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SHORT COMMUNICATION

FIRST RECORD OF GHOST SHRIMP *CORALLIANASSA COUTIEREI* (NOBILI, 1904) (DECAPODA: AXIIDAE: CALLICHRIDAE) FROM INDIAN WATERS

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First record of ghost shrimp *Corallianassa coutierei* (Nobili, 1904) (Decapoda: Axiidea: Callichiridae) from Indian waters

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Abstract: A Callichiridae ghost shrimp species *Corallianassa coutierei* (Nobili, 1904) is recorded and described here for the first time from the Indian waters. Formerly, five species under the family Callichiridae were recorded from different coastal waters of India. In addition, *C. coutierei* was infested with several copepods. Additional description of *C. coutierei* with key characters and distribution status is given for this species. A comprehensive checklist of the infraorder Axiidea is prepared based on previous records from Indian waters.

Keywords: Checklist, copepods, new record, Goose reef, Gulf of Kachchh, Gujarat.

Axiidea de Saint Laurent, 1979, an infraorder of Decapoda is also known as ghost shrimp, mud shrimp or burrowing shrimp (Dworschak et al. 2012), although they are only distantly related to true shrimp, they are ecologically and morphologically adapted as burrowing forms (Dworschak 2015). Axiidea is the infaunal organisms that build complex burrows, found in marine and estuarine areas of bays (Golubinskay et al. 2016). Axiidea comprises a total of 11 valid families (WoRMS 2020a) dwelling in shallow water of intertidal or subtidal water (less than 200 m or 660 ft). Axiidea

comprises 19 species belonging to five families and 16 genera, distributed in the Indian waters (Table 1). Family Callichiridae comprises of 96 species belonging to 17 genera worldwide (WoRMS 2020b).

The ghost shrimp genus *Corallianassa* was described by Manning in 1987 from America (family: Callianassidae Dana, 1852). The genus *Corallianassa* comprises 13 species in the World (WoRMS 2020c). A scrutiny of literature pertaining to ghost shrimps of Indian waters revealed that the genus *Corallianassa* is hitherto not reported from Indian waters. Therefore, the present taxon, including the genus is the first report from Indian waters.

Ghost shrimp can be the host for copepods. The cavity between the shell and body of the ghost shrimp can be a favourable site for these associated arthropods. Only a few accounts on the copepods of ghost shrimps have been described and recorded worldwide (Pillai 1959; Corsetti & Strasserm 2003; Kihara & Rocham 2013; Sepahvand et al. 2017a,b, 2019). From India Pillai (1959) had recorded and described two new species of *Clausidium* Kossman, 1874 parasitic on

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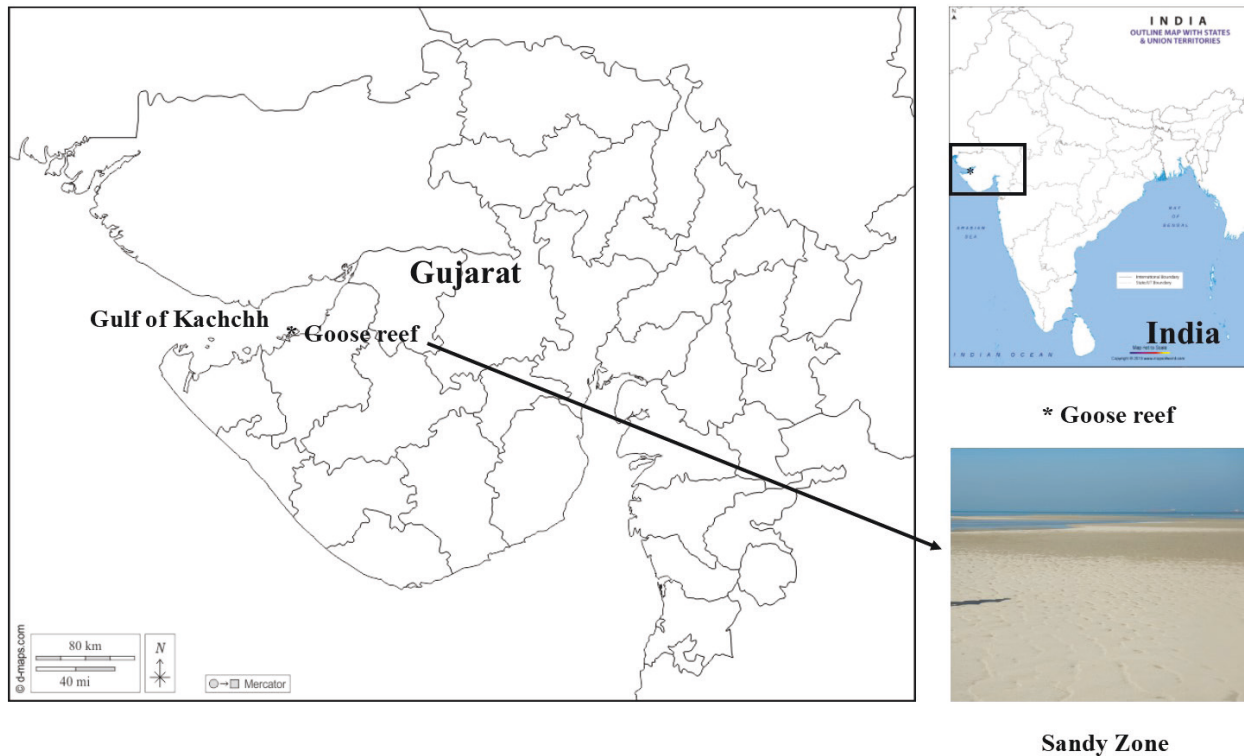


