first appendage is referred to as the **cheliped** and the last 4 appendages (walking legs) as **legs**. The claw (or chela) itself consists of a **palm** (or manus) and 2 **fingers**, one of which is movable (the **dactylus** or **movable finger**), where as the other one (**pollex**) is fixed. The tips or edges of the fingers may be **pectinated**. In some families the last pair or all walking legs are modified for swimming or burrowing, as seen in the Portunidae and the Matutinae (the latter a subfamily of the Calappidae). (Fig. 12)

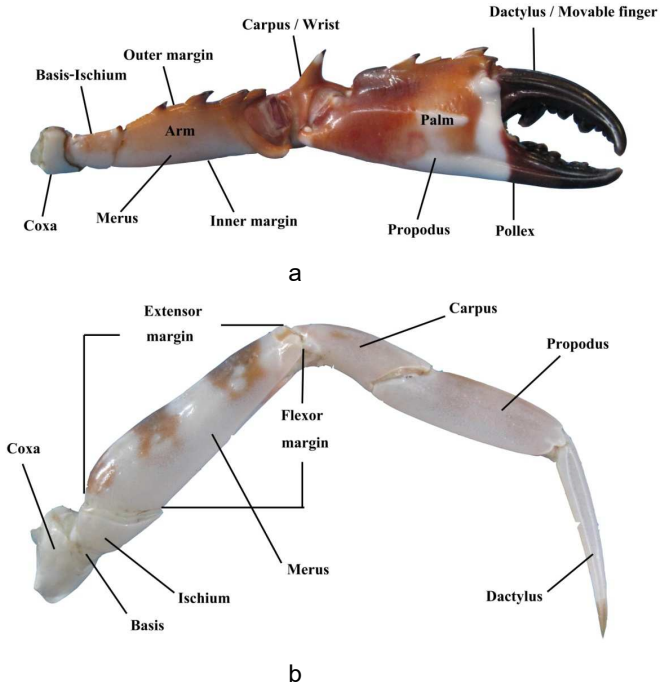


Fig. 12 The cheliped (a) the walking leg (b)

Adult male and female crabs are easily distinguished by the shape of their **abdomen**. In males, the abdomen is triangular to broadly T-shaped, whereas in females it is broad, usually semicircular, often covering most part of the ventral surface. Almost all crabs have 7 **abdominal segments** (although the seventh segment or **telson** is actually not a true segment), (Fig. 13) but in a number of families, several segments are partially or completely fused. This fusion may be complete (i.e. with the sutures between segments no longer visible) or incomplete (i.e. with parts of the sutures still present or obscure). In both cases, however, the segments are immovable. Many crab species show a sexual dimorphism, with the males usually being larger or possessing special or excessively developed structures. In some species,

however, it is the female which grows larger. Males possess **2 pairs** of **gonopods**, that is, modified pleopods specifically adapted for copulation (most crabs practice internal fertilization). The pleopods (abdominal appendages) of females are branched, setose and serve to carry the eggs: fertilized eggs are exuded, attached to the setose pleopods of females, and kept there for several weeks until the planktonic larvae (zoeae) hatch out. The larvae pass several stages before they finally metamorphose to a young crab. (Fig. 14)

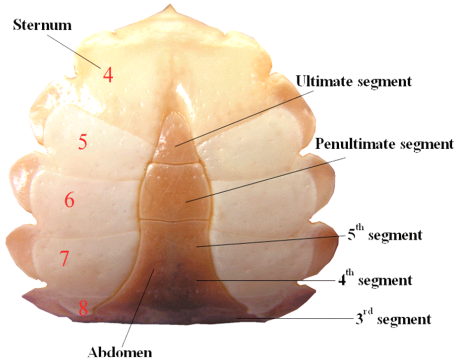
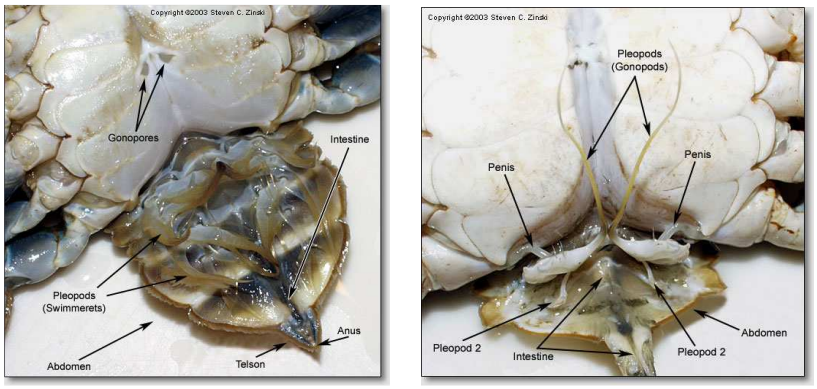


Fig. 13 The position of each segment on abdomen and sternum



a b

Fig. 14 The gonopod of female (a) and male (b)

Many species of crabs possess **pubescence** to varying degrees on their body and appendages. The hair (or more appropriately called **setae**) may be soft or stiff, simple or plumose (plume-like), or so short that it becomes pile-like, sometimes even short and dense, giving a velvet-like appearance. The setae may sometimes be hard and spine-like, especially on the propodus and dactylus of legs. Unlike real spines, however, those stiff setae are never calcareous. Majids often possess hook-like setae that attach to sponges, algae, and debris (similar in action to velcro), supporting the camouflage of the crab. In other

species, the longer and/or plumose setae gather dirt and mud in order to obscure the animal's outline. Most of the softer setae on the legs and chelae have a sensory function.

Carapace types

The shape of the carapace is often used as a descriptive character in many guides and keys. Unfortunately, a large variety of terms have been introduced in the past, not always applied with exactly the samemeaning. Therefore, an approximate categorization has been attempted here and those carapace types which belong to a respective category are illustrated below. It should be remembered, however, that there are sometimes no clear lines separating the different carapace types, and so the designation of a particular type may be somewhat subjective in certain cases. Nevertheless, the use of carapace shapes is still a useful character in many instances. (Fig. 15)

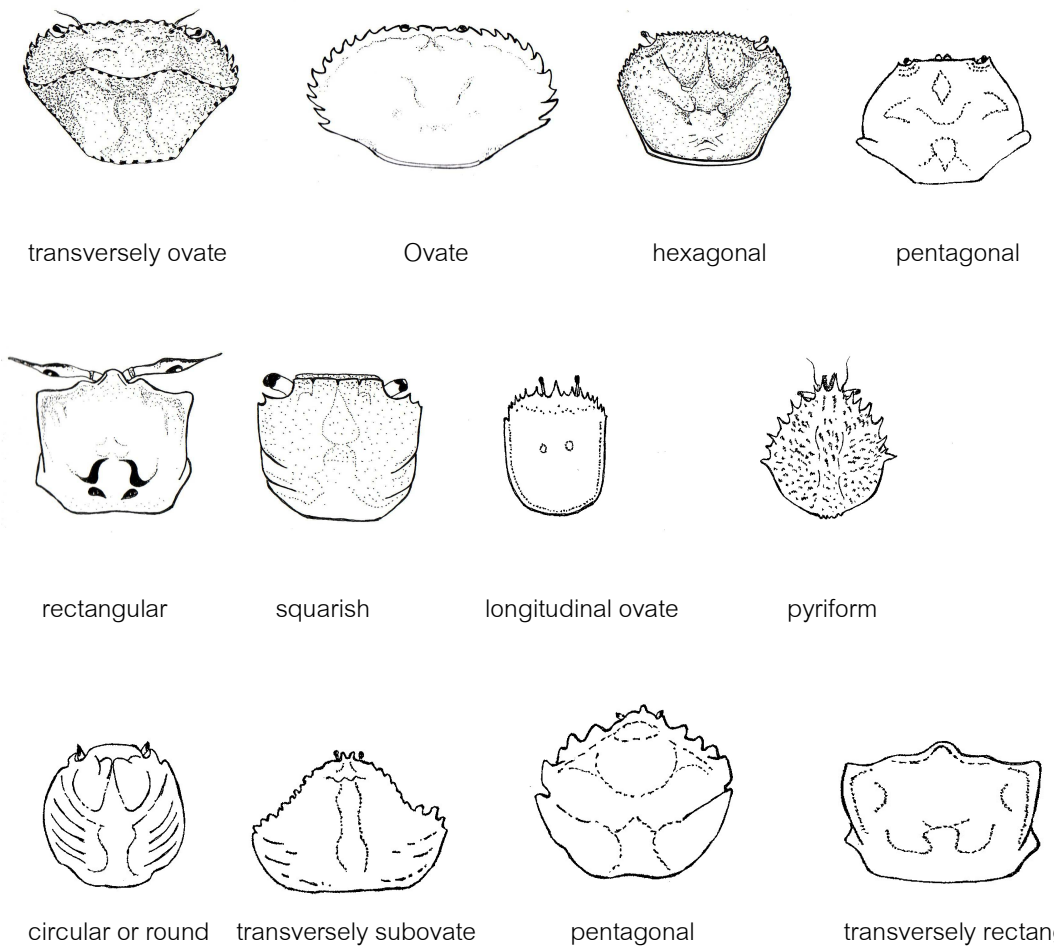


Fig. 15 Various carapace shapes

Fig. 16 The color and pattern of the carapace are the typical characteristics in some crabs

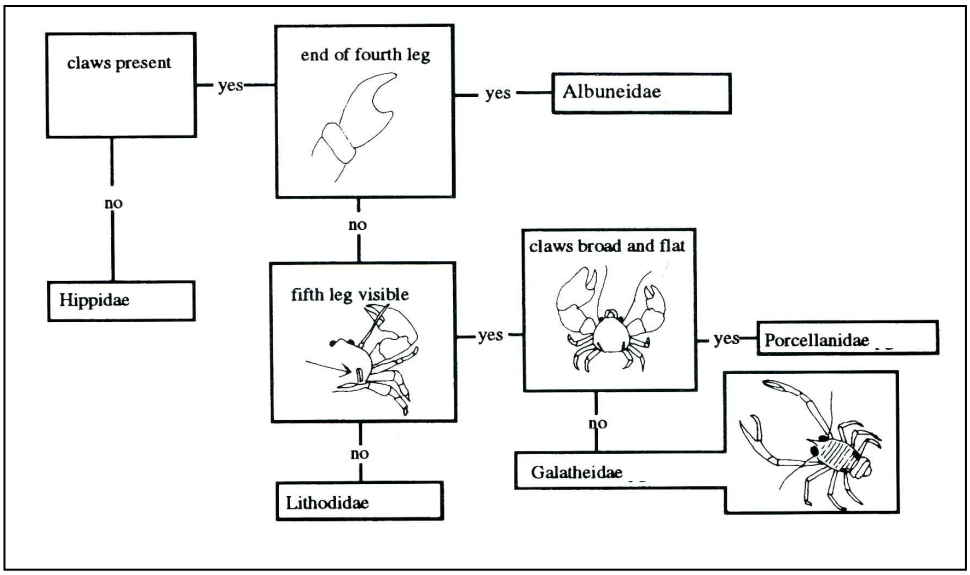


Fig. 17 The identification of anomuran crab to family

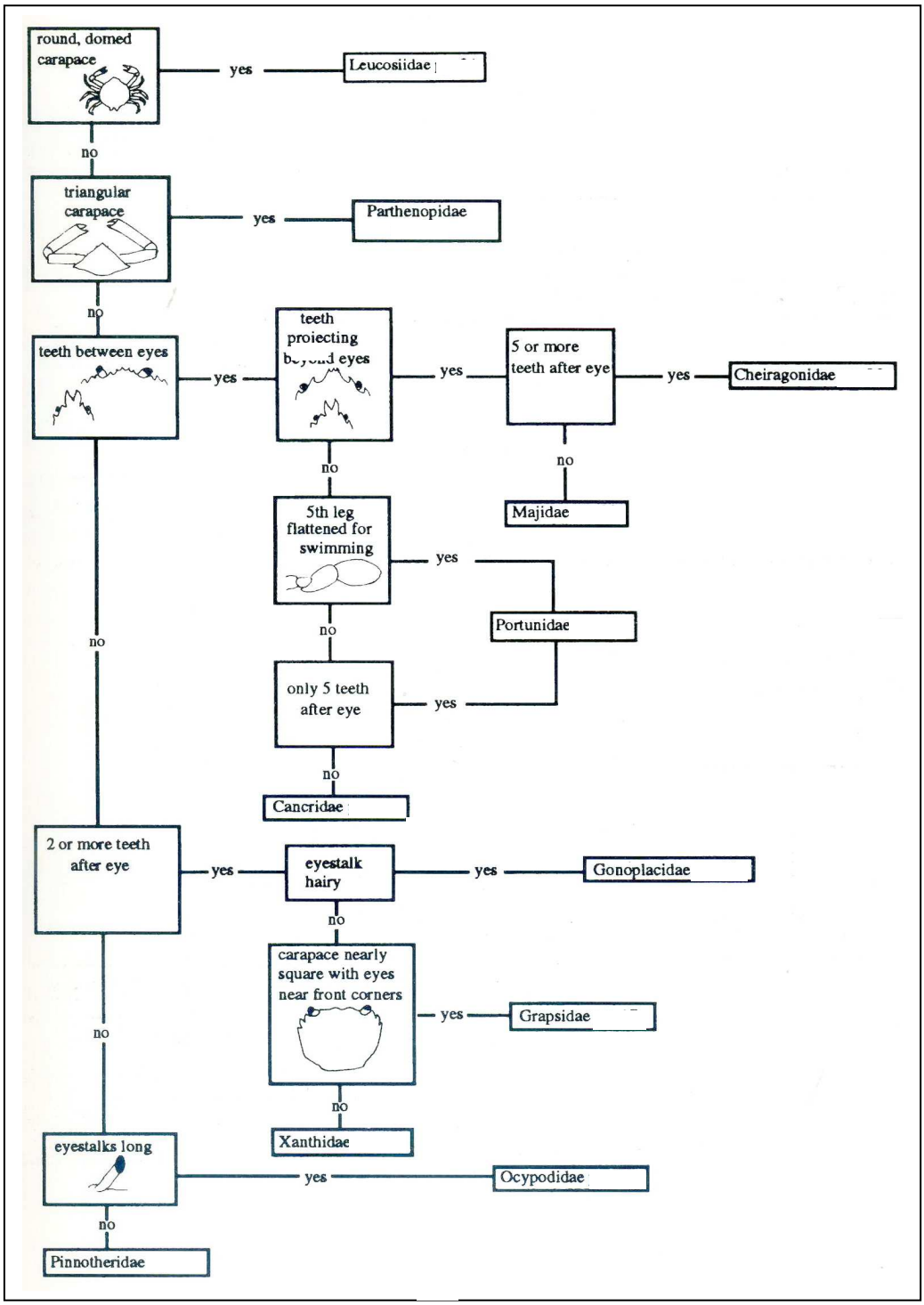
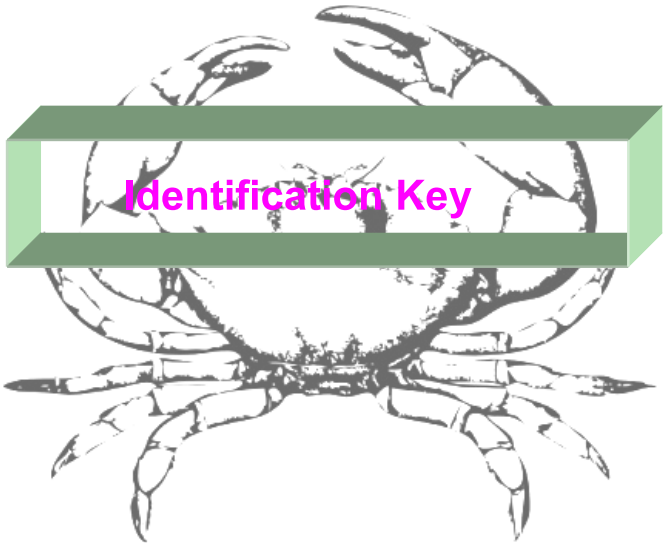


