

Taxonomic notes on spotted reef crab *Carpilius maculatus* (Linnaeus, 1758) of Andhra Pradesh Coastal waters

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ABSTRACT

Carpilius maculatus (Linnaeus, 1758) is categorized by a beautiful creamy ground color with symmetrically disposed 11 large red spots; four in a row along the posterior border, three across the middle area, and two behind each orbit on the carapace. The carapace is smooth, convex, and front with a lobate process divided into two lobules by a depression in the median. Anterolateral border entire, chelipeds very stout, unequal, and smooth. It has four blunts between the eyes. Present communication based on collected specimens from Visakhapatnam, Kakinada, Machilipatnam, and Veta Palem landing centers of the Andhra Pradesh coast.

Key words: Decapoda, Brachyura, Bay of Bengal, Southern India

Introduction

Aquatic biota with shells is called crustaceans. There are 42 orders, 849 families, 13 subclasses, and 6 classes among them. Around 150,000 crustacean species, including Brachyuran, remain unidentified out of the approximately 68,000 known species worldwide (Martin and Davis, 2001); (Castro and Huber, 2008). Brachyuran, with its 7,047 species and 93 families, has been around since the Jurassic Period. They may be found wandering on the beach, swimming freely in the water, or settling on the bottom of the ocean (Anger, 2001), (Irawan and Soegianto, 2006), Ng *et al.* (2008). They are found in terrestrial, semi-terrestrial, freshwater, and primarily marine environments. They can be found hid-

den in rocks, corals, seagrass beds, and mangroves. Aquatic Brachyurans are found all over India, with the longest shore (coastal waters) stretching 8118 km along the East shore's Tamil Nadu, Pondicherry, West Bengal, Odisha, and Andhra Pradesh; along the West Coast's Gujarat, Maharashtra, Goa, Karnataka, and Kerala along the West Coast. India has an Exclusive Economic Zone (EEZ) area of 2.02 million square km and 0.53 million square km. However, information about the presence of infra-red Brachyura on the Andhra Pradesh coast has been mostly reported on economical crabs, while the data on the non-economical and less commercially important crabs is still lacking which leads us to these small taxonomical notes (Ajmal Khan and Ravichandran, 2009), Ajmal Khan *et al.* (2005),

Bijukumar *et al.* (2007), (Roy and Nandi, 2007).

Materials and Methods

An extensive field survey was conducted along the four major sampling stations Visakhapatnam, Kakinada, Machilipatnam, and Veta Palem were selected along the Andhra Pradesh coast, the East coast of India, and the Bay of Bengal. Specimens were preserved using two different methods Viz. wet and dry preservation. In wet preservation, specimens were preserved in 10% formalin. In dry preservation, mostly the male specimen was sacrificed. All the species have a specific number and are deposited in the Museum, Department of Zoology, Andhra University. The collected specimens were then identified up to the species level using standard keys. The identification keys provided by Keenan *et al.* (1998) and Ng *et al.* (2008) were referred for the identification of species which those widely accepted by worldwide taxonomists as well as by the FAO.

Results and Discussion

Family: Carpillidae (Ortmann, 1893)

Diagnosis: Carapace transversely ovate, distinctly broader than long, posterior surface smooth, without tubercles, regions not defined, anterolateral margins entire but without lobes or tubercles, with distinct epibranchial lobe. Front short, medially projected. Orbits are about one-third of the front, eyes small. Third maxillipeds without a gap between, merus relatively quadrate. Chelipeds unequal, fingers apically pointed the immovable finger of larger cheliped with large blunt tooth proximally on cutting edge. Walking legs are medium-sized, smooth, and without setae. The abdomen of males with somites three to four is tightly fused the suture between somites three and four absent, the suture between somites four and five distinct, and the abdomen of females with free-moving somites. G1 stout, nearly straight; G2 longer than G1. Genital opening is male coxal. The genital opening is of the female sternal.

Carpilius maculatus (Linnaeus, 1758) (Figure:1-3)

Material examined

A total of seven crabs, five males, and two females were collected. Male (CL: 6.9cm, CW: 8.1 cm).

Diagnosis

Carapace: The carapace is transversely ovate and the dorsal surface is very smooth; distinctly convex. Hepatic, frontal, and lateral regions are marked with fine netlike corrugation. Surface with 11 symmetrically disposed of large dark red blotches (Figure:1 A), the cardiac region appears with a hollow shape. The anterolateral margin arched, longer than the posterolateral margin; joined between anterolateral and posterolateral margins armed each with an obtuse tooth. Antennae (Figure:1 D), Antennule (Figure 1 E).