Image 1. Study area of the new find of the ghost shrimp *Corallianassa coutierei*.

Callianassa Leach, 1814 (in Leach, 1813–1815). Many researchers suggested their relationship as symbiont (Corsetti & Strasser 2003; Kihara & Rocha 2013) while many suggested them as parasites (Wilson 1935, 1937; Pearse 1947; Humes 1949; Pillai 1959). In this study, *C. coutierei* infested with copepods (*Clausidium* sp.) on the carapace region (Image 3b) can be either parasitic or symbiotic, although all the clausidiid copepods are categorised as parasitic upon different species of *Corallianassa* (Wilson 1935). Hence, this study reports *Corallianassa* genus infested with copepods for the first time from Indian waters.

MATERIALS AND METHODS

The present study was carried out at Goose reef (22.498N & 69.808E) in the Gulf of Kachchh, Gujarat (Image 1). Intertidal area of the Island is having a sandy shore, rocky shore, and coral reefs. Goose reef is under tremendous anthropogenic pressure of various industries which have constructed their offshore terminals. A single live specimen was collected, which was hidden in the sandy zone of the island. The collected specimen was transferred to the laboratory of Fisheries Research Station, Junagadh Agricultural University, Sikka. Identification was carried out through standard literature of (Man 1905; Ngoc-Ho 2005; Dworschak

2018) and communication with experts.

Size of the specimen is indicated by carapace length (cl) measured from the tip of the rostrum to the midpoint of the posterodorsal margin of the carapace and the total length (tl) measured from the tip of the rostrum to the midpoint of the posterodorsal margin of the telson. A comprehensive checklist was compiled and prepared based on previous literatures and publications of an infraorder Axiidea from Indian waters (Table 1).

RESULTS

We report the ghost shrimp *C. coutierei* (Nobili, 1904) along with an associated species of copepod *Clausidium* Kossmann, 1874 for the first time in Indian waters (Image 2c,d). A comprehensive checklist of an Infraorder Axiidea listed a total of 19 species belonging to five families and 16 genera with distribution status in Indian waters is provided (Table 1). Maximum species were reported belonging to the family Callichiridae (six genera, six species) followed by Axiidae (four genera, six species), Callianassidae (four genera, five species), Callianideidae (one genus, one species), and Callianopsidae (one genus, one species).

Systematics

Class: Malacostraca Latreille, 1802
Order: Decapoda Latreille, 1802
Infraorder: Axiidea De Saint Laurent, 1979
Family: Callichiridae Manning & Felder, 1991
Genus: *Corallianassa* Manning, 1987

Glypturus coutierei (Nobili, 1904)

Material examined

FRSACDA1, 04.i.2018, 1 male, tl 75mm, Goose reef (22.494N & 69.802E), Intertidal zone of sandy shore, coll. Prakash Bambhaniya.