Fig. 18 The identification of brachyuran crab to family



Identification Key

Key to family

(From Ng *et al.*, 2009, Part I. Carcinology in Taiwan)

1 Male and female genital openings coxal (on pereopod 5) ……..…….... 2

– Male genital openings coxal, coxo-sternal or sternal; female genital openings sterna……..……....…9

2 Basal segment of eyestalk much longer than terminal article, from dorsal view, eyestalk appears to be 2-segmented……...……..……...**Latreilliidae**

– Basal segment of eyestalk much shorter than terminal article, from dorsal view, eyestalk appears to be unsegmented ……..……....3

3 Pereopod 5 distinctly subchelate to chelate or strongly reduced to just 3 articles, inserted obliquely oncarapace and directed upwards…….....4

– Pereopod 5 normal in structure or reduced in size but not subchelate or chelate and never reduced to just 3 articles, inserted laterally on carapace and directed laterally.……...……...……...……..…8

4 Merus of maxilliped 3 distinctly triangular in shape ……...……...……..……5

– Merus of maxilliped 3 quadrate to subquadrate, never clearly triangular in shape...……...……...……..6

5 Carapace hexagonal to subovate; orbits distinct. Exopod of maxilliped 3 without flagellum.....……**Cyclodorippidae**

– Carapace rectangular to squarish; orbits absent. Exopod of maxilliped 3 with distinct flagellum...……**Cymonomidae**

6 Carapace longitudinally rectangular, dorsal surface glabrous or with scattered stiff setae. Only pereopod 5 with dactylus and propodus subchelate to chelate ……...……...……...……...……...…**Homolidae**

– Carapace longitudinally ovate, circular or hexagonal, dorsal surface usually with dense, soft setae. Both pereopod 4 and 5 with dactylus and propodus subchelate to chelate; carries sponges and other marine organisms when alive……..7

7 Carapace circular to hexagonal. A small platelet-like structure usually intercalated between edges of abdominal somite 6 and telson. Crab carries sponges, tunicates, or bivalve shells ……...……...……...……..**Dromiidae**

– Carapace longitudinally ovate. No platelet-like structure intercalated between edges of abdominal somite 6 and telson. Crab believed to carry sponges or related objects……...……...……...……**Homolodromiidae**

8 Merus of maxilliped 3 distinctly triangular in shape. Carapace longitudinally ovate. Sternum very narrow, thoracic sternites 5–7 very narrow. Fingers of chela strongly bent. Abdominal somite 6 and telson normal without intercalated plate. Pereopod 5 reduced but still clearly discernible as leg. Usually burrows into soft substrates; does not carry objects……...……...……...……...……...……..…….....**Raninidae**

– Merus of maxilliped 3 quadrate, never distinctly triangular in shape. Carapace ovate to tranversely ovate. Sternum relatively broad. Fingers of chela not prominently bent. A small platelet-like structure always intercalated present between edges of abdominal somite 6 and telson. Pereopod 5 strongly reduced, present only as a short appendage. Not a burrower; no known carrying behaviour ……..……..……..……..**Dynomenidae**

9 Male genital openings clearly coxal, with genital papilla protruding directly from coxa of pereopod 5……10

– Male genital openings otherwise ……....…..……..……..……..……..…..... 54

10 Only 4 pairs of pereopods visible. Pereopod 5 lost, not visible in adults……...……...**Hexapodidae**

– Five pairs of pereopods visible. Pereopods 1–5 visible in adults ……...……...11

11 Merus of maxilliped 3 distinctly triangular in shape…...……...……...……...……...12

– Merus of maxilliped 3 quadrate to subquadrate, never clearly triangular in shape ……...……...18

12 Pereopod 4 and 5 distinctly chelate, inserted obliquely on carapace and directed upwards ……...……...13

– Pereopod 4 and 5 distinctly normal, not chelate, inserted laterally on carapace ……...……...14

13 Afferent branchial openings narrow, elongated. Male abdomen triangular. Male gonopores coxal to coxalsternal in condition. Dactyli of pereopods 4 and 5 relatively long, forming distinct subchela with propodus……**Dorippidae**

– Afferent branchial openings oval or circular. Male abdomen narrow, with nearly parallel sides. Male gonopores only exhibits coxal-sternal in condition. Dactyli of pereopods 4 and 5 hook-like…...…**Ethusidae**

14 Opening for afferent respiratory current at base of chela, no canal present along sides of buccal cavern even when maxilliped 3 pushed aside ……...……...……...……...……15

– Opening for afferent respiratory current below frontal margin or orbits, adjacent to endostome, with distinct canal present along sides of buccal cavern when maxilliped 3 pushed aside ……...……...……...……...……...16

15 Female abdomen with all somites freely articulating, not forming brood-chamber with thoracic sternum, eggmass protruding from sides of abdomen when ovigerous ……...……...……...……...……...……...**Iphiculidae**

– Female abdomen with most somites fused, forming brood-chamber with thoracic sternum, egg-mass not visible when ovigerous ……...……...……...……...……...……**Leucosiidae**

16 Both afferent respiratory opening directly under the middle portion of the frontal margin, not separated by any of the mouthparts ……...……...……...……...……...……...……...17

– Afferent respiratory opening separated by maxilliped 3 and not continuous with each other……...……...**Aethridae**

17 Sides of carapace may be expanded to form a clypeiform process. Right chela (rarely left) with specialized cutting tooth, the fingers of other chela long, forceps-like; propodus and dactylus of pereopods 2–5 never paddle-like…...……...……...……...……...……...……...……...……...……...**Calappidae**

– Sides of carapace never expanded to form a clypeiform process; chelae symmetrical, fingers never with specialized cutting tooth, propodus and dactylus of pereopods 2–5 paddle-like…...……...……...……...**Matutidae**

18 Pereopod 5 strongly reduced compared to other legs, appears rudimentary or vestigial…...……19

– Pereopod 5 subequal to other legs, or if smaller, is functional and not greatly reduced in size compared to pereopod 4 ……...……...……...……...……...……...……...……...……...……...……21

19 Carapace quadrate, smooth, may have dorsal transverse ridges, anterolateral margin entire. Pereopod 5 setose to strongly setose and appearing feather-like ……...……...……...**Retroplumidae**

– Carapace quadrate to ovate, dorsal surface rugose to strongly rugose and granulate, never with dorsal transverse ridges; anterolateral margin with teeth and spines. Pereopod 5 simple, filamentous, not setose…...……...……20

20 Abdominal somites 1 and 2 of both sexes very short in comparison to the remaining four somites...……...**Palicidae**

– Abdominal somites 1 and 2 of both sexes not significantly shorter than remaining somites..……**Crossotonotidae**

21 Carapace transversely ovate, wider than long; anterolateral margins convex. Wholly freshwater group; eggs large developing directly into juvenile crabs; females brooding young for short period…...……...……...……22

– Carapace transversely ovate to squarish or longer than broad. Completely marine; eggs almost always developing into planktonic zoeae, rarely as megalopa; females do not usually brood young…..…………..………..………………………...23

22 Mandibular palp with single lobe. Male abdomen triangular in shape ……………....………...…..……………..**Potamidae**

– Mandibular palp with two lobes. Male abdomen distinctly T-shaped ……………....……..….................…**Parathelphusidae**

23 Carapace usually pyriform, usually longer than broad, sometimes squarish. Carapace, chelipeds and walking legs usually with hooked setae (sometimes very dense) that cling on to debris and objects, used in camoufla……….....…24

– Carapace usually broader than long. Carapace, chelipeds and legs without hooked setae (if present, setae simple or plumose)……...…………...………..………………..…………...…….…..……… ..…………...……..……………………27

24 Basal antennal segment broad, at most twice as long as broad. Orbits present, formed by supraorbital eave, adjacent spines and a postorbital spine or lobe ……………......…………...………..……………………...…......…………….…….**Majidae**

– Basal antennal segment slender, at most twice as long as broad. Orbits absent or with narrow, weakly developed supraorbital eave and small postorbital …………..............................……..………….……….……..……..…....……..25

25 Orbits with narrow, weakly developed supraorbital eave partially overhanging eyes; with or without small postorbital lobe…..……………...………..……………………..…………..………...………………...…………...………..……………..**Epialtidae**

– Orbits absent, eyes unprotected though orbital margin usually with several small spines and postorbital spine…........…26

26 Male telson fused with abdominal somite 6……..…………...………..……………………...…………...….…..……**Inachoididae**

– Male telson not fused with abdominal somite 6……..……………...………..……………………...…………...….…..……..…**Inachidae**

27 Fossae (sockets) for antennules squarish to longer than broad, antennules fold longitudinally, almost so or absent...28

– Fossae for antennules broader than long, antennules fold transversely or obliquely……..…......…………………………31

28 Carapace poorly calcified; pyriform, subpyriform, triangular, circular, or subcircular; orbits absent…**Hymenosomatidae**

– Carapace strongly calcified, longitudinally and transversely ovate, hexagonal, circular, or subcircular; orbits complete………...…………...………..…………………………...………..…………………………………………………......29

29 Antennal flagellum slightly setose to glabrous……..…………...………..…………………………………………..……....**Cancridae**

– Antennal flagellum distinctly setose……………...…………...………..……………………………………......………...…......30

30 Antennae very long, longer than or as long as carapace length, strongly setose…………………...…...………**Corystidae**

– Antennae short, much shorter than carapace length, not strongly setose ……………………..…………….. **Atelecylidae**

31 Carapace triangular or hexagonal; front triangular, forked or spiniform. Chelipeds triangular in cross-section, usually very long..……………...………..……………………………...………..…………………...…………..……….……………………32

– Carapace shape not as above; front usually truncate or multidentate. Chelipeds usually oval to circular in cross-section, usually not prominently elongated……………………...……...…………...………..……………………………………………33

32 Press-button on sterno-abdominal cavity that retains male abdomen consisting of a rounded tubercle on posterior edge of sternite 5. Male abdomen relatively broad …………………...…………...……….……………….…………..….**Dairoididae**

– Press-button on sterno-abdominal cavity consisting of a low peg-like tubercle on anterior edge of sternite 5. Male abdomen relatively slender ………………………..…………………………...…………...………..………...……**Parthenopidae**

33 Pereopod 5 dactylus flattened, paddle-like (with exception of a few mud-dwelling and obligate coralsymbionts)………

..…………...………...……………………...……………..………….…………………… ..…………..………..………….…..…**Portunidae**

– Pereopod 5 with normal dactylus, not paddle-like…………...…………...………..……………………..…………....……….……34

34 Cross-section of dactylus of walking leg T-shaped ……..……………...………..……………………………………**Geryonidae**

– Cross-section of dactylus of walking leg not T-shaped, usually quadrate to ovate ……35

35 Male abdominal somites (including telson) all freely articulating……36

– Male abdominal somites somites 3 and 4, or 3–5 fused, immovable, even if some or all the sutures are visible……47

36 Carapace trapezoidal in appearance, with antero- and posterolateral margins not well demarcated, converging sharply to very short posterior margin; frontal region very wide, eyes positioned at edge of carapace and demarcates broadest part of carapace……37

– Carapace quadrate to ovate; frontal margin normal, occupying part of frontal region; eyes not place at the edge of carapace, widest part of carapace usually at junction of well demarcated antero- and posterolateral margins……38