Front (Figure:1 C): The frontis obliquely deflexed, the median lobe very decidedly bilobate and separated from the lateral lobes on either by a deep notch.

Eyes: Large, well developed.

Orbits: Orbit small; inner supra-orbital teeth larger than frontal lobe. The distance between inner superorbital teeth is unequal to one-third of carapace breadth; outer orbital teeth are obtusely round.

Mandibles (Figure 2 F): Mandibles consist of a divided apparatus, with a palpus, which primarily consists of three segments.

First maxillae (Figure 2 E): The first maxillae are small leaflike structures, lack exopods consisting of coxa, basis, and endopodites, and bear numerous spines.

Second maxillae (Figure 2 D): Scapognathite, coxa basis and endopodites having numerous small setae.

First maxilliped (Figure 2 C): The endopod base is narrow and the upper part expanded to two lobes, the nearest lobe of the exopod lean. The exopod consists basal part and terminal flagellum, with long setae. Epipod is elongated with a broad proximal and a narrow distal part, distal margin.

Second maxilliped (Figure 2 B): The endopod is slender and more cylindrical and has more setae on coxa, basis, carpus propodus, and dactyls. The exopod has a single segmented flagellum, podobranch enlarged and epipod reduced.

Third maxilliped (Figure 2 A): The coxa, basis, ischium, merus, carpus, propodus, and dactylus of the maxilliped appear very strong. The Antero-external angle of the merus expanded and formed a triangular structure. The outer margin of the merus, carpus, propodus, and dactyls are purple colored with numerous setae, exopod slender, strong. The epipod and podobranch present.

Chelipeds (Figure 1; F & G): Chelipeds unequal, right chela larger than left chela, fingers apically pointed the immovable finger of larger cheliped with the large blunt tooth. Fingers of major chelipeds are truncated, stout teeth in the proximal half of the inner margins; fingers of minor chelipeds are slender, teeth on the inner margins indistinct. Merus and carpus of the cheliped stout, and short, propodus of a right chela are slenderer than the left chelate leg. The dorsal margins of the chelate leg are

Plate 16

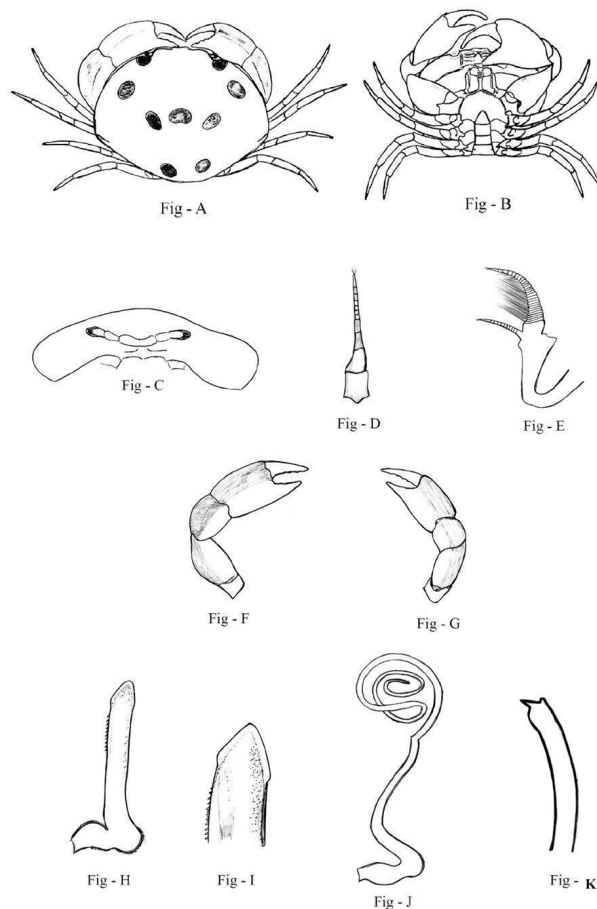


Fig. 1. *Carpilius maculatatus* Linnaeus, 1758

Fig. A. Dorsal view

Fig. B. Ventral view

Fig. C. Frontal view

Fig. D. Antennae

Fig. E. Antennule

Fig. F. Left cheliped

Fig. G. Right cheliped

Fig. H. First gonopod

Fig. I. Tip of first gonopod

Fig. J. Second gonopod

Fig. K. Tip of second gonopod

maroon a colored polygonal pattern present, ventral side of the chela has no pattern but is cream-colored.