Corallianassa coutierei (Nobili, 1904) (Image 2 & 3)

Synonymy:

Callianassa (Callichirus) coutierei Nobili, 1904
Callianassa (Callichirus) placida de Man, 1905
Callianassa coutierei (Nobili, 1904)
Callianassa placida de Man, 1905
Callichirus placidus (de Man, 1905)
Corallichirus placidus (de Man, 1905)

Description

Dorsal oval shaped as long as carapace, rostrum with acute anterolateral carapace spine (Image 2b), shorter than eyestalk. Cornea large. Third maxilliped-merus-ischium with 2.2 times as long as wide, merus shorter than ischium, ischium with crista dentata mesially, propodus as wide as long, dactylus shorter than propodus width about 0.2 of propodus. Cheliped

Table 1. Checklist of the infraorder Axiidea of Indian waters.

	Infraorder	Family	Genus	Species	Author	Distribution
1	Axiidea	Axiidae	<i>Ambiaxius</i>	<i>Ambiaxius alcocki</i> (McArdle, 1900)	Radhakrishnan et al. 2012; Samuel et al. 2016	Southwestern coast of India
2			<i>Calaxiopsis</i>	<i>Calaxiopsis felix</i> (Alcock & Anderson, 1899)	Alcock & Anderson 1899; Radhakrishnan et al. 2012; Samuel et al. 2016	Indian coast
3			<i>Calocaris</i>	<i>Calocaris macandreae</i> Bell, 1846	Alcock & Anderson 1894	Laccadive Sea, India
4			<i>Eiconaxius</i>	<i>Eiconaxius andamanensis</i> (Alcock, 1901)	Rao 2010; Radhakrishnan et al. 2012; Samuel et al. 2016	Andaman & Nicobar Islands
5				<i>Eiconaxius kermadeci</i> Bate, 1888	Alcock & Anderson 1894	Laccadive Sea, India
6				<i>Eiconaxius laccadivensis</i> Alcock & Anderson, 1894	Radhakrishnan et al. 2012; Samuel et al. 2016	Lakshadweep Islands, India
7		Callianassidae	<i>Gilvossius</i>	<i>Gilvossius tyrrenus</i> (Petagna, 1792)	Patel & Mahyavanshi 1974	Okha Port, Gujarat
8			<i>Paratrypaea</i>	<i>Paratrypaea bouvieri</i> (Nobili, 1904)	Sakai 1999	Gulf of Mannar
9				<i>Paratrypaea maldivensis</i> (Borradaile, 1904)	Pearson 1905	Gulf of Mannar
10			<i>Pugnatrypaea</i>	<i>Pugnatrypaea pugnatrix</i> (de Man, 1905)	Sakai 2005	Tharangambadi, Tamil Nadu
11			<i>Rayllianassa</i>	<i>Rayllianassa lignicola</i> (Alcock & Anderson, 1899)	Alcock & Anderson 1899; Rao 2010; Radhakrishnan et al. 2012; Samuel et al. 2016	Andaman & Nicobar Islands, Bay of Bengal
12		Callianideidae	<i>Callianidea</i>	<i>Callianidea typa</i> H. Milne Edwards, 1837	Rao 2010	Andaman & Nicobar Islands
13		Callianopsidae	<i>Callianopsis</i>	<i>Callianopsis caecigena</i> (Alcock & Anderson, 1894)	Alcock & Anderson 1894	Bay of Bengal, India
14		Callichiridae	<i>Audacallichirus</i>	<i>Audacallichirus audax</i> (de Man, 1911)	Rao & Kartha 1966; Sakai 1999, 2005; Dworschak 1992	Ratnagiri, Maharashtra; eastern coast of India; Kannur, Kerala
15			<i>Balsscallichirus</i>	<i>Balsscallichirus masoomi</i> (Tirmizi, 1970)	Sakai 1999, 2005; Sankolli 1971	Bombay, Maharashtra; Ratnagiri, Maharashtra
16			<i>Corallianassa</i>	<i>Corallianassa coutierei</i> (Nobili, 1904)	Present study	Goose reef, Gulf of Kachchh, Gujarat- India
17			<i>Karumballichirus</i>	<i>Karumballichirus karumba</i> (Poore & Griffin, 1979)	Sakai 1999, 2005	Chilka Lake, Odisha; Kayamkulam Lake, Kerala; Travancore, Tamil Nadu
18			<i>Michaelcallianassa</i>	<i>Michaelcallianassa indica</i> K. Sakai, 2002	Sakai 2005	Tharangambadi, Tamil Nadu
19			<i>Neocallichirus</i>	<i>Neocallichirus jousseumei</i> (Nobili, 1904)	Beleem et al. 2019	Diu, India

