

First Record of Colonial Ascidian, *Polyclinum nudum* (Kott, 1992) from Palk Bay, Southeast Coast of India

¹M.M. Karthikeyan and ²G. Ananthan

¹Department of Zoology, Pachaiyappas College for Men, Kanchipuram-631 501, Tamilnadu, India

²Centre of Advanced Study in Marine Biology, Annamalai University,
Parangipettai-608 502, Tamilnadu, India

Abstract: The colonial ascidian, *Polyclinum nudum* (Kott, 1992) is recorded for the first time in the Indian waters. The species was found associated with the seaweed culture rope of Gopalapatnam coastal area, Palk Bay region Southeast coast of India in February 2008.

Key words: *Polyclinum nudum* • Gopalapatnam coast • Palk bay • Southeast coast of india

INTRODUCTION

The ascidians are marine invertebrate animals enclosed in tunic, belonging to subphylum Urochordata (Tunicata) of phylum Chordata. They may be fixed or free-living and swimming. In some free-living forms, the notochord is present in the adult, whereas in other swimming groups and sedentary tunicates the notochord is found only in the larval stages [1]. Ascidians are found mostly on hard surfaces such as rocks, jetty pilings and coral rubbles. They also grow on sea grasses and other vegetation in the sea grass lagoon. Adult ascidians (commonly called "sea squirts") are sessile inhabitants of the intertidal zone. Some species are known to be rapid colonizers on artificial substrates such as marina floats, pilings, buoys and boat bottoms in protected harbours, where there is reduced wave action and enhanced nutrients from anthropogenic activities [2-5].

The family contains aplousobranch genera with gonads in the posterior abdominal of thread-like zooids, which are arranged in common cloacal systems, the atrial apertures opening into an internal common cloacal cavity. The relatively long, narrow, vertical gut loop consists of a long oesophagus and duodenum and distinct sections of mid-intestine between the duodenum and posterior stomach and posterior stomach and rectum, respectively. The distal section of the mid-intestine is invariably in the pole of the gut loop and usually a rectal valve is at its

junction with the long rectum that constitutes the ascending limb of the loop.

Earlier workers have been reported a new species of synascidian from Madras [6]. On *Polyclinum indicum*, a new synascidian from the Madras coast of India [7]. Dedifferentiation on the colony of *Policlinum indicum* [8]. The study of the larvae of *Policlinum indicum* [9], the Indian ascidians [10], some ascidians from Indian waters [11]. On an occurrence of a colonial ascidian, *Symplegma brakenhielmi* Michaelsen from tuticorin coast of India [12].

Hence the present study is aimed to identify and understand the presence and distribution of ascidian *Policlinum nudum* species new record from Gopalapatnam Coast water, Palk Bay, Southeast Coast of Indian. The current survey is the first of its kind at Palk Bay in Gopalapatnam coast to assess the distribution of non indigenous ascidian in seaweed culture rope. This baseline data at regional level is of great importance since it will provide tools for estimating the invasion rates and possible effects on the natural fauna at the invaded site in the years to come.

MATERIALS AND METHODS

Study Area: The Palk Bay is very shallow flat basin and their depth hardly exceeds 12m. In Palk Bay the coral reef extends along the shore from Mandapam eastward along the shores of Rameshwaram Island, interrupted

only at Pampan pass. Corals are found on reef rocks and no consolidated reef flat is seen. The tidal elevation is around 1.5m. The Palk Bay practically calms except during northeast monsoon when turbulent condition prevails [13]. The bottom sediments consist of silt and clay, clays silt and sand, fine to medium sand, coarse sand and coarse sand with gravel. Gopalapattinam is situated 45 km north of Thondi and it is a fishing hamlet (Lat. 09°57' N: Long. 79°11' E) in Ramanathapuram district, Tamil Nadu, India. Here herbivorous fishes and sea grasses are abundant. The average depth varies from 2 to 9.2 meters. The soil type has silty clay.

Collection and Identification: Ascidians were collected by SCUBA diving at intertidal areas during low tide from a depth 0.5 to 12m. Collections included the substrate when possible seaweed culture rope with razor-blades. In the some of the substratum was removed with the specimen to avoid damage to the adhering surface. Before removing the animal its colour, appearance of the living colony and its habitat were noted. Samples were placed in plastic bags or buckets with sufficient seawater to cover the collected specimens and anesthetized with menthol crystals for two hours. A label indicating date of collection, location, depth and colour of the specimen was pasted on the respective containers. Sea water and formalin was found to be the best medium for preserving the colour in ascidians. A mixture of 40% formaldehyde and sea water in the ratio 1:10 (effective concentration of 4%) was used for preservation. Methodology for ascidian collection and identification were followed the procedures of [14-16].

