SHORT COMMUNICATION

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 Kossmann*, 1874 parasitic on...
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 Callianassa (Wilson 1935). Hence, this study reports Callianassa 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

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)

Glypturus coutierei (Nobili, 1904)

Material examined
FRSACDA1, 04.i.2018, 1 male, t1 75mm, Goose reef (22.494N & 69.802E), Intertidal zone of sandy shore, coll. Prakash Bambhaniya.

Description
Dorsal oval shaped as long as carapace, rostrum with acute anterolateral carapace spine (Image 2b), shorter than eyestalk. Cornea large. Third maxillipeds-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...
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
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 (Borradalie 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 chelips. 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 jousseaumii* (Nobili, 2004), and *Corallianassa coutierei* (Nobili, 2004) (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.

References

Aguilera, J.I.H., I.L. Salgado & P.S. Hernandez (1996). Crustáceos estomatopódos y decápodos de Isla Clárion. Fauna Caricinológica insula de Mexico, I. Investigaciones Oceanográficas Biología 3(1): 183–250.

Alcock, A. & A.R.S. Anderson (1894). Natural history notes from H.M. Royal Indian Marine Survey Steamer Investigator, Commander C.F. Oldham, R.N., commanding, Series II, No. 14. An account of a recent collection of deep-sea Crustacea from the Bay of Bengal and the Laccadive Sea. *Journal of the Asiatic Society of Bengal* 63(2): 141–185.

Alcock, A. & A.R.S. Anderson (1899). Natural History Notes from H.M. Royal Indian Marine Survey Ship Investigator, Commander T.H. Heming, R.N., commanding, Series III. No. 2. An Account of the deep-sea Crustacea dredged during the Surveying season of 1897-98. *Annals and Magazine of Natural History* 7(3): 287–290.

Beleem, I., P. Poriya & B. Gohil (2019). First record of the callianassid ghost shrimp *Neocallichirus jousseaumii* (Nobili, 1904) (Decapoda: Axidea) from India. *Journal of Threatened Taxa* 11(3): 13402–13405. https://doi.org/10.11609/jott.3251.11.3.13402-13405

Borradalie, L.A. (1904). Marine Crustaceans. XIII. The Hippidea, Thalassinidea and Scyllaridea, pp. 750–754. In: Gardiner, J.S. (eds.). *The Fauna and Geography of the Maldive and Laccadive Archipelagios*. Cambridge University Press, London, 805pp.

Corsetti, J.L. & K.M. Strasser (2003). Host selection of the symbiotic copepod *Clausidium dissimile* in two sympatric populations of ghost shrimp. *Marine Ecology Progress Series* 256: 151–159. https://doi.org/10.3354/meps256151

Dworschak, P.C. (1992). The Thalassinidea in the Museum of Natural History, Vienna; with some remarks on the biology of the species. *Annalen des Naturhistorischen Museums in Wien* 93(B): 189–238.

Dworschak, P.C. (2015). Methods collecting Axidea and Gebiidea (Decapoda): a review. *Annalen des Naturhistorischen Museums in Wien* 117(B): 5–21.

Dworschak, P.C. (2018). Axidea of Panglao, the Philippines: families Callianassidae, Eucalliacidae and Callichiridae, with a redescription of *Callianassa calmani* Nobili, 1904. *Annalen des Naturhistorischen Museums in Wien* 120(B): 35–40.

Dworschak, P.C., D.L. Felderand & C.C. Tudge (2012). Infraorders Axidea de Saint Laurent, 1979 and Gebiidea de Saint Laurent, 1979 (formerly known collectively as Thalassinidea), pp. 109–219. In: Schram, F.R. & J.C.V.V. Klein, (eds.). *The Crustacea - Treatise on Zoology: Anatomy, Taxonomy and Biology*. Brill Publishers, Boston, 359pp.

Edmondson, C.H. (1944). *Callianassidae* of the central Pacific. *Bernice P. Bishop Museum* 18(2): 35–61.

Golubinskaya, D.D., O.M. Korn & E.S. Kornienko (2016). The seasonal dynamics and distribution of burrowing shrimp larvae of the infraorders Gebiidea and Axidea in Amursky and Ussuriysky Bays, the Sea of Japan. *Russian Journal of Marine Biology* 42(3): 232–242. https://doi.org/10.1134/S1063074016030024

Humes, A.G. (1949). A new copepod (Cyclopoida: Clausidiidae) parasitic on mud shrimps in Louisiana. *Transactions of the American Microscopical Society* 68(2): 93–103. https://doi.org/10.2307/3223256

Kihara, T.C. & C.E.F. Rocha (2013). First record of *Clausidium* (Copepoda, Clausidiidae) from Brazil: a new species associated with ghost shrimps *Neocallichirus grandimanus* (Gibbes, 1850) (Decapoda, Callianassidae). *ZooKeys* 335: 47–67. https://doi.org/10.3897/zookeys.335.5490

Kihara, T.C. & C.E.F. Rocha (2013). First record of *Clausidium* (Copepoda, Clausidiidae) from Brazil: a new species associated with ghost shrimps *Neocallichirus grandimanus* (Gibbes, 1850) (Decapoda, Callianassidae). *ZooKeys* 335: 47–67. https://doi.org/10.3897/zookeys.335.5490

Man, J.G.D. (1905). Diagnoses of new species of macrurous decapod Crustacea from the “Siboga Expedition”. *Tijdschrift Der Nederlandsche Dierkundige Vereeniging* 29(5): 587–614.

