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Occurrence of the spider crab *Acanthonyx euryseroche*, a seaweed associate along the Central West Coast of India

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***Acanthonyx euryseroche* has been reported for the first time from the Arabian Sea and thus, the genus *Acanthonyx* from India now comprises two species. The poor abundance and restricted occurrence in the harbour regions are suggestive of the bioinvasive nature of *A. euryseroche*. As the entry of an alien species might be harmful to the native biota, the occurrence of *A. euryseroche* warrants constant monitoring of its population size and its further distribution to other regions, particularly the Arabian Sea.**

Keywords: *Acanthonyx*, Arabian Sea, association, seaweed beds, bioinvasion.

THE genus *Acanthonyx* Latreille, belonging to the subfamily Epialtinae MacLeay, under the family Epialtidae MacLeay[1], comprises 17 species that have been reported from the Atlantic and Pacific Oceans[1,2]. In the Indian Ocean, five species of *Acanthonyx* have been found to occur, viz. *A. limbatus* Milne-Edwards, *A. elongatus* Miers, *A. inglei* Tirmizi & Kazmi, *A. consobrinus* Milne-Edwards and *A. euryseroche* Griffin and Tranter[3], all commonly referred to as 'spider crabs'.

India is one of the few tropical countries in the world, bestowed with a high degree of marine biodiversity, among which the crustaceans are predominant. The earliest literature on the crabs of Indian seas were those of refs 4–10. Early comprehensive reports on the crabs of west coast of India were that from refs 11–15. *A. limbatus* was reported from the northwest coast (Okha, Gujarat) during 1961, and incidentally it was the first record from India[14]. The species presently reported was found in association with seaweed beds from the intertidal belts, along with *A. limbatus* from central west coast (Goa), India and it has been reported for the first time from the Arabian Sea. The specimens were examined and compared with other species of *Acanthonyx*. It has close morphological resemblance with other species and is described here for its easy identification.

Specimens were hand-picked, particularly from seaweed stands in rock pools from intertidal regions at three localities, in India (Figure 1) during January–March 2009. Totally nine specimens were collected at ebb from the lower intertidal rocky coast at Vagatore, Goa (15°36′0.43″N and 73°44′0.12″E), Malvan, Maharashtra (16°03′47.5″N and 73°27′22.5″E) and Karwar, Karnataka (14°47′32.9″N and 74°06′06.7″E), central west coast, India. Live specimens were transported to the laboratory, allowed to survive in aerated seawater (temperature 25°C ± 1°C and salinity ~ 35 psu), collected from the same locality where the organisms were found. They were observed for their feeding habit with marine algae such as *Sargassum* and *Ulva* species for a week.

All specimens were preserved in 4% seawater buffered formalin and, after a week, were further studied for their dimensions, and a comparative account of major morphological features was prepared for ascertaining systematic position of the specimens under study. The following standard measurements and abbreviations were used; carapace width (cw): across widest part of carapace (including tips of spines); postrostral carapace length (pcl): base of rostrum to posterior carapace margin; rostral length (rl): tip to base of rostrum. Specimen has been retained in the collections of Biological Oceanography

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Division, National Institute of Oceanography (NIO), CSIR, Goa for reference.

The following are the taxonomic details of the spider crab.

Order: Decapoda Latreille, 1803
Infraorder: Brachyura Linnaeus, 1758
Super family: Majoidea Samouelle, 1819
Family: Epialtidae MacLeay, 1838
Genus: *Acanthonyx* Latreille, 1824
Acanthonyx euryseroche Griffin & Tranter, 1986 (Figures 2 and 3).

Morphological variations among the collected specimens (Table 1) revealed the presence of two species of *Acanthonyx* spp., i.e. *A. limbatus* and *A. euryseroche*. Of the nine specimens, two belonged to *A. limbatus* (both male) and the rest (five males and two females) belonged to *A. euryseroche*. Carapace measurements are carapace length × maximum breadth respectively. For *A. limbatus* male (20 × 12.5 mm), (18 × 13 mm) and *A. euryseroche* males (16 × 11.5 mm), (16 × 10 mm), (15 × 11 mm), (15.5 × 11 mm), (15.5 × 10.5 mm); female (13.5 × 11 mm), (11 × 9.5 mm).