37 Carapace transversely ovate, appears subglobose, dorsally very convex; frontal margin not clearly discernible with entire surface very convex. G2 much longer than G1, with distal segment looping. Free living or in holes in dead corals……**Dacryopilumnidae**

– Carapace trapezoidal, dorsal surfaces almost flat; frontal margin sharply defined. G2 about half length of G1.Obligate symbionts mainly on zooxanthellate scleratinian acroporid corals……**Tetraliidae**

38 G1 very slender, usually S-shaped, distal part never with large spines or complex folds. G2 less than 0.25 times G1 length, very small, sigmoidal, comma-shaped……39

– G1 otherwise. G2 about between 0.3–0.7 times G1 length……41

39 At least one cheliped long and slender, at least twice length of carapace; tips of chelipeds spoon-tipped……**Tanaochelidae**

– Chelipeds about same length as carapace; tips of chelipeds not spoon-tipped, sharp……40

40 Carapace usually densely pubescent. Male abdomen triangular, with somites 5, 6 and telson trapezoidal to triangular. G1 S-shaped ……**Pilumnidae**

– Carapace usually glabrous or sparely pubescent. Male abdomen distinctly T-shaped, with somites 5, 6 and telson slender, elongate. G1 long, straight to almost straight, tip may be fluted……**Galenidae**

41 Male abdomen distinctly T-shaped; male abdominal somites very narrow. G1 very slender medially and distally, almost straight. G2 about one-third length of G1……**Euryplacidae**

– Male abdomen triangular; somites trapezoidal to triangular. G1 relatively stout and straight or gently curved. G2 0.25 times length to longer than G1……42

42 G2 about 0.3–0.5 times G1 length ……**Pseudoziidae**

– G2 subequal in length or longer than G1……43

43 Male abdomen distinctly triangular, with lateral margins of somites 3–6 distinctly converging towards telson. Abdominal somite 3 about 2 times telson width ……**Goneplacidae**

– Male abdomen subrectangular, with lateral margins of somites 3–6 gradually converging towards telson. Abdominal somite 3 about 2 times telson width ……44

44 G1 reaching to edge of thoracic sternite 4……**Menippidae**

– G1 reaching to edge of thoracic sternite 5 ……45

45 Carapace usually transversely ovate, with frontal regions relatively narrower; surfaces usually smooth or covered with flattened granules, sometimes appearing eroded; or carapace more quadrate and very setose, with setae obscuring margins. Larger chela usually with distinct cutting tooth ……**Oziidae**

– Carapace quadrate, with frontal regions relatively broad; surfaces usually granular to spinose, never strongly setose, margins never obscured by setae. Larger chela usually with indistinct cutting/crushing tooth or molariform crushing teeth ……46

46 Carapace rugose to smooth, margins may be spinular but surfaces of carapace. Chelipeds and legs are never prominently spinose; larger chela with distinct molariform crushing teeth. G2 with terminal part of distal segment gradually tapering to sharp tip. Intertidal crabs ……**Eriphiidae**

– Carapace, chelipeds and legs covered with numerous sharp spines all over dorsal and lateral surfaces. Larger chela with indistinct cutting/crushing tooth. G2 with terminal part of distal segment of G2 suddenly becoming very slender along terminal section. Subtidal to deep-water crabs……**Hypothalassiidae**

47 Male abdominal somites 3 and 4 fused ……48

– Male abdominal somites 3–5 fused although sutures may be visible……49

48 Carapace ovate, dorsally prominently convex; anterolateral margin entire with only 1 rounded lateral tooth present. Male abdomen relatively broad. G2 very long, over 1.5 times G1 length, distal segment looping……**Carpiliidae**

– Carapace squarish to quadrate, dorsally gently convex to almost flat; anterolatelal margins usually dentate or lobate. Male abdomen triangular. G2 as long as G1, distal segment as long as subdistal segment or shorter ……**Mathildellidae**

49 Male genital papilla either exposed or sheathed under a calcified structure between thoracic sternites 7 and 8 ……50

– Male genital papilla never exposed or sheathed between thoracic sternites 7 and 8……51

50 Male genital papilla exposed between thoracic sternites 7 and 8, not sheathed under any structure. Carapace about twice as broad than long. Male abdominal somite 3 about 0.2 times carapace width……**Scalopidiidae**

– Male genital papilla sheathed underneath a calcified structure between thoracic sternites 7 and 8. Carapace width about the same as length. Male abdominal somite 3 about 0.3 times carapace width…… **Chasmocarcinidae**

51 G2 slender, less than 0.3 times G1 length ……**Xanthidae**

– G2 longer than 0.3 times G1 length. G1 moderately stout……52

52 Carapace surface with numerous mushroom-shaped tubercles, fusing with each other along edges; tufts of setae at edges of some of fused tubercles. G2 1.5 times length of G1. Free-living species……**Dairidae**

– Carapace surface smooth, gently rugose or with granules or small spines,never large tubercles, glabrous or almost so. G2 half length to subequal G1 length.Living amongst branches of scleractinian corals. ……53

53 Carapace rounded, dorsal surface covered with small granules and spines; anterolateral regions lined with numerous spines and granules. Propodus of chelipeds with prominent round or pointed tubercles along other surface; merus short, with a row of teeth along anterior margin ……**Domeciidae**

– Carapace trapezoidal or transversely ovate, dorsal surface smooth or faintly rugose at best; anterolateral margin usually entire or with low teeth, never spines. Propodus of cheliped smooth, without tubercles along other surface; merus long to very long, always having a third or more of the length a row of conspicuous teeth along anterior margin ……**Trapeziidae**

54 Carapace poorly calcified. Maxilliped 3 ischium and merus fused or free. Typically parasitic or commensal on molluscs, echinoderms or corals……55

– Carapace well calcified; usually squarish or transversely ovate. Maxilliped 3 ischium and merus free. Free living……56

55 Carapace pyriform, subpyriform, triangular, circular, or subcircular; fossae (sockets) for antennulae squarish to longer than broad, antennulae fold longitudinally or almost so. Male and female adults parasitic inscleractinian corals, forming galls……**Cryptochiridae**

– Carapace transversely ovate, squarish or rounded, never pyriform or subpyriform; fossae for antennulae broader than long, antennulae fold transversely or obliquely. Adults free living or as parasites or commensals in molluscs, various phyla of worms, echinoderms or other crustaceans, never with scleractinian corals ……**Pinnotheridae**

56 Distinct rhomboidal gap between closed maxillipeds 3. Mandibles usually visible when mouthparts closed ……57

– No distinct rhomboidal gap between closed maxillipeds 3, if present very small. Mandibles not visible when mouthparts closed ……59

57 Carapace distinctly ovate; suborbital crest straight without any granules; pterygostomial region with very thick, soft setae. Pereopods 2–5 with strong fixed chitinous spines on dactyli ……**Gercarcinidae**

– Carapace subquadrangular to quadrangular; suborbital crest with small granules; pterygostomial region glabrous to moderately setose. Pereopods 2–5 unarmed or with small chitinous spines on dactlyi……58

58 Merus and ischium of maxilliped 3 without setose oblique ridge. Pterygostomial region sparingly setose, without pattern of reticulated setae ……**Grapsidae**

– Merus and ischium of maxilliped 3 with distinct oblique setose ridge. Pterygostomial region densely setose, setae arranged in reticulate pattern……**Sesarmidae**

59 Front simple, triangular, narrow to very narrow compared to carapace width ……60

– Front truncate, multilobate or multidentate, relatively broad compared to transverse carapace……63

60 Carapace rounded, globose; orbits absent; eyes relatively short……61

– Carapace quadrate; orbits long; eyes relatively long……62

61 Chelipeds relatively stout, almost covering entire face. Eyestalk absent ……**Mictyridae**

– Chelipeds relatively small, not covering entire face. Eyestalk short but present……**Dotillidae**

62 Cheliped strongly heterochelus in males (as in Uca) or subequal in both sexes (Ocypode); dactylar finger with row of teeth along cutting edge,never distinct median or submedian truncate tooth.. ……**Ocypodidae**

– Cheliped equal in size; dactylar finger usually with a distinct truncate tooth medially or submedially along cutting edg……**Macrophthalmidae**

63 Male abdominal somites 2 and 3 fused, or if suture visible, somites are immovable.G1 strongly bent,forming U-shape……**Camptandriidae**

– Male abdominal somites 2 and 3 always movable, never fused. G1 straight. Aquatic to semiterrestrial crabs……64

64 Carapace distinctly subcircular to quadrate in shape, usually longer than wide; frontal margin with deep cleft to receive antennules. Abdominal somites 3–5 or 3–6 fused……**Plagusiidae**

– Carapace ovate to quadrangular in shape, usually wider than long; frontal margin without cleft to receive antennules. Abdomen of 6 free somites and telson……65

65 Orbit of eyes totally closed. Maxillipeds 3 closed with almost no gape, with faint sulci on merus and ischium respectively. Subtidal crabs associated with hydrothermal vents……**Xenograpsidae**

– Orbit of eyes with lateral opening. Maxillipeds 3 closed with a small gape, with distinct sulci on merus and ischium respectively. Intertidal and subtidal crabs, many freshwater as adults……**Varunidae**

Family Homolidae De Haan,1839

(From : Ahyong *et al*., 2009 Part II infraorder Brachyura : Sections Dromiacea, Raninoida, Cyclodorippoida)

Key to genera of Homolidae

1. Pereopod 5 merus clearly longer than carapace length (including rostrum)……..……..2
- Pereopod 5 merus shorter than carapace length (including rostrum) ……4
2. Pseudorostral spines distally bifid; as long as or longer than maximum carapace width. Pereopod 5 dactylus and propodus forming large pincer; fingers long, slender, with wide gape ……..……*Homolochunia*
- Pseudorostral spines distally unidivided (with or without dorsal spines along margin); shorter than maximum carapace width. Pereopod 5 dactylus and propodus forming small subchela, occluding, without wide gape ……..3
3. Carapace hepatic region not swollen; width across hepatic region (excluding spines) narrower than width across branchial regions (excluding spines); without constriction behind hepatic region. Pseudorostral spines with row of dorsal spines ……*Dagnaudus*
- Carapace hepatic region swollen, width across hepatic region equal to or greater than width across branchial regions; with distinct constriction behind hepatic region. Pseudorostral spines simple or with row of dorsal spines..……*Latreillopsis*
4. Rostrum with pair of dorsal spines, directed anterolaterally, forming trident. Carapace with long lateral spine at base of cervical groove and long upright median gastric spine ……*Homologenus*
- Rostrum simple. Carapace margin at base of cervical groove unarmed or with spines of similar length to other carapace spines; without long median gastric spine ……5
5. Maxilliped 3 operculiform, almost fully covering buccal cavity. Carapace hepatic region swollen. Carapace without dorsal or lateral spines, apart from subhepatic spine ……*Homolomannia*
- Maxilliped 3 pediform or subpediform, not covering buccal cavity. Carapace hepatic region not swollen……..……6
6. Pseudorostral spines antler-like, with additional dorsal spines; very long, equal to or exceeding distance between bases of hepatic spines; with additional dorsal spines ……*Ihlopsis*
- Pseudorostral spines not antler-like, simple or with short dorsal spine at midlength; length distinctly less than distance between bases of hepatic spines ……7
7. Carapace dorsal and lateral surfaces with spinules or spines …… 8
- Carapace dorsal and lateral surfaces without covering of spinules or spines ……...13
8. Pereopod 5 merus long, reaching anteriorly to level or orbit ……..…10
- Pereopod 5 merus relatively short, not reaching anteriorly to the level of the orbit ……..……11
10. Carapace surface and margins covered with prominent conical spines. Pseudorostral spines as long as or longer than rostrum ……*Moloha*
- Carapace surface and margins without conical spines. Pseudorostral spines low, much shorter than half rostral length……*Homolax*
11. Pseudorostral spines small, conical, much shorter than rostrum ……..……14
- Pseudorostral spines well developed, as long as or longer than rostrum ……..……12
12. Pereopod 5 merus very slender, more than 10 times as long as wide ……..……*Yaldwynopsis*

- Pereopod 5 merus relatively stout, about 7 times as long as wide ……*Paromola*

13. Carapace widest near midlength. Pseudorostral spines very small, much shorter than rostrum …..……*Paramolopsis*

- Carapace widest posteriorly. Pseudorostral spines well developed, conical, about as long as rostrum ……· *Gordonopsis*

14. Anterior wall of carapace either side of rostrum with elongated, transverse cavity forming orbit-like structure. Outer surface of cheliped palm with dark coloured sunken depression at base of pollex in males.and some females ……*Lamoha*

- Anterior wall of carapace lateral to rostrum rounded, without orbit-like structure. Outer surface of cheliped palm without sunken depression at base of pollex ……..……*Homola*

Key to species of *Homola*

1. Rostrum spiniform, apex minutely bifurcate. Anterolateral angle of carapace with prominent, conical spine reaching anteriorly slightly beyond base of eyes ..... *H. mieensis*

- Rostrum distinctly bifid. Anterolateral angle of carapace with small, short spines, none reaching as far forward as base of eyes ..... *H. orientalis*

Key to species of *Homolomannia*

1. Carapace gastric region flat; intestinal region without ridge. Pereopod 5 propodus occlusal margin with short spine opposing apex of dactylus ..... *H. occlusa*

- Carapace gastric region inflated; intestinal region with low transverse ridge. Pereopod 5 propodus occlusal margin without spine opposing dactylus ..... · *H. sibogae*

Key to species of *Latreillopsis*

1. Carapace with 2 hepatic spines. Maxilliped 3 merus with bluntly rounded outer distal angle..... *L. bispinosa*

- Carapace with 4 hepatic spines. Maxilliped 3 merus with pointed outer distal angle ..... *L. tetraspinosa*

Family Raninidae Dana 1852

(From : Dai and Yang, 1991, Crabs of the China Seas)

Key to subfamilies and genera of Raninidae

I. Eyestalk transversely or longitudinally folded. Second pleopod of male obliquely tapering and shorter than first pleopod. Merus of third maxilliped without an oblique carina……...*Raninae*

1. Large size, carapace very broad. Eyestalk 3-segemented. Last ambulatory legs normal in size……*Ranina*
2. Moderate and small size, carapace narrower, elongate-elliptical. Eyestalk of one segment. Last ambulatory legs reduced and slender.

