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Taxonomic Notes on Brachyuran Crab *Jonas indicus* Chopra, 1935 of Andhra Pradesh Coastal Waters

Ponnada Vijay Kumar [a], Virendra Kumar [b], D.E Babu [a], Pradeep Sastry Tarapatla [a] and Diamond Rajakumar Tenali [a*]

[a] Department of Zoology, College of Science and Technology, Andhra University, Visakhapatnam, India.
[b] Department of Fisheries Resource Management, College of Fisheries, Dr Rajendra Prasad Central Agricultural University, Pusa 848 125 Bihar, India.

Authors' contributions

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

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ABSTRACT

Marine crab species *Jonas indicus* carapace is longitudinally elliptical and its dorsal surface is set with clusters of granules. The rostrum is bidentate and the rostral spine is produced beyond the tip of the pre-orbital spines. The lateral border of the carapace is with sharp teeth. The flagellum of the antenna is longer than half the length of the carapace. The dactylus of the last pair of ambulatory legs is flattened and paddle-shaped. The body is pinkish-white in colour. Present taxonomic reports based on collected specimens from Kaviti, Visakhapatnam, Kakinada, Machilipatnam, and Vodalarevu landing centers of the Andhra Pradesh coastal region.

**Corresponding author: Email: diamondraj.t@gmail.com;*

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Keywords: Decapoda; brachyura; bay of bengal; Southern India.

1. INTRODUCTION

Within their habitat, crabs have a significant ecological role as well as being a valuable crustacean resource in trawl harvests. While many of the species underpin the commercial fishery, many other groups of brachyuran crabs are also unintentionally captured in trawl nets and landed as low-value bycatch. Indian waters are home to 991 different species of brachyuran crabs. Among them are 849 families, 6 classes, 13 subclasses, and 42 orders. Of the approximately 68,000 recognized species of crustaceans worldwide, some 150,000 species, including Brachyuran, are still unknown [1,2]. With 7,047 species and 93 families, the brachyuran order has existed since the Jurassic Period. They can be discovered floating on the ocean floor, swimming unrestrictedly in the water, or meandering along the shore [3] Irawan and Soegianto [4]. They inhabit freshwater, semi-terrestrial, terrestrial, and mostly marine habitats. They are concealed by mangroves, seagrass beds, corals, and rocks. India is home to aquatic brachyurans, with the longest coastline (coastal waters) extending 8118 kilometers along the east. Gujarat, Maharashtra, Goa, Karnataka, and Kerala along the West Coast; Tamil Nadu, Pondicherry, West Bengal, Odisha, and Andhra Pradesh on the East Shore. The extent of India's Exclusive Economic Zone (EEZ) is between 2.02 and 0.53 million square kilometers. These brief taxonomical notes are the result of incomplete data regarding non-economical and less commercially significant crabs [5,6,7]; and the majority of reports regarding the existence of infrared Brachyura on the Andhra Pradesh coast that deal with economical crabs [8].

2. MATERIALS AND METHODS

Type specimen voucher: *Jonas indicus* AUZM-2910, Coll: Vijay Kumar P and Diamond Raju. K T., on 12/12/2017

A wide-ranging field survey was conducted along the Kaviti, Visakhapatnam, Kakinada, Machilipatnam, and Vodalarevu were selected along the Andhra Pradesh coast, the East coast of India, and the Bay of Bengal. Specimens were collected from landing centers, sometimes from artisanal fisherman's who knows very well about local traditional catchings and preserved using two different methods Viz. wet and dry preservation. In wet preservation, specimens were preserved in 10% formalin. In dry preservation specimens were sacrificed. All the species have a specific number and are deposited in the Museum, Department of Zoology, Andhra University. The collected specimens have been compared with those deposited in the Museum of the Department of Zoology, Andhra University. The identification keys provided by Keenan et al., [9] and Ng et al., [4] were referred for the identification of species which those widely accepted by worldwide taxonomists as well as by the FAO.

3. RESULTS AND DISCUSSION

Family: Corystidae (Samouelle, 1819)

Diagnosis: Carapace longitudinally oval, distinctly longer than broad, strongly convex, regions weakly defined; lateral margins often with teeth or spines along the entire length, no distinct junction between anterolateral and postero-lateral margins of carapace. Front distinct, narrow, produced, with two or three teeth or lobes, orbits incomplete. The socket of antennules is broader than long, and antennules are folded longitudinally. Basal antennal segments are broad, flagella of antenna long, intensely setose. Third maxillipeds elongate, reaching to antennules, and ischium longer than merus, merus quadrate, or subquadrate. Epistome is absent. Chelipeds were sexually dimorphic, with ambulatory lags reduced in size. The abdomen of males with five somites, the first somite of the male and female abdomen is visible from dorsal view.