Ambulatory legs: Ambulatory legs are smooth with merus subcylindrical, dactyls elongate, and slender, claw-shaped at the tip. The tip of the ambulatory legs is black dotted.

Abdomen: The male abdomen seven segmented with telson triangular, second and third segments slightly fused, but only segments five and six can be truly regarded as fused. Between these two segments, the suture is very shallow or indistinct.

Male gonopods (Figure 1; H, I, J & K): Male first gonopod long, stout.

Colour: Cream to pink color with 11 large violets to maroon spots on the dorsal surface of the carapace.

Habitat: Rocky beaches or coral reefs, 3 - 30 meters

Plate 17

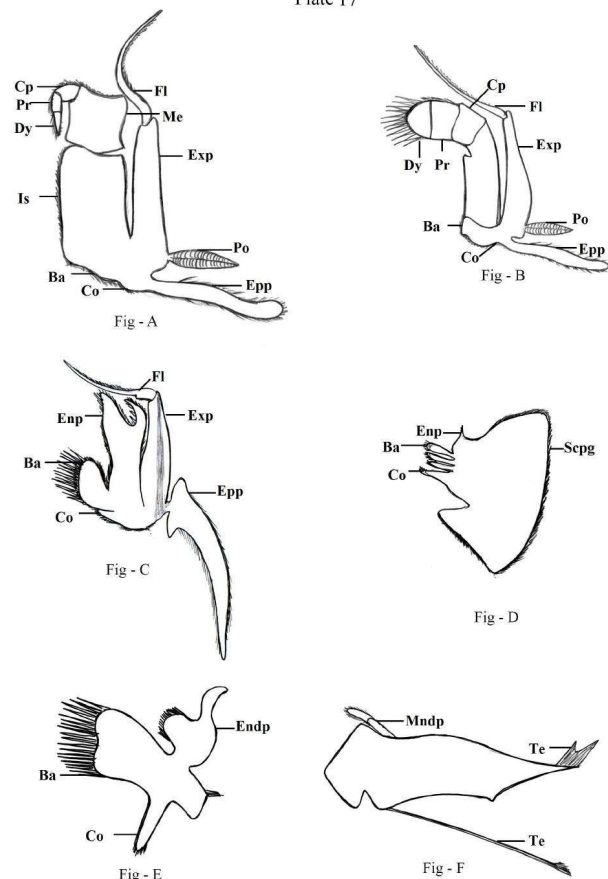


Fig. 2. *Carpilius maculatatus* Linnaeus, 1758

Fig. A. Third maxilliped

Fig. B. Second maxilliped

Fig. C. First maxilliped

Fig. D. Second maxillae

Fig. E. First maxillae

Fig. F. Mandible

deep and mostly found in three to six meters deep coral reefs.

Abbreviations

Co	–	Coxa
Ba	–	Basis
Is	–	Ischium
Me	–	Merus
Cp	–	Carpus
Pr	–	Propodus
Dy	–	Dactylus
Enp	–	Endopod
Exp	–	Exopod
Epp	–	Epipod
Po	–	Podobranch
Fl	–	Flagellum
Endp	–	Endopodite
Scpg	–	Scapognathite
Mndp	–	Mandibular palp
Te	–	Tendon

Conclusion

Providing taxonomic notes of the current investiga-

tion, *Carpilius maculatus* will make interest in non-commercial and less commercially important crab's taxonomical studies especially Bay of Bengal and the state of Andhra Pradesh.

Future Scope

These investigation results will show a high impact on future taxonomic explorations in the Andhra Pradesh coastal waters for future taxonomical studies on crabs.

Authors' contributions

This work was carried out in collaboration among all authors. Author PVK, and DEB designed the study, PVK analyzed data, and DRK curated the manuscript. Authors RS, and S did the literature survey and analysis. All authors read and approved the final manuscript

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Competing Interests: Authors have declared that no competing interests exist.

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PLATE - A3



Carpilius maculatus (A) dorsal view, (B) ventral view

Jonas indicus (C) dorsal view, (D) ventral view

Dorippoides fuchino (E) dorsal view, (F) ventral view

Fig. 3.