

First report of *Zoanthus pulchellus* from India

Richa Mehra, Digvijay Singh Yadav, Pushpendu Kundu, Wahid ul Rehman,
Felix Bast*

Molecular Genetics Laboratory, Centre for Biosciences, Central University of Punjab,
Bathinda-151 001

*Corresponding Author: Telephone: +91 9872152694; Fax: +91 164 2430586

Email: felix.bast@cup.ac.in, felix.bast@gmail.com

Abstract

The marine ecosystem carries immense undescribed organisms having huge potential uses for mankind. The zoanthids, classified under phylum Cnidaria, are mostly found in shallow waters, below the low tide mark. Based on morphological features, we identified a zoanthid during an expedition to Kanyakumari. Thorough examination of the color variations, polyp length, tentacle number, colony appearance and comparison with previously reported species of the genus, suggests that the species is *Zoanthus pulchellus*. This is the first report of this species from India.

Keywords: Zoanthids, Cnidaria, Polyp, Tentacles, *Zoanthus pulchellus*

Introduction

The zoanthids are marine coelenterates which mostly inhabit coral reefs in tropical and subtropical coasts. These are beautiful, fast growing, ornamental organisms demanding low maintenance and have gained popularity in aquarium trade. But behind that pleasing appearance lie some specialised stinging cells, nematocysts, which inject a toxin in defence, prey or in stress (Moshirfar *et al.*, 2010). Some zoanthids are also associated with a deadly toxin, palytoxin, found in wide variety of marine organisms, viz. sponges, shellfish, crustaceans, polychaetes and fish. The toxin is however, believed to be produced

by bacteria living in symbiotic association with these organisms and is secreted in varying amounts, under specific conditions (Seemann *et al.*, 2009). Besides these toxins, zoanthids are reported to contain bioactive compound, norzoanthamine, which has promising anti-osteoporotic and anti-leukemic properties (Miyashita *et al.*, 2004).

The peculiar characteristic of the family Zoanthidae, is the embodiment of sand and allied particles to make their own tissue which helps to strengthen their structure, except the genus *Zoanthus*. This genus is the most specious of the family and contains around 150 described species;

however true count at species level is still doubtful (Fautin, 2013). Many variations have been observed within the genus which adds to the chaos of identification (Reimer *et al.*, 2004). There is need to have further insights into the hidden potential and whereabouts of these neglected organisms.

During a recent expedition to Kanyakumari, we discovered greenish-brown polyps, grown in thick mat-like colonies in the coral reefs environment. On

investigating the morphological characteristics the species was tentatively identified as *Z. pulchellus*. There are scarce studies on *Z. pulchellus* worldwide although it has been reported from 43 sites around Caribbean sea (Figure 1); while in India previously reported *Zoanthus* species comprise *Z. sociatus* and *Z. sansibaricus* only (Kaladharan *et al.*, 2011; Krishna *et al.*, 2011). Here, we report the first instance of the existence of *Z. pulchellus* in India.

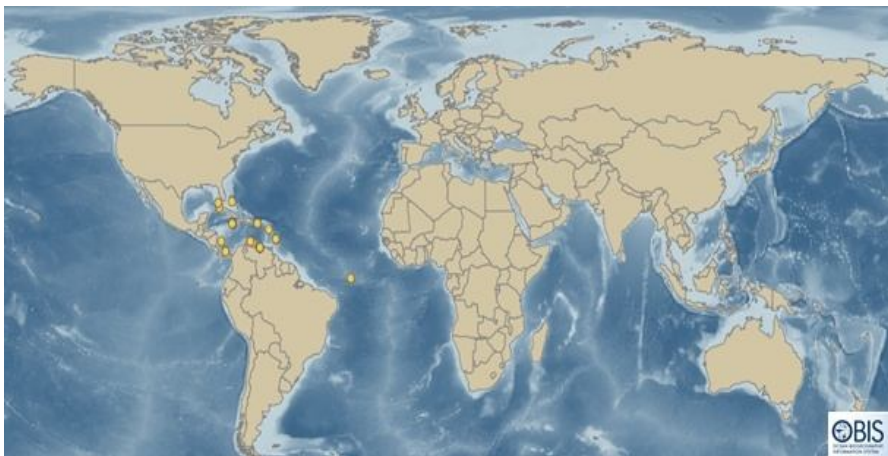


Figure 1: Previous reports of *Z. pulchellus*: Ocean Biogeographic Information System OBIS documented 43 reports from the Caribbean sea (OBIS)

Materials and Methods

The organisms were discovered at The Hidden Twin Beach, Cape Comorin Point, Kanyakumari during January 2015 (Figure 2). The organisms were photographed *in situ* using a digital camera to assist in study of morphological and characteristic features. Thorough morphological investigation regarding polyp size, color variations, tentacles, colony appearance was performed. The photographs were also sent to a leading scientist for observation of the specimen. GPS locations were recorded

using built-in GPS device of the camera (Table 1).