Genus: *Jonas* Hombron & Jacquinot, 1846

Jonas indicus Chopra, [10] (Plate 1, 2 & 3 – Fig. C, D):

Material examined:

A total of 5 males and 5 females were collected. Male (CL: 2.5cm, CW: 1.6 cm).

Diagnosis:

Carapace (Plate 1; Fig. A)**:** The carapace is longitudinally elliptical and its dorsal surface is set with clusters of pear shape granules arranged in clusters on elevated frontal, gastric,

cardiac, and intestinal regions; granules arranged longitudinally on the branchial region. A distinct groove was observed between gastric, cardiac, and branchial regions; stalked eyes large filling orbits; anterolateral margin of carapace convex with ten teeth on each side, first one largest, size of anterolateral teeth decreasing from first to ninth; tenth larger than ninth, at the posterolateral junction, pointing obliquely backward; antennal flagellum almost equal to carapace length, strongly setose. Antennae (Plate 1; Fig. E). Antennule (Plate 1; Fig. F).

Front (Plate 1; Fig. C)**:** Rostrum bidentate, rostral spine extended almost to the level of spines in the inner angle of orbits, supra-orbital spine slightly longer than bifid rostrum, orbital spine longer than first anterolateral tooth.

Eyes: Stalked eyes.

Orbits: Large filling orbits.

Mandibles (Plate 2; Fig. F)**:** The body of mandibles consists of a divided apparatus and the bases to which the muscles are attached mandibles have a palpus, which primarily consists of three segments. The mandibular palp is well developed.

First maxillae (Plate 2; Fig. E)**:** The first maxillae have small leaflike structure, lack exopods, and consist of coxa, bearing numerous spines and setae.

Second maxillae (Plate 2; Fig. D)**:** Second maxillae have scapognathite with fringed setae on the blade, coxa basis biramous with numerous small setae and unsegmented endopodite present.

First maxilliped (Plate 2; Fig. C)**:** The base of the endopod narrow and the upper part expanded with setae. The exopod consists of a cylindrical basal part and terminal flagellum, with setae. Epipod is remarkably elongated with a broad proximal and a narrow distal part.

Second maxilliped (Plate 2; Fig. B)**:** The endopod is more slender and more cylindrical and has more setae on the ischium, merus carpus, and propodus. The dactylus has strong spines like setae. The exopod consists of the single-segment flagellum, podobranch present and epipode elongated.

Third maxilliped (Plate 2; Fig. A)**:** Third maxillipeds elongated with a granular surface, merus quadrate, ischium with setae, merus with long setae, inner border of exopod lined with tubercles, with long flagellum, podobranch present.

Chelipeds (Plate 1; Fig. G)**:** Chelipeds equal in size including the fingers densely covered with long setae. The presence of a straight spine appears dorsally on the inner angle of the carpus of the cheliped. The outer angle of the buccal cavern bears one spine each below those of the lower inner angle of the orbit single spine on the distal part of the inner and outer margins of merus; the inner carpal spine is long, sharp, followed by small spine behind it, prominent large basal tubercle; outer margin of carpus with two sharp spines; upper dorsal ridge behind movable finger with three or four sharp spines; mid-part of outer surface of palm with two to three spines; rounded teeth on cutting margins of dactylus, pollex; fingertips curved.

Ambulatory legs: Ambulatory legs are relatively long, fringed with setae; second, and third legs almost equal; ischium of last ambulatory leg without spine, as in other legs; three spines present at base of merus of last ambulatory leg, single spine in dorsal view, two other spines on ventral view; all three spines inwardly curved (Plate 1; Fig. H).

Abdomen (Plate 1; Fig. I)**:** Abdomen short, first three somites not wide, fourth, fifth somites very wide, sixth somite half-width of fifth somite, telson triangular with rounded tip, stiff setae; fourth somite triangular; fifth somite with three projections, two large ovate ones on marginal side, subovate on upper border, separated by deep groove; abdomen covered with dense setae.

Gonopods (Plate 1; Fig. J &K)**:** The first gonopod is L-shaped in ventral view, with a stout basal, slender, long distal shaft. The second gonopod is short, with a broad base; bent basally, apex portion spoon-shaped.