Carapace was broad, longitudinally ovate, dorsal surface smooth with tubercles (Figure 2 *a* and *b*), ratio of cw to pcl was 0.884. Rostral spines were slightly deflexed downwards, basally broad, tapering to a narrow apex, tips with tuft of setae (Figure 2 *a* and *b*), ratio of rl to pcl was 0.24 (Table 2). Orbital eave was moderately expanded, preorbital spine blunt, directed forward, lateral margin of eave concave. Eyestalk was short, slender, cornea concealed under eye, eave completely covering eye when apposed against carapace.

Hepatic margin was produced to triangular, flat, broad, with blunt tip, posterior margin weakly convex, longer than anterior margin, and sub-parallel to midline of carapace (Figure 2). Branchial region had three lateral lobes, anterior very small; two posterior lobes sub equal, short, blunt, less than half size of hepatic lobe (Figure 2). Branchial region was dorsally smooth, except for very small tubercles (Figure 3). Lateral margin of carapace had smooth ridge. Gastric region was weakly elevated, protogastric region had small tubercle surmounted by tuft of setae, mesogastric tubercle small. Cardiac region had small medial tubercle (Figure 3). Pterigostomial region had smooth, margin with tubercle in distal half. Intestinal region had low central tubercle. Third maxilliped was smooth, distomedial angle of ischium slightly overlapping

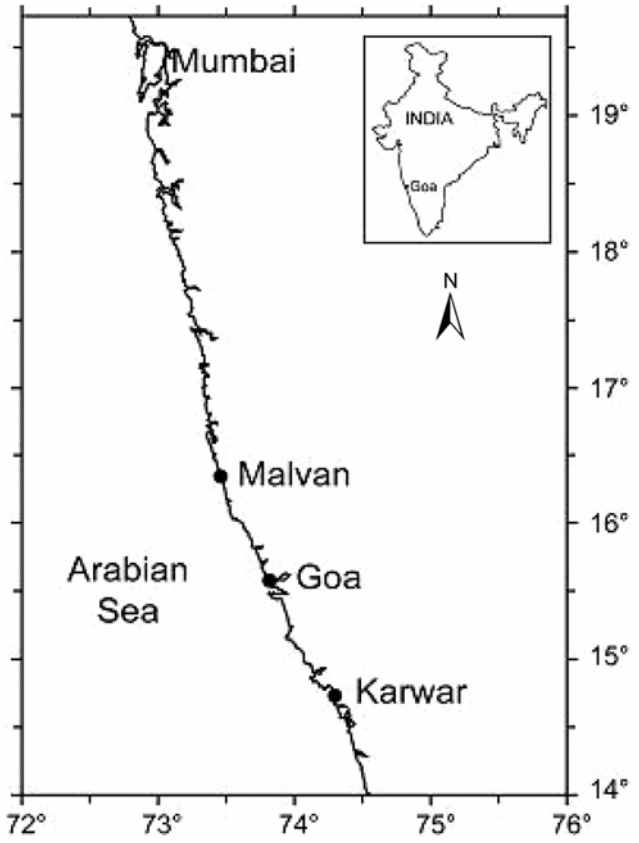

Figure 1. Occurrence of *Acanthonyx euryseroche* in Arabian Sea.