Table 1: GPS Location of the Site of collection

	Decimal	Degrees
Longitude	8.077370	8° 4' 38.532"
Latitude	77.532371	77° 31' 56.535"

Results and Discussion

The zoanthids grew in aggregates giving a mat like appearance with colony size varying from 20-30cm. The colonies were smooth to touch, not encrusted in sand and

appeared polygonal in shape. The polyps were yellowish green in color with pink, brown patterning and attached to rocky substrate. Their height varied from 30-50mm and diameter 1-1.5cm. Approximately 60-70 light brown tentacles were arranged in two rows around the outer edge of the yellowish-green oral disks which had diameter of about 0.5-0.8 cm (Figure 3, 4). Based upon above observations and analysing the morphological features of the previously reported zoanthids the species was identified as *Z. pulchellus*. Further molecular studies are required to confirm the true identity.

The polyp height of *Z. pulchellus* reported in a previous study varied from 4-30 mm and diameter from 4-6mm which is quite shorter than the one observed in this study. The polyps are also known to attain a circular shape when fully expanded. (Reimer *et al.*, 2012). The zoanthids are reported to have inter and intra-specific morphological variations. Recent studies on the genus have demonstrated that the zoanthids are very plastic in context to their morphology and are difficult to identify on the basis of same (Pandya Khushali *et al.*, 2014).



Figure 2: Site of Sample collection: The Hidden twin Beach, Kanyakumari, India



Figure 3: Colonies of *Zoanthus pulchellus* at the rocky shore in the Hidden Twin Beach, Cape Comorin Point, Kanyakumari



Figure 4: Magnified view of *Zoanthus pulchellus* showing oral disc and arrangement of tentacles

Conclusion

The macro-morphological investigations suggest that the examined species is *Z. pulchellus*. However, molecular studies are required to confirm its identification. It is also believed that despite their scarcely reported occurrences worldwide, the said species is distributed widely. The immense pharmacological potential of this genus has attracted scientific fraternity lately, so more refined research is expected in order to overcome the identification chaos.

Acknowledgements

We are grateful to the Vice Chancellor, Central University of Punjab, for the support that he extended to materialize this study. This work is supported with Department of Science and Technology, India, INSPIRE Faculty Award (IFALSPA-02) awarded to FB. RM acknowledges Indian Council of Medical Research (ICMR) for the financial assistance in terms of junior research fellowship.

References

- Commission, I. O. The Ocean Biogeographic Information System. Retrieved January 27, 2015, from UNESCO <http://www.iobis.org>
- Fautin, D. (2013). Hexacorallians of the World. <http://geoportal.kgs.ku.edu/hexacoral/anemone2/index.cfm>.
- Kaladharan, P., Asokan, P. and Koya, K. (2011). Revival of bleached *Zoanthus sociatus* (Ellis & Solander, 1786) in the intertidal waters of Thikkodi, Malabar coast, Kerala. *Journal of the Marine Biological Association of India* 53(1): 157-159.
- Krishna, M., Gophane, A., Ravindran, C., Ingole, B., Anjeneyulu, Y., Deepti, D. and Meena, R. (2011). Identification of a marine zoanthid *Zoanthus sansibaricus* (Carlgren) from the intertidal rocky shore of Anjuna (Goa) using morphological and molecular analyses.
- Miyashita, M., Sasaki, M., Hattori, I., Sakai, M. and Tanino, K. (2004). Total synthesis of norzoanthamine. *Science* 305(5683): 495-499.
- Moshirfar, M., Khalifa, Y. M., Espandar, L. and Mifflin, M. D. (2010). Aquarium coral keratoconjunctivitis. *Archives of ophthalmology* 128(10): 1360-1362.
- Pandya Khushali, M., Jyoti, S. K., Parikh Kinjal, V. and Mankodi Pradeep, C. (2014). Occurrence of Zoanthid genus *Isaurus* from Saurashtra coast, Gujarat, India. *European Journal of Zoological Research* 3(2): 1-5.
- Reimer, J. D., Foord, C. and Irei, Y. (2012). Species diversity of shallow water zoanths (Cnidaria: Anthozoa: Hexacorallia) in Florida. *Journal of Marine Biology* 2012.
- Reimer, J. D., Ono, S., Fujiwara, Y., Takishita, K. and Tsukahara, J. (2004). Reconsidering *Zoanthus* spp. diversity: molecular evidence of conspecificity within four previously presumed species. *Zoological science* 21(5): 517-525.
- Seemann, P., Gernert, C., Schmitt, S., Mebs, D. and Hentschel, U. (2009). Detection of hemolytic bacteria from *Palythoa caribaeorum* (Cnidaria, Zoantharia) using a novel palytoxin-screening assay. *Antonie van Leeuwenhoek* 96(4): 405-411.