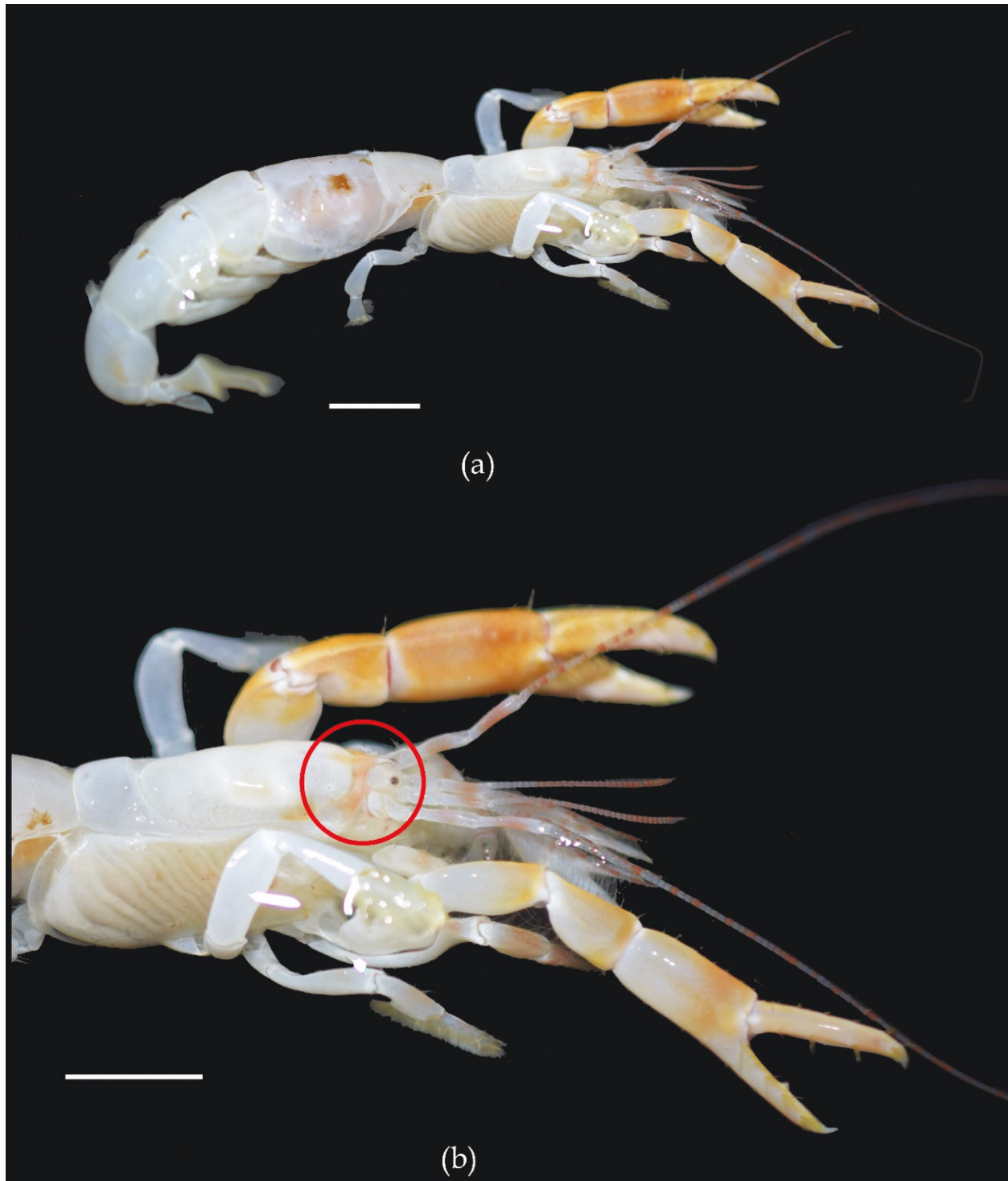


Image 2. a—entire view of *Corallianassa coutierei* (Nobili, 1904) | b—anterolateral carapace spine of *C. coutierei* (Bar represents= 1cm).
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distinctly unequal in shape. Major cheliped massive, ischium unarmed anteriorly, lower margin possesses four teeth increasing gradually in size; merus having row of tubercles at lower margin; carpus broader than long; propodus smooth; cutting edge of fixed fingers sharp

with small sharp triangular tooth proximally; dactylus longer than fixed finger, cutting edge sharp, unarmed. Minor cheliped relatively stout; ischium with four teeth distally increasing gradually in size, merus and carpus unarmed; propodus twice longer than carpus; cutting