Colour: In fresh specimens, the carapace is pinkish white with the elevated parts orange red larger granules whitish, ambulatory legs with orange patches, setae bordered legs reddish.

Habitat: Species habitats are relatively shallow waters of less than 20 meters in depth, from sandy and muddy substrates.

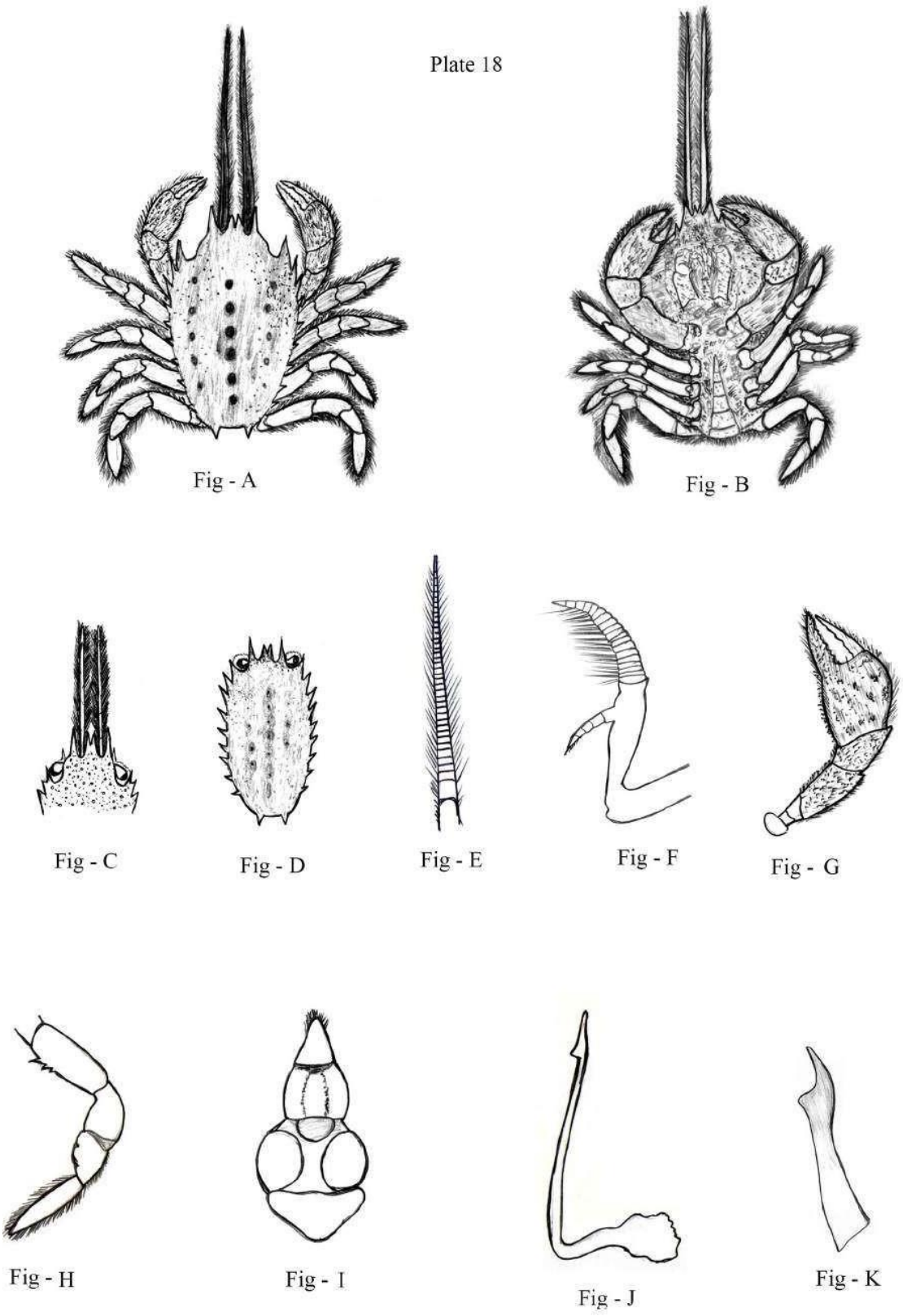

Plate 1. *Jonas indicus* Chopra, [10] Fig. A: Dorsal view Fig. B: Ventral view Fig. C: Front Fig. D: Carapace Fig. E: Antennae Fig. F: Antennule Fig. G: Right cheliped Fig. H: Last ambulatory leg Fig. I: Abdomen Fig. J: First gonopod Figure K: Second gonopod