A. Carapace anteriorly broadened. Front-orbital border more than half the width of the carapace. Median frontal teeth broadly triangular and with 3 teeth on each side……*Raninoides*

B. Carapace anteriorly narrowed. Front-orbital border less than half the width of the carapace. Only with 1 inner orbital tooth on each side of median frontal tooth……*Lyreidus*

II. Eyestalk strongly folded downward and obliquely directed backward. Second pleopod of male with chitinous process on the extremity, slightly beyond the foliaceous distal end of first pleopod. Merus of third Maxilliped with an obique carina……..*Notopinae*

1. Carapace anteriorly broadened, convex, without a longitudinal carina at the middle line. Front not in V-shaped depression form……*Ranilia*
2. Carapace anteriorly narrowed, with a longitudinal carina at the middle Line. Front in V-shaped depression form……*Cosmonatus*

Key to species of *Raninoides*

I. Middle frontal tooth carinated in the center and serrated on both sides. Manus of cheliped with 2 subparallel carinae on upper border……*R. serraifrons*

II. Middle frontal tooth entire on both sides. Manus of cheliped only with a single subdistal spine on upper border ……*R. persondus*

Key to species of *Lyreidus*

I. Lateral margin of carapace with a sharp spine. Carpus of chelipeds with spines……..*L. tridentatus*

II. Lateral margin of carapace without a sharp spine. Carpus of cheliped only with 1 spine……*L. stenops*

Family Calappidae Milne Edwards, 1837

(From : Dai and Yang, 1991, Crabs of the China Seas)

Key to subfamilies and genera of Calappidae

I. Merus of third maxillipeds not triangular, flagellum never concealed.

1. Carapace broader than long, or subcircular. Outerorbital spine indistinct. Ambulatory legs gressorial ……..Calappinae

A. Carapace much broadened behind owing to clypeiform expansions of the posterolateral border, beneath which 4 pairs of ambulatory legs are concealed in flexion. Basal joint of antenna much dilated…….....*Calappa*

B. Carapace transversely ovate or subcircular, without any clypeiform expansion on posterolateral border. Basal joint of antenna slender

a. Carapace transversely ovate, with a strong spine at the junction of the anterolateral and posterolateral borders……*Mursia*

b. Carapace subcircular, with a small denticle at the junction of the anterolateral and posterolateral borders……*Cycloes*

2. Carapace longer than broad, lateral margin with 2 spines. Exopodite of third maxillipeds without flagellum. Outerorbital tooth distinct. First 3 pairs of ambulatory legs gressorial, last pair natatorial……Orithyinae (only including *Orithyia*)

II. Merus of third maxilliped triangular, flagellum completely concealed under merus. Ambulatory legs natatorial. Carapace circular, with a strong spine at the junction of the anterolateral and posterolateral borders……..……....Matutinae (only including *Matuta*)

Key to species of *Calappa*

I. Carapace with clypeiform expansions typically developed, ambulatory legs largely concealed under carapace. The longitudinal septum of prolongated portion of endostome visible, extending between the lamellar processes of the first pair of maxillipeds.

1. Length of carapace less than two – thirds of its breadth; clypeiform expansions with brad teeth, tips of these teeth directed forwards……..….*C. hepatica*
2. Length of carapace about two – thirds of its breadth ; clypeiform expansions with sharp teeth, tips of these teeth directed outwards
   - A. Posterior margin of carapace beaded with pearl – like granules; both sides bounded by an indistinct tooth, with reddish – brown spots……..……*C. lophos*
   - B. Posterior margin of carapace not beaded with pearl – like granules.
     - a. Posterior margin with prominent sharp spines. Upper orbital margin marked with an incomplete loop of reddish – brown spots; chelipeds also with large spots of the same color on the outer surface of carpus and manus……..…..*C. philargius*
     - b. Posterior margins without prominent sharp spines; without any color spots……..……..…….*C. terrae – reginae*
3. Carapace markedly longer than two – thirds of its breadth
   - A. Front thick and obtusely truncate. Carapace covered with coarse tubercles which become squamiform toward the posterior surfaces. Hepatic regions strongly depressed……..….*C. gallus*
   - B. Front thin and slightly emarginated, anterior margin with V – shaped notch, bidentate. Carapace covered with wart – like tubercles on anterior half. Hepatic regions not markedly depressed……..……..……*C. undulata*

II. The clypeiform expansions of carapace ill – developed, ambulatory legs almost uncovered. The longitudinal septum of endostome low and entirely concealed by lamellar processes from first pair of the maxillipeds……..…..*C. pustulosa*

Family Goneplacidae MacLeay, 1838

(From : Castro, 2007, A reappraisal of the family Goneplacidae)

Key to genera of Goneplacinae MacLeay, 1838

1. Carapace distinctively quadrate, with anterolateral borders only slightly rounded and at a nearly 90Åã angle and no anterolateral teeth (see Clark & Ng 2006: fig. 2). Cornea of eye small, spherical ..... *Notonyx*

— Carapace of various shapes (hexagonal, transversely rectangular, ovoid) but never distinctively quadrate, with rounded anterolateral borders typically having one or two anterolateral teeth posterior to outer orbital margin (no anterolateral teeth but carapace oval, not quadrate, in very large adults in some species). Cornea of eye large, not reduced, clearly spherical or reniform 2

2. Eye peduncles short, as long as or only slightly longer than cornea, much shorter than front. Cornea always spherical, not elongated or reniform 3

— Eye penduncles long, clearly longer than cornea, sometimes as long as or longer than front (if eye penduncles short, cornea is distinctively reniform, being dorso-ventrally flattened and almost completely divided into anterior and posterior portions). Cornea elongated or reniform 6

3. Two anterolateral teeth posterior to outer orbital angle (one or the two anterolateral teeth may be greatly reduced or even obsolete in some large individuals; always one tooth in *Carcinoplax ischurodous* (Stebbing, 1923) [see Guinot 1989: pl. 13, fig. F, as *Carcinoplax eurysternum*]) 4

— Only one anterolateral tooth posterior to outer orbital angle (shallow lobe or carina, but no tooth, may be present anterior to each anterolateral tooth) 5

4. G1 slender, thin (dorso-ventrally flattened). Vulva greatly expanded, without vulvar cover (see Fig. 1). Sternal suture 6/7 incomplete ..... *Carcinoplax*

— G1 stout, thick. Vulva relatively small, vulvar cover in large mature females (see Figs 14;15; 18) (not found in small mature females of P. surugensis (Rathbun, 1932)). Sternal suture 6/7 complete ..... *Pycnoplax* n. gen.

5. One long, horn-like, acute, dorsally oriented anterolateral tooth on each side of carapace (blunt tooth anterior to anterolateral tooth in males). G1 stout, tip conspicuously truncated …..... *Menoplax* n. gen.

— One short, triangular or slightly elongated anterolateral tooth on each side of carapace (shallow lobe or carina, but no tooth, may be present anterior to anterolateral tooth). G1 slender, tip typically pointed (truncated in Thyraplax truncata n. sp., see Fig. 25C) ..... *Thyraplax* n. gen.

6. Carapace, pereopods, eye peduncles with conspicuous setae ..... *Entricoplax* n. gen.

— Carapace, pereopods, eye peduncles without conspicuous setae (naked or only with sparse setae) 7

7. Eye peduncles conspicuously long, almost always more than half front (0.4-1.2 front width). Carapace conspicuously wider than long (often 1.5 as long as wide or more) 8

— Eye peduncles not conspicuously long, not more than half front (0.2-0.5 front width). Carapace conspicuously quadrate or nearly circular, approximately as wide as long 16

8. Cornea elongated, not conspicuously dorso-ventrally flattened, distal margin spherical without being nearly divided into anterior and posterior portions 9

— Cornea reniform (dorso-ventrally flattened and almost completely divided into anterior and posterior portions) 13

9. Anterolateral teeth in median portion of carapace (see Fig. 35A). Carapace of adults small (cl rarely more than 4.5 mm) 10

— Anterolateral teeth (if present) in upper, anterior portion of carapace. Carapace of adults not small (cl more than 7-8 mm) 11

10. G2 short (see Fig. 39C), much shorter than G1. Broad suborbital tooth ..... *Microgoneplax* n. gen.

— G2 long, slender, longer than or as long as G1. Short or obsolete suborbital tooth ..... *Singhaplax*

11. Eye peduncle clearly not much longer than carapace front. Outer orbital teeth anteriorly oriented. Anterolateral teeth present (except some individuals of Goneplax rhomboids (Linnaeus, 1758))..... *Goneplax*

— Eye peduncle long, much longer than carapace front. Outer orbital teeth straight or nearly straight. Anterolateral teeth obsolete (except obtuse prominence in Ommatocarcinus fibriophthalmus Yokoya, 1933) 12

12. Male abdomen with 6 somites plus telson; antennules divided by median septum ..... *Ommatocarcinus*

— Male abdomen with 4 somites plus telson, somites 3-5 fused; antennules not divided by septum .... *Neommatocarcinus*

13. P5 dactylus dorso-ventrally flattened, broad. G2 with nearly coiled flagellum ..... *Goneplacoides* n. gen.

— P5 dactylus slender. G2 with slightly curved flagellum, straight tip 14

14. G2 much shorter than G1. G1 bent in adult males. Suborbital teeth obsolete. Iridescent region at distal end of eye peduncle ..... *Paragoneplax* n. gen.

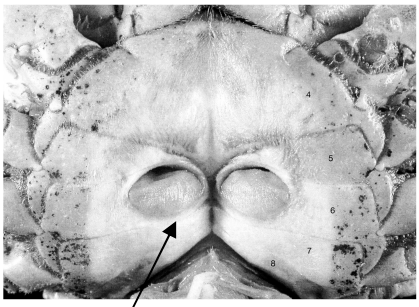
— G2 about same size of G1. G1 straight. One or two short suborbital teeth on each orbit. No iridescent region at distal end of eye peduncle 15

15. Long basal antennular articles do not fit into antennular fossae (see Ser.ne & Umali 1972: fig. 73). Anterolateral teeth obsolete. Vulva without vulvar cover ..... *Hadroplax* n. gen.

— Relatively short basal antennular articles that fit into antennular fossae. Anterolateral teeth present (obsolete or reduced in Neogoneplax costata n. sp.; see Figs 30A; 31). Vulva with vulvar cover (see Fig. 32)..... *Neogoneplax* n. gen.

16. Carapace subquadrate. G1 stout, proximal portion broad, nearly triangular (Guinot 1990: figs 44, 45, 47, 48, 50, 52, 53). Vulva small, with small vulvar cover (see Fig. 47) ..... *Psopheticus*

— Carapace subcircular. G1 slender, proximal portion not expanded (see Fig. 48B). Vulva much expanded, without vulvar cover (see Figs 48; 49) ..... Exopheticus n. gen.



Vulva without vulvar cover in *Carcinoplax*

Key to species of *Carcinoplax*

1. Only one well developed, anteriorly curved anterolateral tooth posterior to outer orbital tooth on each side of carapace (see Guinot 1989: pl. 13, fig. F, as *Carcinoplax eurysternum*)..... *Carcinoplax ischurodous*

— Two anterolateral teeth posterior to outer orbital angle (one or two anterolateral teeth may be greatly reduced or even obsolete in some large individuals) 2

2. Adults attain large size (cl more than 30-40 mm) and have reduced outer orbital and anterolateral teeth (obsolete in largest individuals), rounded anterolateral borders (carapace becoming spherical), and much enlarged chelipeds (P1) with conspicuously elongatedmeri, propodi 3

— Adults do not attain large size (cl less than 30-40 mm) and do not show progressive reduction in outer orbital (if present) and anterolateral teeth with corresponding rounded anterolateral borders and chelipeds (P1) with conspicuously elongated meri, propodi 7

3. Low, conspicuous granules on carapace. Dark red-brown carapace, bright red-brown markings on chelipeds (P1). Small individuals with triangular, acute first and curved, acute second anterolateral teeth (see Guinot 1989: pl. 1, fig. D) ..... *Carcinoplax longimana*

— No conspicuous granules on carapace. Carapace not dark-red brown. Small individuals with narrow, acute anterolateral teeth, or small, blunt first anterolateral teeth 4

4. Small- to medium-size individuals with two narrow, acute, spine-like anterolateral teeth below acute, conspicuous outer orbital tooth on each side of carapace (see Guinot 1989: pl. 1, figs G, H; Hsueg & Huang 2002: fig. 6A). Carapace nearly quadrate, with red, round spot on dorsal surface in most individuals (see Hsueg & Huang 2002: fig. 8B) ..... *Carcinoplax indica*

— Small- to medium-size individuals with blunt first anterolateral tooth, second tooth curved, acute. Carapace globose..... 5

5. Outer orbital angle with short, triangular tooth. Second anterolateral tooth salient, usually hook-like (see Chen 1984: figs 2-1 to 2-4) ..... *Carcinoplax sinica*

— Outer orbital angle without tooth. Second anterolateral tooth short (more conspicuous in small individuals).……..... 6

6. Wide, purple-red vertical band across carapace from front to posterior border (see Hsueg & Huang 2002: fig. 8C). G1 with flat, truncated tip (Guinot 1989: fig. 21A). Western Pacific Ocean (Japan to Indonesia) in distribution ..... *Carcinoplax purpurea*

— No purple-red band across carapace. G1 with pointed tip (Guinot 1989: fig. 8A, B). Red Sea in distribution .....*Carcinoplax monodi*

7. Carapace, chelipeds (P1), and ambulatory legs (P2-P5) covered with conspicuous setae..... 8

— Carapace, chelipeds (P1), and/or ambulatory legs (P2-P5) may have sparse setae, short tomentum, or mostly or completely devoid of conspicuous setae, or tomentum 9

8. Conspicuous, acute tubercles on proximal portion of P1 propodi (may be absent in large individuals) (see Hsueh & Huang 2002: fig. 5E). Dark portion of about one quarter of fingers. Acute tooth on distal portion of ambulatory leg (P2-P5) meri (see Chen 1998: fig. 4-2; Hsueh & Huang 2002: fig. 5C). No conspicuous colour pattern…..*Carcinoplax spinosissima*

— Conspicuous, low, blunt tubercles on proximal portion of P1 propodi (see Guinot 1989: pl. 6, fig. H). Dark portion of about one half of fingers. Distal portion of ambulatory legs (P2-P5) meri smooth. Orange reticulated lines on P1 and carapace (clear when setae are removed) ..... *Carcinoplax nana*

9. Carapace, chelipeds (P1), and ambulatory legs (P2-P5) covered with short tomentum (large individuals only on ambulatory legs) (see Hsueh & Huang 2002: fig. 7A) ..... *Carcinoplax tomentosa*

— Carapace, chelipeds (P1), and ambulatory legs (P2-P5) not covered with conspicuous short tomentum..... 10

10. Outer orbital angle without tooth or eminence. Two thin, spine-like anterolateral teeth (see Figs 4A; 5) .....*Carcinoplax tenuidentata* n. sp.