Man, J.G.D. (1928). A contribution to the knowledge of twenty-two species and three varieties of the genus *Callianassa* (Leach). *Capita Zoologica* 2(6): 1–56.

Manning, R.B. (1987). Notes on Western Atlantic Callianassidae (Crustacea: Decapoda: Thalassinidea), In: Kensley, B. (ed.).
Patel, M.I. & I.N. Mahyavanshi (1974). 
Ngoc-Ho, N. (2005). 
A new genus for Corallianassa xutha Manning, R.B. (1992). 
Pearse, A.S. (1947). 
Pearson, J. (1905). 
On two new species of Pillai, N.K. (1959). 
Rao, D.V. (2010). 
Rao, P.V. & K.N.R. Kartha (1966). 
Sakai, K. (2005). 
Sakai, K. (1999). Synoposis of the family Callianassidae, with keys to subfamilies, genera and species, and the description of new taxa (Crustacea: Decapoda: Thalassinidea). Zoologische Verhandelingen 326: 1–152.

Sakai, K. (2000). Callianassioidea of the world (Decapoda, Thalassinidea). Crustacea Monographs 4: 1–285.

Samuel, V.K.D., C.R. Sreeraj, P. Krishnan, C. Parthibhan, V. Sekar, K. Chamundeeswari, T. Immanuel, P. Shesdev, R. Purvaja & R. Ramesh (2016). An updated checklist of shrimps on the Indian coast. Journal of Threatened Taxa 8(7): 8977–8988. https://doi.org/10.11609/jott.2628.8.7.8977-8988

Sankolli, K.N. (1971). The Thalassinioidea (Crustacea, Anomura) of Maharashtra. Journal of the Bombay Natural History Society 68(1): 94–106.

Sepahvand, V., A. Sari, H. Salehi, S.M.B. Nabavi & S.G. Ghorbanzadeh (2013). Littoral mud shrimps (Decapoda: Gebiidea & Axidae) of the Persian Gulf and Gulf of Oman, Iran. Journal of the Marine Biological Association of the United Kingdom 93(4): 999–1008. https://doi.org/10.1017/S0025315412001363

Sepahvand, V., N. Rastegar-Pouyani & T.C. Kihara (2017a). Two new species of Clausidium copepods (Crustacea, Poecilostomatoida) associated with ghost shrimps from Iran. Journal of the Marine Biological Association of the United Kingdom 98(6): 1401–1409. https://doi.org/10.1017/S0025315417000303

Sepahvand, V., N. Rastegar-Pouyani, T.C. Kihara & F. Mottazi (2017b). A new species of Clausidium Kossmann, 1874 (Crustacea, Copepoda, Cyclopoidea, Clausidiidae) associated with ghost shrimps from Iran. Nauplius 25: 1–16. https://doi.org/10.1590/2358-2936en20170108

Sepahvand, T.C. Kihara & G.A. Boxshall (2019). A new species of Clausidium Kossmann, 1874 (Copepoda: Cyclopoidea) associated with ghost shrimps from the Persian Gulf, including female-male interlocking mechanisms and remarks on host specificity. Systematic Parasitology 96(2): 171–189. https://doi.org/10.1007/s11230-019-09839-x

Wilson, C.B. (1935). Parasitic copepods from the Pacific Coast. The American Midland Naturalist 16(5): 776–797. https://doi.org/10.2307/2420107

Wilson, C.B. (1937). Two new semi-parasitic copepods from the Peruvian Coast. Parasitology 29(2): 206–211. https://doi.org/10.1017/S0031182000024744

WoRMS (2020a). World Register of Marine Species. Available from http://www.marinespecies.org/aphia.php?p=taxdetails&id=477324 on 30 March 2020.

WoRMS (2020b). World Register of Marine Species. Available from Callichiridae Manning & Felder, 1991. Accessed at: http://www.marinespecies.org/aphia.php?p=taxdetails&id=1397714 on 30 March 2020.

WoRMS (2020c). World Register of Marine Species. Available from Corallianassa Manning, 1987. Accessed at: http://www.marinespecies.org/aphia.php?p=taxdetails&id=246268 on 30 March 2020.