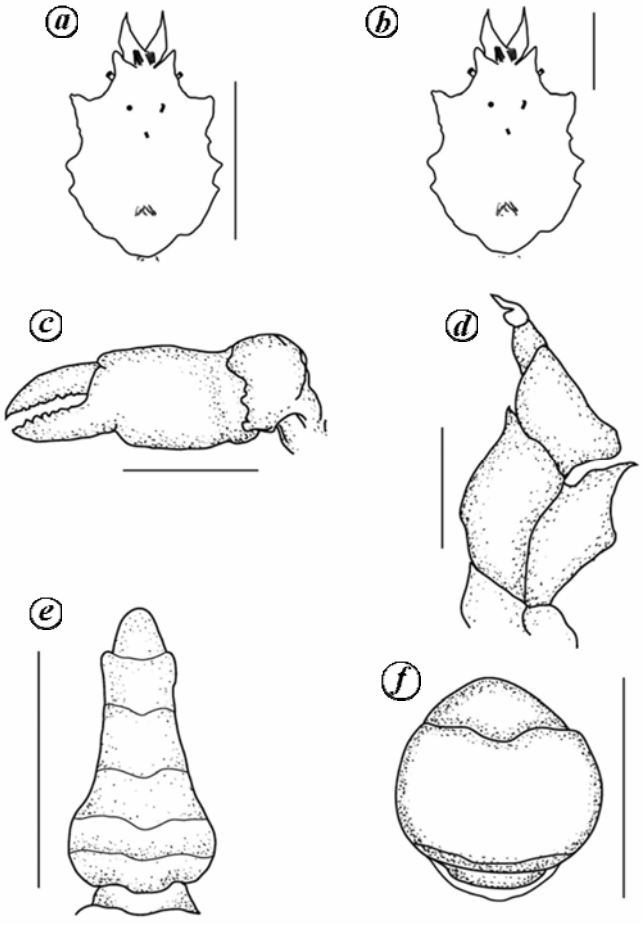

Figure 2. Major morphological characters of *A. euryseroche*.

Table 1. Comparative account of some species of *Acanthonyx*

Characters	*A. petiverii*	*A. formosa*	*A. limbatus*	*A. euryseroche*
Occurrence	Pacific and Atlantic Ocean	Pacific Ocean	Indian Ocean	Indian Ocean
Adult male rostrum	Narrow U-shaped, tips rounded	Rostral spine relatively long, ca. 0.23 times pcl	Rostral spine 1/5th of carapace length, relatively long narrow V-shaped acute tip	Rostral spines relatively short, ca. 0.16 times pcl
Adult male chela	Dactylus with submolar processes.	Cutting edges with one median tooth dactylus and blunt teeth on distal 1/3rd of both fingers	With just one big tooth	A line of small, even teeth in the inner side of the dactylus
Male abdomen	Triangular, enlarged, lateral margins almost straight, somites 6 relatively enlarged, somites 5–6 fused immovable, sutures not visible.	Triangular somites 6 squarish, 3–5 fused, immovable but sutures visible, with lateral parts deeper and more distinct somites 5–3 trapezoidal and shorter, somite 1 dumb-bell shaped.	Triangular, with 6 segments, 4–6 being fused	Subquadrate, anterior lateral triangular, 7 immovable segments, sutures visible between all segments, 6th segment less than 1/2 width of 3rd segment, 6th and 7th, both as wide as long.

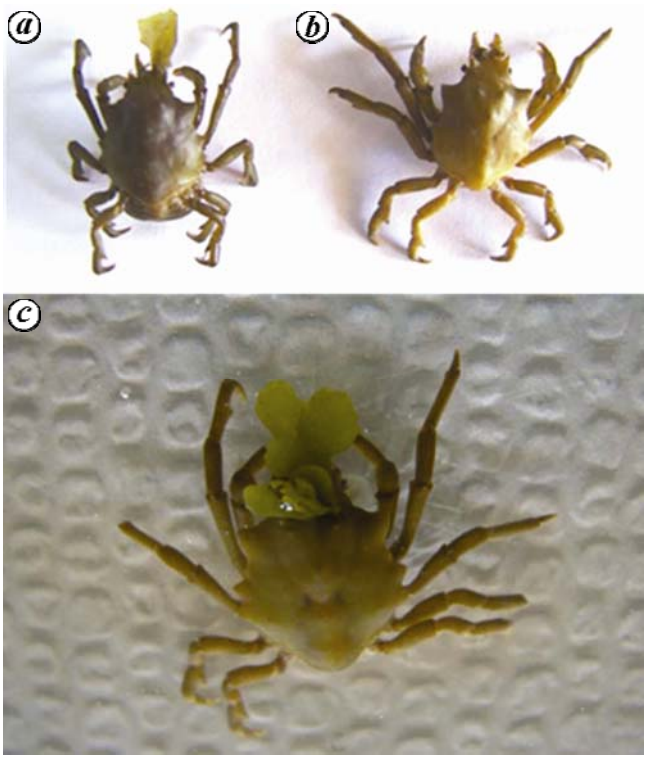

Figure 3. A*canthonyx euryseroche.*

Table 2. Major morphological features of *A. euryseroche*

Body parts	Male	Female
Carapace length (cl)	16 mm	11.5 mm
Postrostral carapace length (pcl)	13 mm	10.5 mm
Carapace width (cw)	11.5 mm	9.5 mm
Rostral length (rl)	3 mm	1 mm
cw/pcl	0.884	0.904
rl/pcl	0.236	0.095

proximomedial border of merus, merus broad, subquadrate, distolateral angle produced and rounded, distal margin slightly concave (Figure 2 *d*). Chelipeds was about three-fourth of pcl, merus of adult male smooth, carpus with blunt ridge, palm smooth dorsally, fingers short, hardly gapping proximally, uniform small teeth along cutting edge of both fingers (Figure 2 *c*).