— Outer orbital angle ends in lobe or tooth. Anterolateral teeth not thin, spine like.....11

11. Front with slight median notch (see Guinot 1989: fig. 17) ..... *Carcinoplax confragosa*

— Front straight, without distinct median notch 12

12. Conspicuous, well developed anterolateral teeth, with acute, anteriorly-oriented or hooklike tips.....13

— Relatively small, blunt anterolateral teeth (see Figs 7; 10)..... 17

13. Ambulatory legs (P2-P5) long, relatively slender, distal end of merus of folded P5 extending beyond tip of second anterolateral tooth 14

— Ambulatory legs (P2-P5) short, distal end of merus of folded P5 only reaching or barely reaching tip of second anterolateral tooth..... 15

14. Two conspicuous, wide horizontal ridges on dorsal surface of carapace (see Fig. 3)..... *Carcinoplax cracens*

— Dorsal surface of carapace without conspicuous ridges .....*Carcinoplax longipes*

15. Two conspicuous, wide horizontal ridges on dorsal surface of carapace ..... *Carcinoplax inaequalis*

— Dorsal surface of carapace without conspicuous ridges 16

16. Outer orbital angle prominent, often with raised, tooth-like prominence (see Guinot 1989: pl. 8, figs A, B). Chelipeds (P1), particularly propodi, inflated (see Guinot 1989: pl. 9, fig. F, as C. verdensis) ..... *Carcinoplax specularis*

— Outer orbital angle flattened, inclined outwardly (see Guinot 1989: fig. 38, pl. 9, figs A, B). Chelipeds (P1), particularly propodi, slender (see Guinot 1989: pl. 9, fig..... *Carcinoplax abyssicola*

17. Outer, dorsal surface of cheliped (P1) propodi and carpi with conspicuous granular tubercles (see Fig. 8). Ambulatory legs (P2-P5) relatively short (see Fig. 7), distal end of merus of folded P5 only reaching tip of second anterolateral tooth.....*Carcinoplax tuberosa* n. sp.

— Outer, dorsal surface of chelipeds (P1) smooth. Ambulatory legs (P2-P5) relatively long (see Fig. 10), distal end of merus of folded P5 extending beyond tip of second anterolateral tooth ..... *Carcinoplax velutina* n. sp

Family Leucosiidae Dana 1852

(From : Dai and Yang, 1991, Crabs of the China Seas)

Key to subfamilies of Leucosiidae

I. Carapace not very broad and with no lateral expansion.

1. Merus of third maxillipeds as long as or longer than half of the inner border of ischium, Fingers Stout, graduatedly tapering.

A. Anterior boundary of pterygostomian region ends in the rounded depression behind the orbit Carapace uneven.....Ebaliinae

B. Anterior boundary of pterygostomian region does not end in the rounded depression behind orbit or inconspicuous. Carapace subglobose, slightly uneven……..……..……..Philyrinae

2. Merus of third maxilliped shorter than half of the inner border of the ischium. Fingers slender. Fingers not graduatedly tapering……..……..Leucosiinae

II. Carapace very broad and with lateral expansion, concealing the ambulatiory legs or part of them……Cryptocneminae

** pterygostomian region = Anterolateral part of carapace on ventral surface located on opposite sides of buccal cavity.*

Key to genera of Philyrinae

I. The anterior extremity of the buccal cavern reaches beyond the level of the anterior extremities of the pterygostomian regions. Carapace with its margin thin and expanded and its upper surface usually transversed by ridges. Radiating from the center.

1. Carapace broadly pentagonal, chela normal…….*Nursia*
2. Carapace broadly polygonal. Fingers slender, much longer than manus, curved at tip and finely toothed ……..……*Nursilia*

II. The anterior extremity of the buccal cavern stops at the level of the anterior boundaries of the pterygostomian regions. Margins of carapace unexpanded. Exopodite of third maxilliped not broadened, its outer margin not arched.

1. Carapace subcircular. Merus of third maxilliped longer than half of the ischium. Finger of cheliped as long as its manus.

A. Anterior boundaries of pterygostomian regions cut into 2 lobes or teeth. Manus of chelipeds subcylindrical

a. Ventral-orbital lobe prominent and acuminate. Anterior boundaries of pterygostomian regions with 2 sharp lobes. Fingers slender and filiform……..……..*Arcania*

b. Ventral-orbital lobe low and obtuse. Anterior boundaries of pterygostomian regions with 2 rounded lobes. Chelipeds slender, fingers compressed, manus not swollen……..……..*Randallia*

B. Anterior boundaries of pterygostomian regions cut into 3 teeth. Chelipeds slender, 3 times as long as the length of the carapace in adult male……..……..*Myra*

2. Carapace transversely elliptical and with a stout lateral process. Posterior margin with a rounded process. on each side. Merus of third maxilliped shorter than half of the ischium. Finger of cheliped much shorter than half of the manus

A. Carapace smooth……..……..*Ixoides*

B. Carapace thickly covered with granules……..……..*Ixa*

3. Carapace ovate, covered with short hairs. Chelipeds slender, manus short, very much swollen proximally. Finger filiform, much longer than manus.

A. Carapace circular, its margin with 13 protuberances, without teeth……..……..*Pariphiculus*

B. Carapace transversely ovate, its margin with 14 protuberances and teeth……..…*Iphiculus*

III. Carapace subglobose. Exopodite of third maxilliped broad, its outer border semicircular, hepatic forms a slope behind the orbit……..……..……*Philyra*

Key to species of *Arcania*

I. Carapace with 11 spines around the margins, the median one of the posterior margin deviated onto the Intestinal surface, directed backwards

1. Upper surface of carapace covered with vesiculose granules. Fingers of cheliped longer than manus

A. Carapace almost globular, 11 marginal spines nearly equal in size Borders of frontal lobes covered with pavement of flat granules……*A. undecimspinosa*

B. Carapace globular, of the 11 marginal spines the first of the anterolateral margin smaller, the second the smallest. Borders of frontal lobes closely covered with pearly granules……*A. novemspinosa*

C. Carapace longitudinally ovate. Of the 11 marginal spines the first 2 of the anterolateral margin very small. Border of front coarsely granulated……*A.. elongate*

2. Upper surface of carapace densely covered with sharp spinules. Fingers of cheliped shorter than manus. Frontal lobes markedly produced beyond orbit. Marginal spines distinctly long and covered with secondary spinules……*A. erinaceus*

II. Carapace with 10 spines around the margins, one deviated onto intestinal surface, not directed backwards. Upper surface covered with 15 protuberances, 3 of them deviated onto the median line……*A. sagamiensis*

III. Carapace with 7 spines around the margins, of with the 2 lateral ones the most prominent.

1. Carapace with a carina on median line……*A septemspinosa*

2. Carapace without a carina on median line……*A, heptacantha*

IV. Carapace with 5 spines around the margins, of which 2 are lateral and one intestinal, very long……*A quinquespinosa*

Key to species of *Ixa*

I. Carapace with broadly deep grooves along several median regions, which branched anteriorly……*I. cylindrus*

II. Carapace without broadly deep grooves along median regions……*I. edwardsii*

Key to species of *Leucosia*

I Anterior edge of thoracic sinus deeply invaginated forward; the lower edge of this sinus defined by large pearly granules.

1. Aterior invaginated margin of the thoracic sinus simple and narrow, only faintly defined by granules

A. Postorbital neck long and slender. Front bluntly triangular.

a. Manus of chelipeds broader than long, margins acutely thin. Merus of fourth ambulatory legs with 6 obtuse teeth on posterior border……*L. compresa*

b. Manus of chelipeds longer than broad, merus of fourth ambulatory legs without teeth on posterior border……*L. anatum*

B. Postorbital neck very short; truncate, merus of chelipeds broadened in distal one-third……*L. formosensis*

2. Anterior invaginted margin of thoracic sinus looped and defined by pearly granules. Postorbital Neck short and stout, front thin, with a vestigial median tooth in the middle. First pleopod of male with 6 whorls, its distal end acutely conical……*L. unidentata*

II. Anterior edge of thoracic sinus not invaginated, edge of pterygostomian plate straight and forming almost a right angle with the roof of the sinus.

1. Front truncate, conves. Carapace very slightly longer than broad, covered with reddish spots…..*L. haematosticta*
2. Front with a median tooth

A. Carapace with 5-7 color bands

a. Carapace distinctly longer than broad, anterolateral margin about as long as posterolateral margin. Thoracic sinus deep, without granules……..……*L. vittata*

b. Carapace slightly longer than broad, anterolateral margin shorter than posterolateral margin. Thoracic sinus with granules.

i. Front narrow and long, the median tooth strongly produced. Manus of cheliped narrow, slightly larger than carpus……..……*L. craniolaris*

ii. Front broad and short, the median tooth not strongly produced. Manus of cheliped broad, much larger than carpus……..*L. latirostrata*

B. Carapace without color bands, but with spots

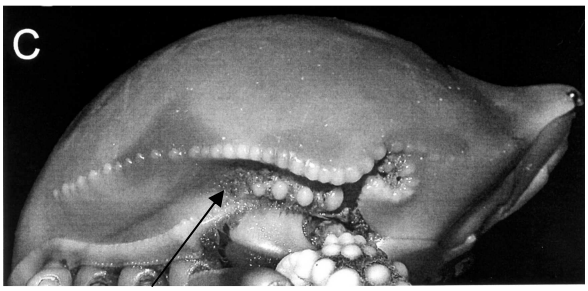
a. Thoracic sinus without granules. First pleopod of male slender, distal end with a short process ……*L. rhomboidalis*

b. Thoracic sinus with granules

i. Lower margin of thoracic sinus with 6-7 granulated tubercles. Last segment of male abdomen acutely triangular. Distal end of first pleopod hook-like……*L. longibrachia*

ii. Lower margin of thoracic sinus with a row of simple granules. Last segment of male abdomen obtusely rounded. Merus of fourth ambulatory legs produced outwards on basal half of its posterior border. Intestinal region with red spots in crescent form on each side……..*L. sinica*

iii. Lower margin of thoracic sinus with a row of simple granules. Last segment of male abdomen obtusely rounded. Merus of fourth ambulatory leg with serrated process on basal half of its posterior border. Upper surface without red spots……..*L. pulchra*



Thoracic sinus in *Leucosia*

Family Portunidae

Key to genera of Portuninae

I. Bearing more than 7 anterolateral teeth

1. Surface of carapace smooth and regions indistinct. Manus of chelipeds smooth and inflated……..*Scylla*
2. Surface of carapace with regions distinguished. Manus of chelipeds not inflated, usually with granules or ridges

A. Carapace narrow, slightly than long. Anterolateral teeth alternately large and small; last tooth not much larger than the others……*Lupocyclus*

B. Carapace broad, much broader than long. Anterolateral teeth not alternately large and small; last one much larger than the others……....*Portunus*

II. Bearing 7, or less than 7 anterolateral teeth.

1. Chelae extremely long, merus distinctly longer than breadth of carapace……..……..*Lupocyclus*
2. Chelae of normal length; merus shorter than breadth of carapace

A. Extent of front – orbital margin distinctly less than the greatest breadth of carapace. Anterolateral margin arched and cut into 6 or 7 teeth. Tips of chelipeds pointed……..……*Charybdis*

B. Extent of front – orbital margin slightly less the greatest breadth of carapace. Anterolateral margin not markedly arched and cut into 5 teeth (some species with first anterolateral tooth bearing an accessory denticle). Tips of chelipeds generally pointed……..*Thalamita*

C. Extent of front – orbital margin slightly less than the greatest breadth of carapace. Anterolateral margin not arched. Anterolateral margin cut into 3 teeth. Tips of chelipeds spoon shaped ……..……*Thalamitoides*

