

Distribution extension of mangrove box jellyfish, *Tripedalia cystophora* along the eastern Arabian Sea

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A regular microplankton sampling in the estuarine stretches of Udyavara in Karnataka, has revealed the presence of *Tripedalia cystophora* Conant, 1897 a cubozoan jellyfish with cube shaped medusa and known for their potent venom. This estuarine stretch of Udyavara is known for the clam fishery and its proximity to the Malpe Fisheries Harbour. The study confirms the occurrence of *Tripedalia cystophora* Conant, 1897 in the estuaries of Karnataka and the northward extension in the distribution of this species along the estuaries of eastern Arabian Sea. Among the 40 species of box jellyfish described around the globe *Tripedalia cystophora* Conant, 1897 is one of the widely distributed small box jellyfish and to the best of our knowledge, no box jellyfishes have been recorded from the estuaries of Karnataka until this report.

Micro-zooplankton sampling was done at 3 sampling sites in Udyavara River on 25th January 2020 with surface water filtered through a 20-micron net at each sampling site. The samples preserved with Lugol's solution were observed under Magnus MS 24 stereo microscope and the micro-zooplankton were classified to major taxonomic groups. The identification of the specimen was based on the morphological character of medusa and nematocyst and measurements like Bell height (BH), Diagonal bell width (DBW) and Inter-rhopalial width (IRW) was measured using vernier callipers. A small part of the tentacle was squashed on a glass slide under a coverslip and examined through a microscope at 400x magnification. The nematocysts were identified using the microphotographs of the nematocysts which were taken using the camera attached to Nikon Eclipse Ci Trino microscope. The environmental parameters assessed from all the sampling sites included Surface Water Temperature (SWT), salinity, pH, measured in-situ

using multiparameter probe. Dissolved Oxygen (DO) and Biological Oxygen Demand (BOD) was measured following Winkler's titration method and Chlorophyll and measured spectrophotometrically.

The single specimen of *Tripedalia cystophora* Conant, 1897 was small with a BH of 6.07mm, DBW of 7.67mm and IRW of 5.37mm (Fig. 1). The major characters of the medusa used for the identification of *Tripedalia cystophora* Conant, 1897 were the presence of four groups of tentacular pedalia, one at each corner of the bell; three pedalia per group; and each pedalium with one tentacle. Nematocysts from the tentacles were identified based on the shapes of undischarged capsules. Among the three types of nematocysts, viz., heteronemes, round and oval haplonemes observed in tentacles, the quantity of heteronemes was found to dominate over the other two (Fig. 2). Three velarial canals per quadrant was also



Fig. 1. *Tripedalia cystophora* Conant, 1897

Table 1. Environmental parameters of sampling sites of Udyavara River on the day of sampling

Sampling Site	SWT (°C)	pH	Salinity (ppt)	DO (mg/l)	BOD mg/l	Chl a (mg pigment/m ³)
Site 1	28	7.02±0.038	17.3±0.20	3.40±0.01	2.00±0.03	0.13±0.01
Site 2	28	7.559±0.01	26.5±0.10	2.99±0.05	2.02±0.02	0.152±0.02
Site 3*	28	7.92±0.01	31.60±0.01	2.84±0.03	1.89±0.03	0.20±0.01

*Site of occurrence of mangrove box jellyfish

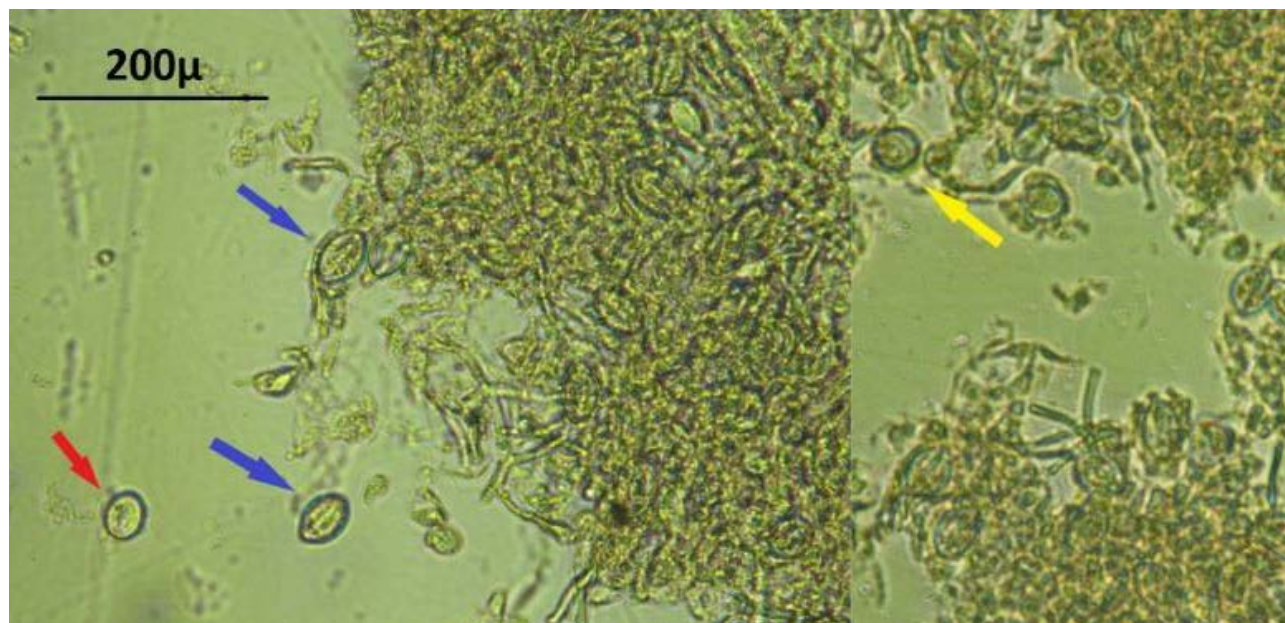


Fig. 2. Different types of nematocysts i.e., heteronemes (blue arrow), round haplonemes (yellow arrow) and oval haplonemes (red arrow), found in the tentacles of *Tripedalia cystophora* Conant, 1897

observed. Each quadrant of the bell had rhopalial niches. The bell had random cover of nematocyst warts and bands of nematocysts were observed in the tentacles. The manubrium when contracted was cruciform in cross-section. Spermatophores or ovaries were not seen in the current specimens and hence the gender could not be identified. The environmental parameters of the 3 sampling sites indicated except for salinity, no other environmental parameter varied widely between sites.

The micro-zooplankton communities found along with mangrove box jellyfish were ciliates, dinoflagellates and copepod nauplii. The zooplankton assemblages showed a dominance of copepod nauplii (12667 ind. L⁻¹) followed by ciliates (7333 ind. L⁻¹) and dinoflagellates (5667 ind. L⁻¹). Of the 3 described box jellyfish from the Family Tripedaliidae, only 2 species, *T. cystophora* and *T. binate*

are reported from India. The species is known to prey upon dense swarms of copepods and the presence of good quantity of copepods in the estuary, might have attracted *T. cystophora* to the site, as these cubozoans rely on the visual clues. Most likely, distributional records of *T. cystophora* based on recorded sightings along the eastern Arabian Sea may be low, as the characteristics of organism such as small size, transparent bell and preference for mangrove habitat make them difficult to spot. Although, many box jellyfishes are known for their poison and cause painful 'Irukandji syndrome', the *Tripedalia cystophora* Conant (1897), is not known to produce any venom harmful for humans. Hence the presence of this species will not have any negative impact on people involved in the clam fishing or for the fishers at Malpe Fisheries Harbour.