Ambulatory legs were smooth; merus of first leg with a line of seta midway dorsally, and a group of setae on a low terminal tubercle; propod with a compressed, obtusely triangular lobe about midway along ventral margin, setae along distal margin of lobe; a similar lobe on propodi of second to fourth pairs of legs; dactyli of ambulatory legs with a double row of small teeth ventrally along their length. First ambulatory was leg slightly greater than pcl, fourth leg less than two-thirds length of first.

Anterior thoracic sternum was smooth, pair of small, circular, submedial pits just behind anterior margin and shallow central depression in front of abdominal fossa. Abdomen had seven segments, junctions visible between all segments; sixth segment was half the width of the third segment (Figure 2 *e*). First pleopod of male was straight, broad, slightly narrowed before broad apex, anterior margin recurved, ventrally medial angle rounded, lateral angle sub acute; aperture sub terminally on sternal surface.

Adult females resembled the male specimen except for a few characters (Figure 3). Rostrum was slightly shorter, chelipeds slender, chelae not inflated, fingers not gaping when closed. Abdomen was round with four visible

sutures, rest of the segment seemed to fuse (Figure 2 *f*). Female gonopore was narrow with slit opening anteriorly.

Acanthonyx species were mainly found in association with seaweed stands (Figure 3) in sheltered rock pools from lower and mid-intertidal rocky regions. Distribution was observed to be occasional from sampling sites. Only nine organisms could be collected over three samplings during the period of January to March, when seaweed growth, abundance and diversity remained relatively rich.

Most of the specimens observed during the present study had very similar visual appearance. However, major morphological details (Table 1) were helpful in differentiating *A. euryseroche* from the rest of the species, and particularly from *A. formosa* and *A. limbatus*, from Pacific and Indian Ocean respectively[3,16] which have very close morphological resemblance, particularly the third maxillipede, abdomen and chelae. This communication confirms the taxonomic identification of *A. euryseroche*, reporting this species from the Arabian Sea for the first time and, thus, contributing to the Indian marine biodiversity.

The present finding of *A. euryseroche* raises two thoughts. First, it was always among the Indian crab population, although less common, and remained unnoticed as spider crabs are highly capable of concealing themselves within seaweeds. Second, it could be a bioinvasive species during recent years; it might have been introduced in larval forms through ballast water due to international shipping activities. Ballast water has been considered to be a main vector for invasion by alien species[17]. Sampling locations of *A. euryseroche* were situated in the close vicinity of one of the major harbours in India, which is mainly involved in transportation of iron and bauxite ores.

Spider crabs decorate their bodies with materials such as algae, sponges and hydroids from their habitats[18,19], which serve as camouflage to avoid predators[20,21], for food storage[22,23] as well as for chemical defence against predators[24,25]. The majority of the spider crabs are not particular about any biota, and decorates with commonly available forms in their habitat. *A. petiverii*[4] preferentially camouflages itself with algae of the same colour as its background. It may acquire matching pigments in its exoskeleton from the algae that it feeds on[20]. *A. euryseroche* was observed to be decorated with species of *Sargassum* (Figure 3 *a* and *b*) and *Ulva* (Figure 3 *c*). Decorating is an activity for which the crab is morphologically well adapted. All specimens studied during our investigations were observed to have rows of hooked setae on the surface of the carapace[26,27].

The existing report on the distribution of *A. euryseroche* was from Warroora, Western Australia as type locality[16] and now Central West coast, Arabian Sea, India. The abundance of *A. euryseroche* and *A. limbatus* from Arabian Sea region presently appears to be poor. The occurrence of *A. euryseroche* at the vicinity regions of the harbour suggests its introduction due to intense shipping activities[28]. Bioinvasion is considered to be harmful for the native biota. Since, the existing population of *A. euryseroche* seems to be less abundant, it may not be an immediate threat to native flora and fauna. However, the epidemic outburst of such population might be dangerous to native biodiversity. It is therefore, necessary to monitor distribution and population growth in the Indian Ocean region.

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