Key to the species of *Portunus*

I. Carapace marked with transverse ridges, covered with uniformly distributed granules.

1. Entire body bare. Carapace less than half as long as the greatest breadth. Epistome defined anteriorly by a very stout spine

A. Merus of chelipeds with a spine at distal end of its posterior margin. Without blood – red spot on carapace surface

a. Carapace covered with scattered, coarse granules, and meshwork pattern. Front cut into 4 teeth, besides the teeth of dorsal – orbital margins……..……...*P. pelagicus*

b. Carapace covered with much smaller granules, without any meshwork pattern. Front cut into 2 teeth, besides the teeth of dorsal – orbital margins……..……*P. trituberculatus*

B. No spine on posterior margin of merus of chelipeds. Carapace marked with 3 large blood – red spots……..……*P. sanguinolentus*

2. Entire body covered with pubescences. Carapace length much greater than the half of breadth. Epistome without spine……..……*P. pubescens*

II. Carapace covered with patches of granules

1. Posterolateral angle of carapace rounded, without any spine.

A. Last anterolateral tooth much larger than the rest. Carapace broader

a. Crest of second abdominal segment and of manus of chelipeds very prominent, and with pearly sheen. A round dark – colored spot on dactylus of last ambulatory legs...*P. argentatus*

b. Crest of second abdominal segment and manus of chelipeds not very prominent, without pearly sheen. Neither dactylus or manus of last legs bears dark – colored spot……*P. haanii*

B. Last teeth slightly larger or a little smaller than the rest. Carapace narrower.

a. Manus of cheliped very stout, about as long as merus. Merus of last ambulatory legs without spine on posterior margin……..……..*P. granulatus*

b. Manus of chelipeds extremely slender, less massive than merus. Last legs with spines on posterior margin of merus……..……*P. gracilimanus*

2. Posterolateral junction of carapace forming a right angle or armed with a spine.

A. Front flat or sinuous. Merus of cheliped with 2 teeth on its posterior margin……...*P. brockii*

B. Front distinctly cut into 3 teeth or 3 lobes

a. Posterolateral junction of carapace forming a right angle. Merus of chelipeds with a spine on posterior margin……..……..….*P. tenuipes*

b. Posterolateral junction of carapace forming an acute angle. Merus of chelipeds with 2 spines on posterior margin

i. Posterior portion of carapace with elevated spiniform areas. Merus of chelipeds with 3 spines on anterior margin……..……..….*P. tridentatus*

ii. Posterior portion of carapace without spiniform areas. Merus of chelipeds with 4 spines on anterior margin……..……..……*P. tweediei*

C. Front distinctly cut into 4 teeth.

a. Merus of chelipeds with a spine on posterior margin

i. Inner front tooth nearly as long as the outer one, or more prominent……..*P. tuberculosus*

ii. Inner front tooth much shorter than the outer one. Mesogastric region with short ridge, but without protuberance……..……*P. iranjae*

b. Merus of chelipeds with 2 spines

i. Merus of third maxillipeds with outer – distal angle not produced outwards. Last ambulatory legs with a spine on posterior margin of merus……...*P. pulchricristatus*

ii. Merus of third macillipeds with outer – distal angle produced outwards. Posterior margin of merus of last ambulatory legs serrated, but without distal spine

(i) Carapace narrower, about 1.6 times as broad as long. Merus of chelipeds with 4 spines on anterior margin. Distal portion of male first pleopod tapering ……..….*P. hastatoides*

(ii) Carapace broader, about 1.8 times as broad as long. Merus of chelipeds with 2 spines on anterior margin. Male first pleopod bent at right angle, its distal portion long and slender……..……..….*P. tuberculosus*

Key to subgenera and species of *Charybdis*

I. Antennal flagellum excluded from orbital hiatus

1. Posterior-postero-lateral junction of carapace rounded

A. Anterolateral margin of carapace divided into 6 teeth, of which at least 5 are large……..……(*Charybdis)*

a. Cardiac region without ridge

i. First and second antero-lateral teeth more of less truncated

(i) Merus of chelipeds with 2 spines on anterior margin……..……*C. (C.) callianassa*

(ii) Merus of chelipeds with 3 or more than 3 spines

a. Manus of chelipeds with 4 spines

(*a*) Manus of chelipeds more inflated; carapace with conspicuous cross-like mark ……*C. (C.) feriatus*

(b) Manus of chelipeds not inflated; carapace without cross-like mark

(1) Manus of chelipeds with ventral surface squamiform……....…*C. (C.) miles*

(2) Manus of chelipeds with ventral surface smooth……..*C. (C.) riversandersoni*

b Manus of chelipeds with 5 spines

(a) 5 spines of manus well-developed; sixth segment of male abdomen with lateral margins gradually converged forwards……*C. (C.) japonica*

(b) 2 spines on the distal portion ill-developed; sixth segment of male abdomen with lateral margins subparalle……*C. (C.) affinis*

ii. First anterior-lateral tooth not truncated

(i) Second antero-lateral tooth much smaller than the first

a. Last antero-lateral tooth elongate, spiniform……*C. (C.) anlsodon*

b. Last antero-lateral tooth hittle the more produced than other teeth……*C. (C.) orientalis*

(ii) Second anterolateral tooth subequal to first

a. Natatory leg with spinose carpus……*C. (C.) hellerii*

b. Natatory leg with not spinose carpus

(a) Front teeth acuminate……..*C. (C.) acuta*

(B) Front teeth bluntly round

(1) Median lobule of lateral part of orbital ventral margin acutely dentiform……*C. (C.) lucifera*

(2) Median lobule of lateral part of orbital ventral margin not dentiform……*C. (C.) annulata*

b. Cardiac region with conspicuous ridge

i. Mesobranchial region bearing ridge

(i) Median and first lateral front teeth more protruding than second lateral front teeth. Sixth segment of male abdomen with lateral margin convex

a. Epibranchial tooth relatively long……*C. (C.) variegata*

b. Epibranchial tooth shorter……..…..*C. (C.) variegate brevispinosa*

(ii) Median and first lateral front teeth not longer than second lateral front teeth……..……*C. (C.) natator*

B. Anterolateral margin of carapace armed with 5 large teeth and 2-3 small Teeth……..……*Goniosupradens C. (G.) truncate*

B. Posterior margin of carapace straight; posterolateral angle of carapace angular or with ear……..*Goniohellenus*

A. Epibranchial tooth shorter than other anterolateral teeth……*C. (G.) truncate*

B. Epibranchial tooth longer than the others

a. Epibranchial tooth slightly longer than the others; sixth segment of male abdomen with lateral margin slightly convex……*C. (G.) hongkongensis*

b. Epibranchial tooth distinctly longer than the others; sixth segment of male abdomen with lateral margin strongly convex……*C. (G.) vadorum*

II. Antennal flagellum not excluded from orbital hiatus……...*Gonioneptunus C. (G.) bimaculata*

Family Raninidae	*Raninoides personatus* Henderson, 1888

Description : Anterior margin of carapace nearly smooth, inner orbital spine truncate, not protruding; rostral tooth triangular, pointed, reaching beyond external orbital teeth. Cheliped palm with three spines on lower border. fixed finger strongly deflexed. dactyl strongly curved, carpus smooth, with a pair of distal spines, merus without spine. Frontal borders of dactyli of second and third pereiopods slightly curved, that of of fourth pereiopod straight

Size : Carapace width is about 13.9-20.8 mm., Length 25.1-35.5 mm.

Habitat : Muddy to sandy substrates; 31-252 m.

Distribution : Bay of Bengal Burma, Japan - Shiono-misaki, East China Sea, South China Sea , Nansha Islands, Philippines, Indonesia, Makassar Strait, Ambon, Australia

Family Calappidae	*Calappa pustulosa* Alcock, 1896

Description : its surface tuberculated, clypeiform expansions with five obtuse teeth around free margin of each of them, ambulatory legs nearly uncovered; front composed of two median blunt teeth, separated by a U-shaped deep sinus.

Merus, carpus and propodus of cheliped are smooth to the naked eye. The distal portion of the propodus is somewhat compressed. The merus, carpus and propodus of the ambulatory legs are cylindrical, smooth and rather glabrous to the naked eye; the dactylus is fringed with brownish hairs on the anterior and posterior borders

Size : Carapace width is about 42.3-51.1 mm., Length 38.5-46.5 mm.

Habitat : Muddy-sandy or shelly bottoms 40-165 m.

Distribution : Burma, Japan - Tosa Bay, Sagami Bay,Taiwan China - Hainan Island, Vietnam , Philippines - south of Manila Bay, Marinduque Island, South China Sea

Family Calappidae	*Mursia armata* De Haan, 1837

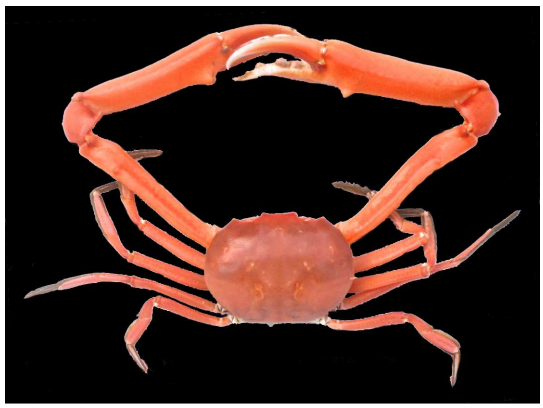
Description : Carapace about 1.2 times as wide as long, its surface with closely set flattened granules anteriorly and well spaced rounded ones posteriorly; front with slightly rounded lateral lobes and triangular rostrum; lateral spine of carapace massive and very long, posterior margin bearing two cylindrical lobes. Upper margin of cheliped palm with eight teeth. Second to fifth pereiopods with upper border of meri granulated, otherwise nearly smooth, only external surface of merus of fourth pereiopod distinctly

Size : Carapace width is about 31.4-32.7 mm., Length 25.2-26.3 mm.

Habitat : Muddy to sandy bottom; 50-150 m.

Distribution : Japan ,Korea, China , Hong Kong ,Vietnam, Philippines , South China Sea

Family Goneplacidae	*Carcinoplax longimana* (De Haan, 1835)



Description : Carapace slightly more than two-thirds as long as broad.Two antero-lateral teeth, behind the exorbital tooth. All these teeth spiniform in the young and becoming blunt and obscure or even completely lacking in large adults. the chela becoming extremely elongated in large males; palm with a tubercular subdistal tooth on the inner surface, inner margin of carpus with one tooth; lower border of merus without subdistal spinules. Ambulatory legs thin Chelipeds varying in length and elongate, with short few hairs.

Size : Carapace width is about 51.2-62.9 mm., Length 37.1-48.5 mm.

Habitat : Bottom of mud, sand or broken shells ; 30-100 m.

Distribution : Japan , South Africa, Portuguese East Africa, Madagascar,Vietnam, Andaman Sea, Korea, China , Taiwan, East China sea, South China Sea, Thailand, Philippines

Family Goneplacidae	*Carcinoplax microphthalmus* Guinot & Richer, 1981

Description : Carapace rounded. Surface finely granulate. Antero-lateral border nearly smooth in large individuals, in others without exorbital tooth and with the other teeth hardly marked. Front not very produced, only sinuous. Orbits very small. Chelipeds becoming only more robust in large males; palm smooth and unarmed at the inner surface; fingers with black colouration in the distal half. Ambulatory legs subcylindrical, tomentose.

Habitat : Muddy to sandy bottom; 50-400 m.

Distribution : New Caledonia, Philippines , South China Sea

Family Iphiculidae	*Iphiculus spongiosus* Adam & White, 1849

Description : Carapace transversely ovate, convex, thickly covered with pubescence. Protogastric and branchial regions each with three larger tubercles, triangulated in position. Front narrow, bidentate, separated by a V-shaped notch at the middle. Antero-lateral margin with 4 sharp spines increasing in size from the front backwards. Postero-lateral margins with 2 spinules. Chelipeds covered with short hairs. Fingers slender, longer than palm, inner borders finely denticulated, with 4 larger sharp teeth at distant intervals, bent inwards at the tip. Ambulatory legs with pubescence; dactylus longer than propodus, fringed with short setae.

Size : Carapace width is about 17-24.5 mm., Length 10.7-14.4 mm.

Habitat : soft muddy or coarse sandy bottoms, 25-106 m

Distribution : Japan ,Korea, China , Taiwan , Hong Kong ,Vietnam, Philippines , South China Sea, Gulf of Thailand, Singapore , Indonesia

Family Iphiculidae	*Pariphiculus mariannae* (Herklots, 1852)

Description : Carapace is circular and globular. The whole surface of the body is thickly covered with fine sponge-like tomentum. The granules are variable in size and a number of them are larger and tuberculiform. The intestinal region is distinctly isolated by deepish grooves and is mounted with two tubercles, one behind the other. The chelipeds are symmetrical and are not very robust, each segment subcylindrical and closely covered with tomentum. The palm is short and proximally swollen, the fingers are slender and much longer than the palm, the tip of the fingers are naked and hooked.

Size : Carapace width is about 20.5-29.2 mm., Length 26.1-32.4 mm.

Habitat : Soft muddy bottom in shallow waters, 65-1080 m .

Distribution : Red Sea, India, Japan, East China Sea, South China Sea, Philippines, Indonesia

Family Portunidae	*Charybdis bimaculata* (Miers, 1886)

Description : Carapace covered with a dense short tomentum, patches of granula on cardiac and branchial regions, front with 6 low, blunt and broadly triangular teeth, medians little more prominent than the submedians; antero-lateral borders with 6 teeth. First truncate, third the largest, sixth acute, directed antero-laterally.Chelipeds slightly heterochelous; merus with 3-4 strong spines on anterior border, posterior border with a spinule at its distal end; carpus with a strong internal spine, outer border with 3 spinules, palm with 3 spines on upper border, granulate on upper, and outer faces

Size : Carapace width is about 25.4-28 mm., Length 16.4-19.1 mm.