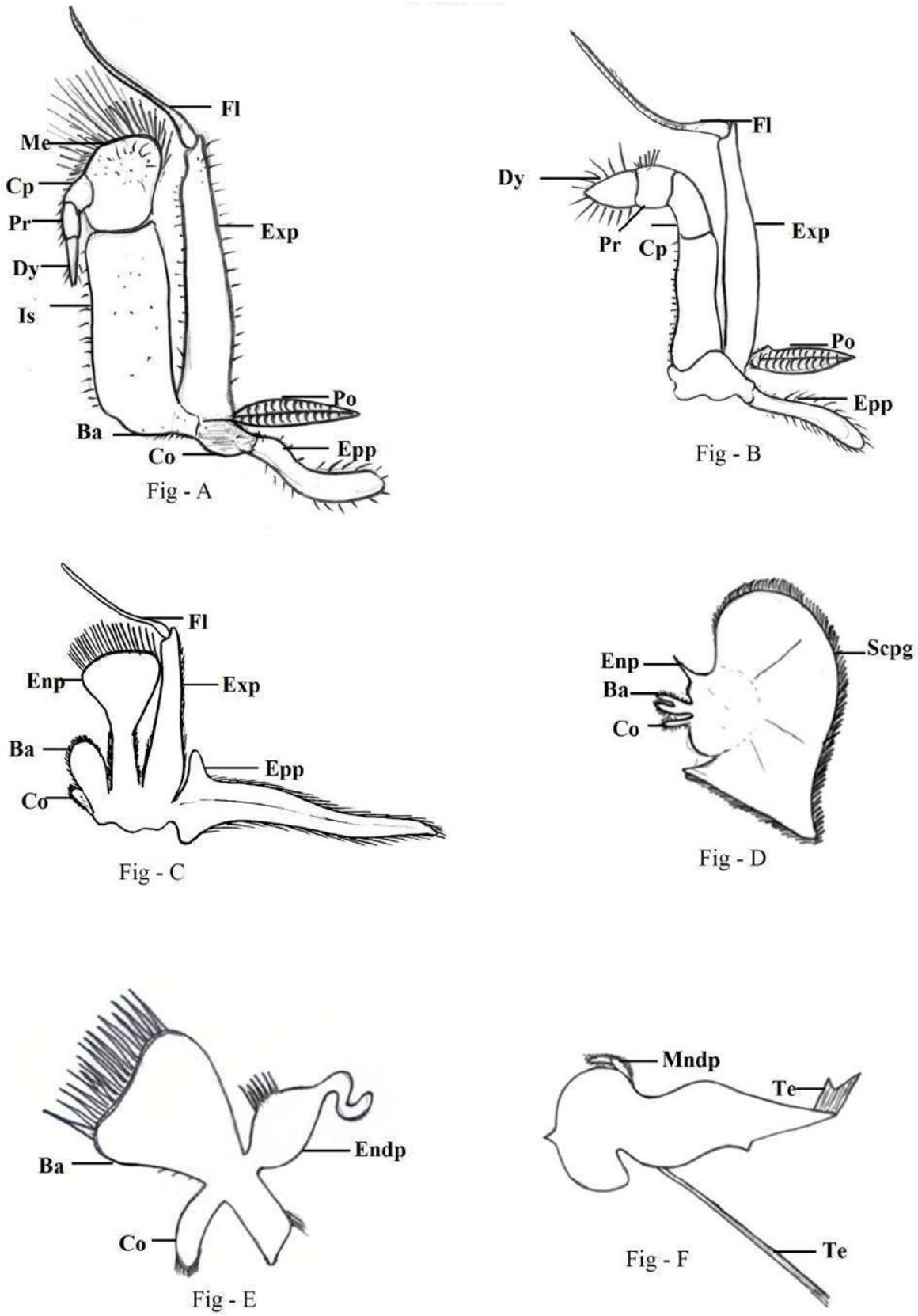

Plate 2. *Jonas indicus* Chopra, [10]. Fig. A: Third maxilliped Fig. B: Second maxilliped Fig. C: First maxilliped Fig. D: Second maxillae Fig. E: First maxillae Fig. F: Mandible

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

Plate 3. Dorsal and ventral view

4. CONCLUSION

Jonas indicus taxonomic notes of the current investigation will make interest to conduct more surveys, studies on non-commercial crab species and may brain storming for possible utilization fish processing outputs in different sectors with the help of technologies in non-commercial and less commercially important crab's especially Bay of Bengal and the state of Andhra Pradesh.

FUTURE SCOPE

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

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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