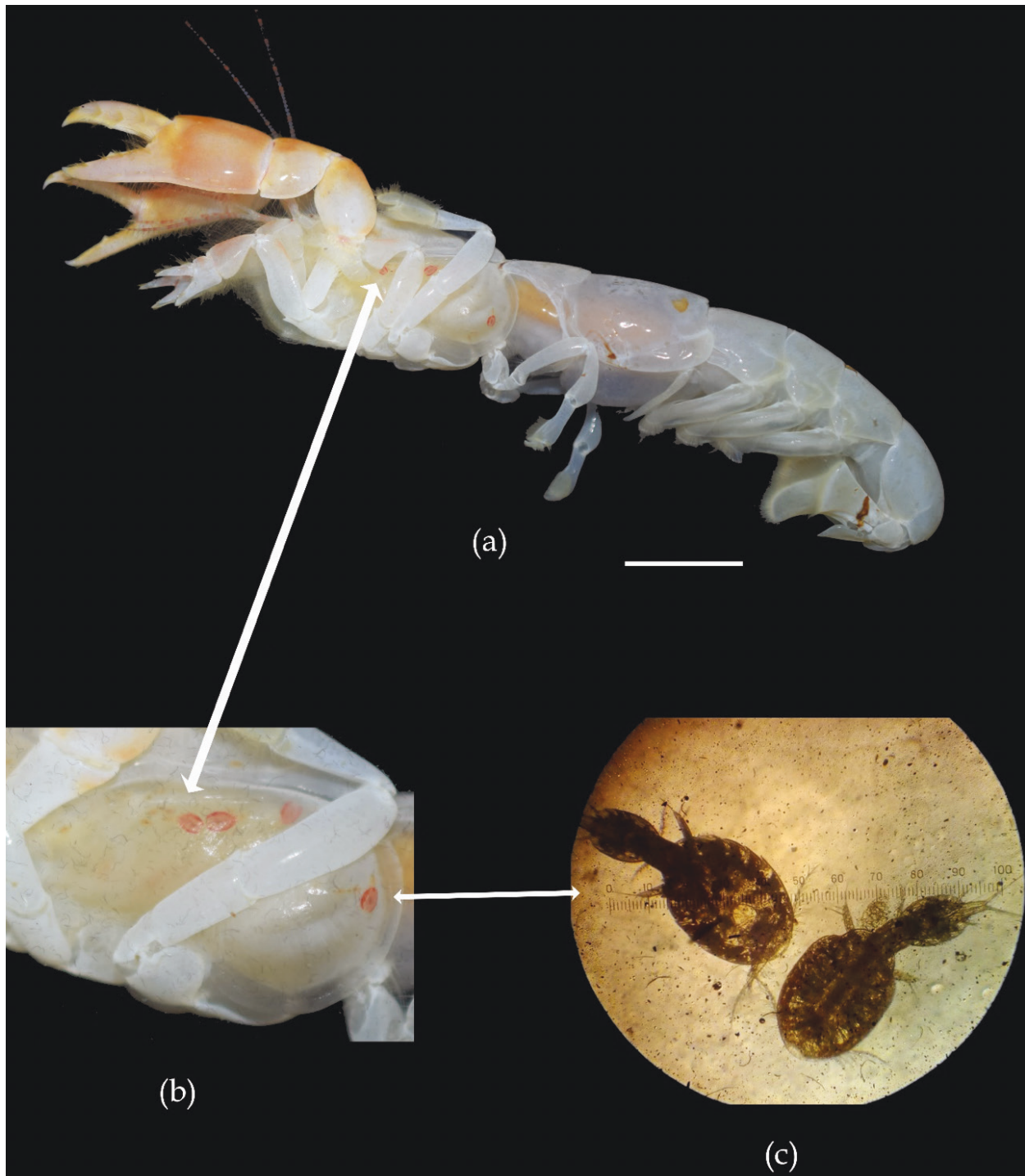


Image 3. a—lateral view of *C. coutierei* | b—copepods (*Clausidium* sp.) infested on carapace region of *C. coutierei* | c—female-male interlocking mechanism of copepods. (Bar size= 1cm). © Fisheries Research Station, Junagadh Agricultural University, Sikka.

edge of fixed finger with median small sharp tooth; dactylus slightly longer than fixed finger, cutting edge sharp, unarmed. Third pereopod as long as high. Telson trapezoid in shape as wide as long. Uropod, endopod oval shaped, longer than telson; uropodal exopod with strongly elevated dorsal plate, as long as endopod.

Colour

Entire animal whitish; carapace tinge of orange spots; chelipeds light brown with white blotches.

Habitat

Present species was found hidden in sandy shore of



Goose reef during low tide.

Distribution

Arabian Gulf (Ngoc-Ho 2005); Djibouti (Sakai 1999; Dworschak 2018); Fiji (Sakai 2005); French Polynesia (Ngoc-Ho 2005); Gilbert Islands (Sakai 1999); Hawaii (Edmondson 1944); Indonesia (Man 1905; Aguilera et al. 1986; Sakai 1999); Iran (Sepahvand et al. 2013); Madagascar (Sakai 1999; Ngoc-Ho 2005); Maldives (Borradaile 1904; Man 1928); Papua New Guinea (Dworschak 2018); Philippines (Sakai 1999; Dworschak 2018); Tahiti (Sakai 1999).

India: This species is reported from Goose reef, Gulf of Kachchh, Gujarat (present study).

Remarks

Taxonomical characters of the present specimen examined agree well with the detailed description given by Dworschak (2018). *C. coutierei* resembles *C. longiventris* (A. Milne-Edwards, 1870) but differentiated by the shape of major and minor