Habitat : Sandy, muddy or broken shelly bottoms, 0-439 m .

Distribution : South Africa, India, Japan, Korea, China, Taiwan, South China Sea, Philippines, Indonesia, Australia

Family Portunidae	*Charybdis miles* De Haan, 1835

Description : Carapace hairy, granulation not evenly spread, distinct on gastric, cardiac, and parts of mesobranchial region; transverse granular lines on frontal, protogastric and mesogastric regions, epibranchial line interrupted at the cervical groove and across midline; front with 6 acute teeth, medians the most prominent, submedians on a higher plane, laterals the narrowest; antero-lateral borders with 6 teeth, first truncate and notched on outer border, acute at tip, sixth acute, directed forwards; postero-lateral junctions rounded. Antennal flagellum excluded from orbit. Chelipeds slightly heterochelous; merus with 4-5 strong spines on anterior border, sometimes with additional granules, posterior border smooth; carpus with a strong internal spine, outer border with 3 spinules; palm with 4 spines on upper border, all faces except upper face with squamiform markings. Merus of swimming leg with a subdistal posterior spine, propodus with a few spinules on posterior border near distal end

Size : Carapace width is about 55.6-61.5 mm., Length 41.2-41.5 mm.

Habitat : Soft or muddy bottom, 10-200 m .

Distribution : Persian Gulf, India, Japan, Korea, East China Sea, Taiwan , China, Hong Kong, South China Sea, Philippines, Indonesia, Australia

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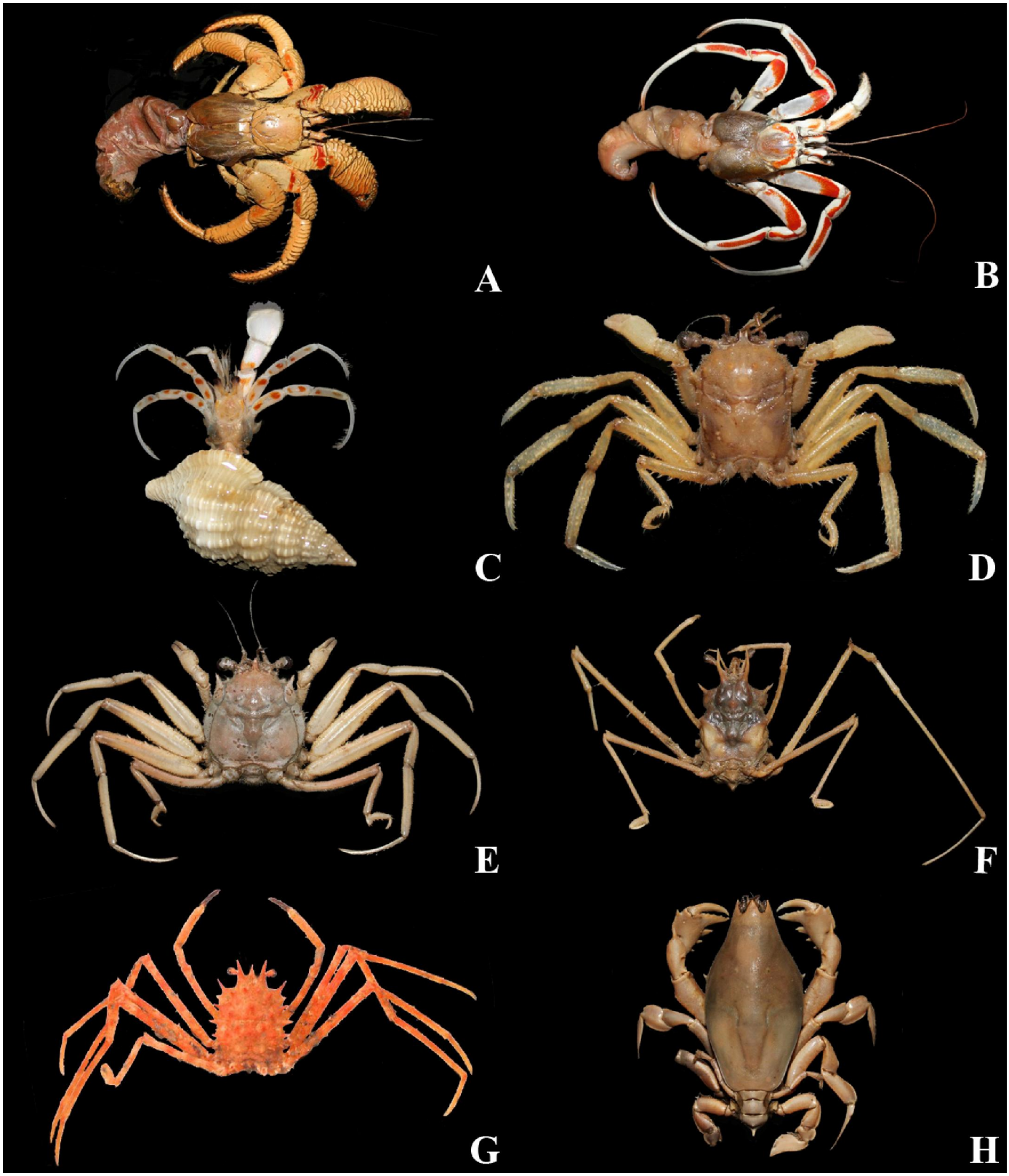
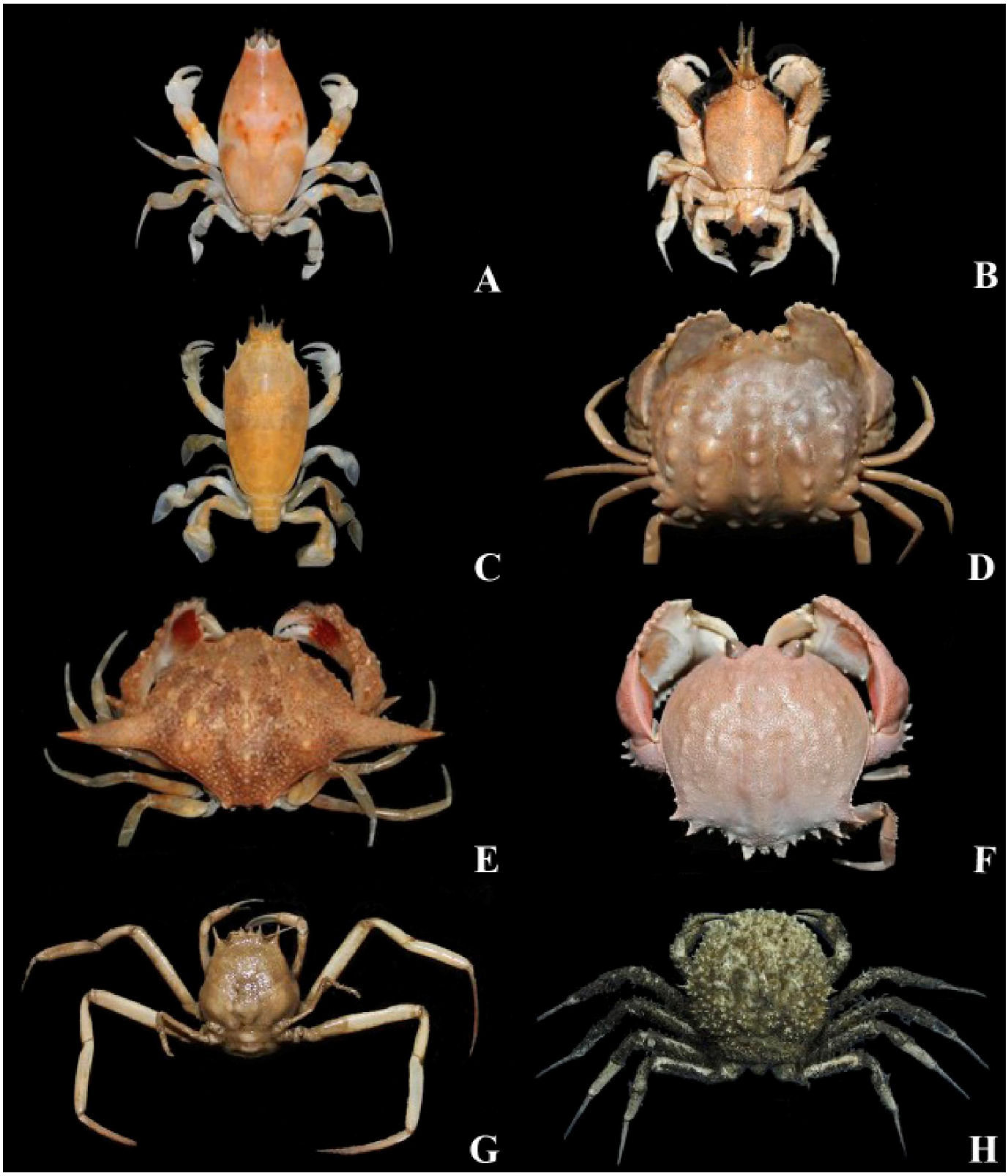
Plate 1



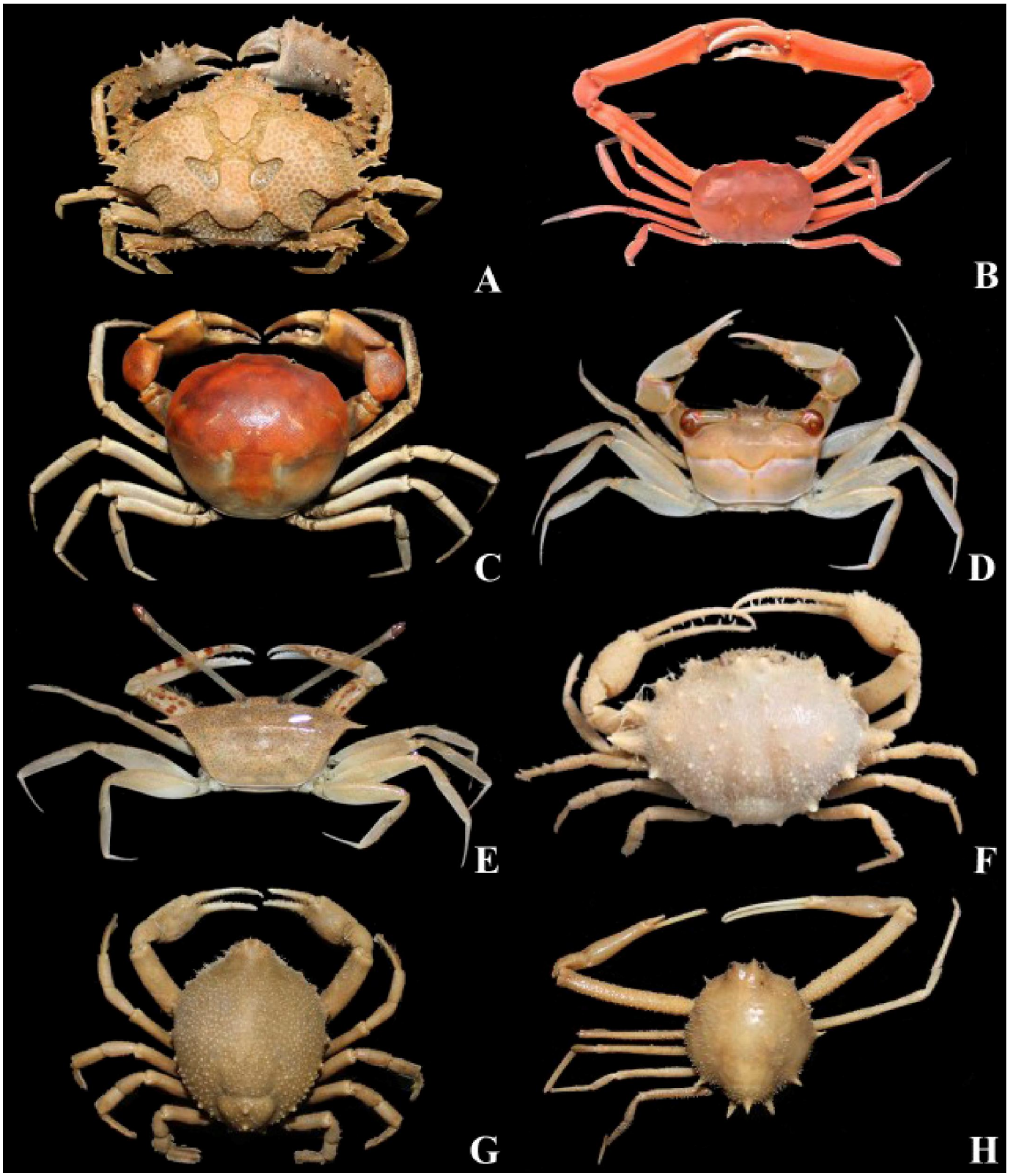
A= *Dardanus arrosor* (Herbst, 1796)
B= *Sympagurus affinis* (Henderson, 1888)
C= *Sympagurus monstrosus* (Alcock, 1894)
D= *Homola orientalis* Henderson, 1888
E= *Paramolopsis boasi* (Wood Mason & Alcock, 1891)
F= *Latreillopsis bispinosa* Henderson, 1888
G= *Moloha acutispina* (Sakai, 1961)
H= *Lyreidus tridentatus* De Haan, 1841

Plate 2



A= *Lyreidus stenops* Wood-Mason, 1887
B= *Cosmonotus grayii* White, 1847
C= *Raninoides personatus* Henderson, 1888
D= *Calappa pustulosa* Alcock, 1896
E= *Mursia armata* De Haan, 1837
F= *Paracyclois milneedwardsi* Miers, 1886
G= *Ethusa indica* Alcock, 1894
H= *Trichopeltarion ovale* (Anderson, 1896)

Plate 3



A= *Dairoides seafdeci* Takeda & Ananpongsuk, 1991

B= *Carcinoplax longimana* (De Haan, 1835)

C= *Carcinoplax microphthalmus* Guinot & Richer de Forges, 1981

D= *Paragoneplax serenei* (Zarenkov, 1972)

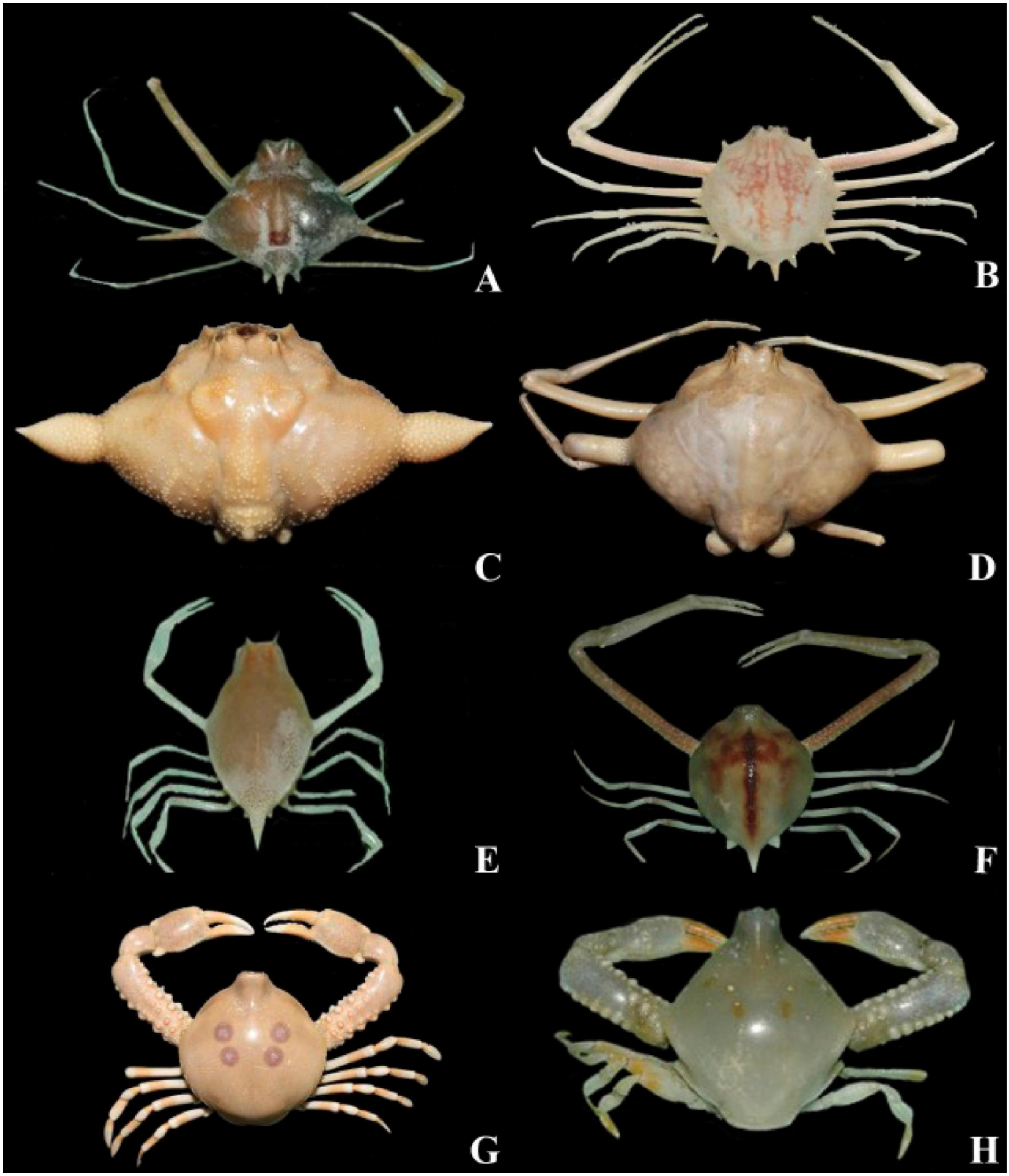
E= *Ommatocarcinus pulcher* Barnard, 1950

F= *Iphiculus spongiosus* Adams & White, 1849

G= *Pariphiculus mariannae (Herklots, 1852)*

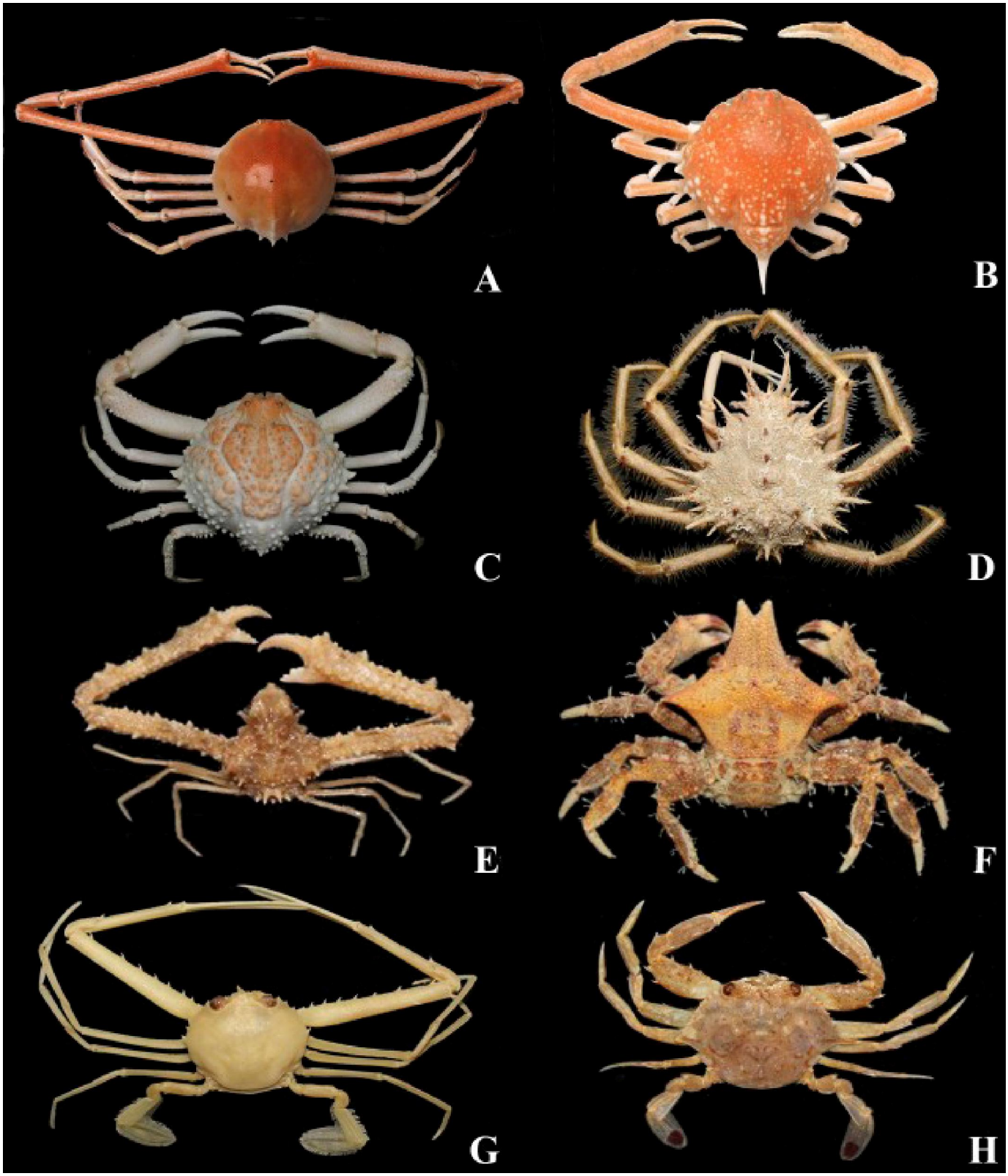
H= *Arcania brevifrons* Chen, 1989

Plate 4



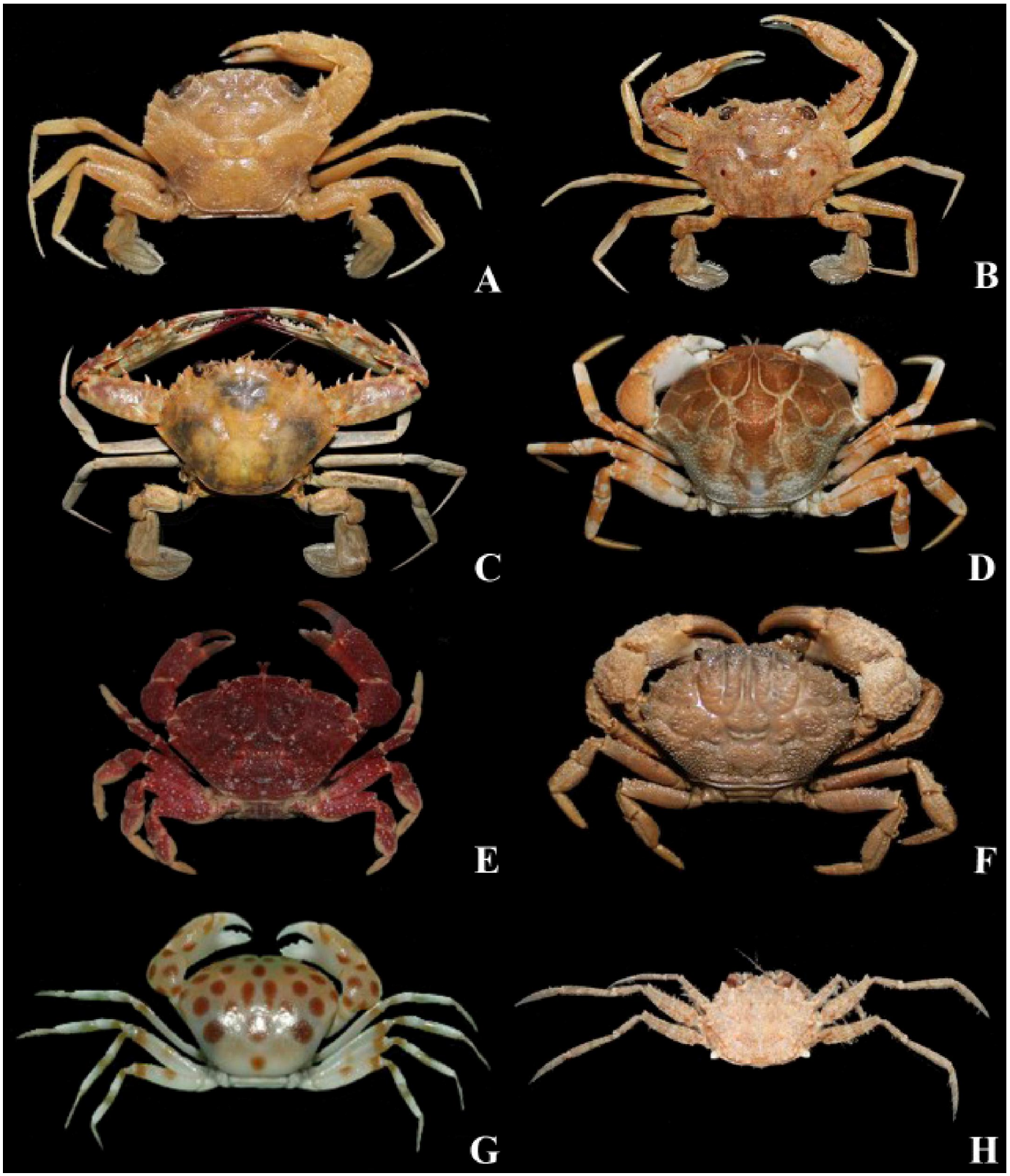
A= *Arcania gracilis* Henderson, 1893
B= *Arcania undecimspinosa* De Haan, 1841
C= *Ixa edwardsii* Lucas, 1858
D= *Ixoides cornutus* MacGilchrist, 1905
E= *Myra elegans* Bell, 1855
F= *Myra subgranulata* Kossmann, 1877
G= *Euclosia unidentata* (De Haan, 1841)
H= *Leucosia rhomboidalis* De Haan, 1841

Plate 5



A= *Parilia major* Sakai, 1961
B= *Tanaoa pustulosus* (Wood-Mason, 1891)
C= *Urashima pustuloides* (Sakai, 1961)
D= *Maja spinigera* De Haan, 1837
E= *Rhinolambrus sisimanensis* (Serene & Umali, 1972)
F= *Eumedonus vicinus* Rathbun, 1918
G= *Lupocyclus philippinensis* Semper, 1880
H= *Portunus hastatoides* Fabricius, 1798

Plate 6



A= *Charybdis (Goniohellenus) truncate* (Fabricius, 1798)

B= *Charybdis (Goioneptunus) bimaculata* (Miers, 1886)

C= *Charybdis (Charybdis) miles* De Haan, 1835

D= *Demania rotundata* Serene, in Guinot, 1969

E= *Zozymodes sp.*

F= *Medaeops granulosus* (Haswell, 1882)

G= *Liagore rubromaculata* (De Haan, 1835)

H= *Parapalicus trituberculatus* (Chen, 1981)