chelipeds. Cheliped is slenderer in *C. longiventris* with triangular carpus, whereas the carpus is rectangular in *C. coutierei*. Sepahvand et al. (2017a) reported two species of copepods, *Clausidium makranensis* Sepahvand & Kihara, 2018 and *C. sarii* Sepahvand & Kihara, 2018 from *Neocallichirus natalensis* (Barnard, 1947) and *Corallianassa martensi* (Miers, 1884), respectively. This was observed in *C. coutierei* associated as *C. martensi* in this report, and it is also documented in other species *Corallianassa* (Pearse, 1947; Sepahvand et al. 2017a).

CONCLUSION

From India, with regards to family Callichiridae, six species are recorded, namely, *Audacallichirus audax* (de Man, 1911), *Balsscallichirus masoomi* (Tirmizi, 1970), *Karumballichirus karumba* (Poore & Griffin, 1979), *Michaelcallianassa indica* K. Sakai, 2002, *Neocallichirus jousseumei* (Nobili, 1904), and *Corallianassa coutierei* (Nobili, 1904) (present study) (Table 1). The present investigation reports the occurrence of *C. coutierei* in association with *Clausidium* for the first time from the Indian waters. The longer duration of their relationship inclines to assume that they might be in symbiotic association. Further detailed research is required to understand the relationship of copepods (either symbiotic or parasitic). Study is also required on ghost shrimps pertaining to diversity, life history, ecology which are still lacking in India. Molecular analysis of copepods and ghost shrimps can be performed to understand their range of extension towards the Indian waters.

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