The Taxonomical Position of *P. nudum* Kott, 1992 (Fig. 1) as Follows:

Phylum : Chordata
 Subphylum : Tunicata or Urochordata Lamarck, 1816
 Class : Ascidiacea Garstang, 1895
 Order : Enterogona Perrier, 1898
 Suborder : Aplousobranchia Lahille 1886
 Family : Polyclinidae Milne-Edwards, 1841
 Genus : *Polyclinum* Savigny, 1816
 Species : *Nudum* Kott, 1992.

Material Examined: Specimens of ascidians were collected and examined from Palk Bay, Southeast coast of India, during February 2008.

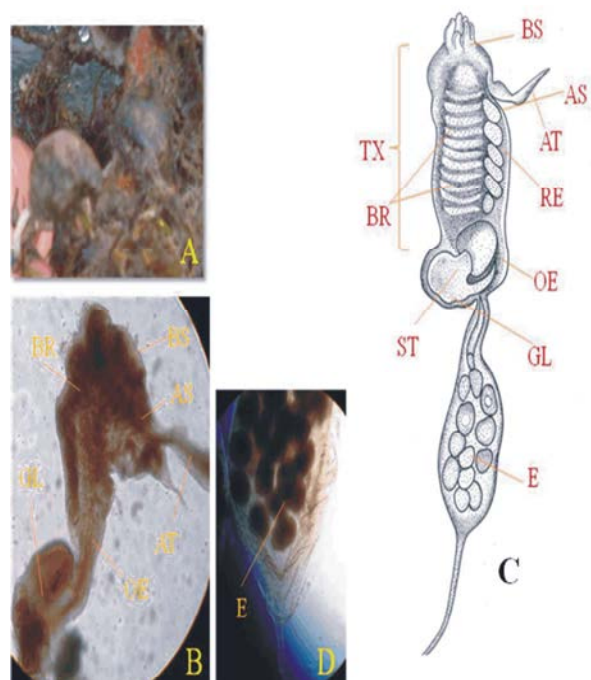


Fig. 1: *Polyclinum nudum* (Kott, 1992) A. Colony, B. Microscopic view of zooid, C. Camera lucida view of zooid, D. Eggs bag of *P. nudum*, BS- Branchial siphon, AS- Atrial siphon, BR- Branchial silt, RE- Rectum, TX- Thorax, OE- Oesophagus, E- Eggs, ST- Stomach, GL- Gut lobe, INT- Intestine, AP- Ampulla, AT- Atrial longuet; Scales bar: fig. A, 6.5 cm; figs. B, C, & D. 200 μ m

Family Characters of Polyclinidae Milne Edwards, 1842:

The family originally was established for genera with the gonads in a posterior abdomen. In the family Polyclinidae, the branchial aperture has a regularly lobed rim, but the atrial aperture is not lobed. The latter opens into the common cloaca guided by an anterior lip that either is a projection from the body wall anterior to the opening, or is produced from the anterior border of the opening. Minute branchial papillae that may be relicts of internal longitudinal vessels are present. Gonads are in the posterior abdomen. These consist of a small ovary and numerous male follicles. The larvae are small and have an otolith and ocellus, 3 small median adhesive organs, ectodermal ampullae and vesicles. The six genera of the family Polyclinidae are *Polyclinum*, *Aplidiopsis*, *Synoicum*, *Sidneioides*, *Aplidium* and *Morchellium*.

The Important Generic Characters of the Polyclinum:

The genus *Polyclinum* can be divided into two groups, those with zooids; arranged in circular common cloacal

systems and those with zooids arranged in double rows radiating from the common cloacal opening other characteristics that aid in distinguishing the species are the overall shape of the colony, the distribution of sand within or on the test of the colony and characteristics associated with the branchial sac and the larvae.

Species Description of *Polyclinum nudum* (Kott, 1992):

No longitudinal folds in stomach, branchial lobes six, ovary in post abdomen, abdomen and post abdomen separated by constriction, gut loop twisted. No sands on the either surface of the test or embedded within the colony. Colony is cushioning shaped dark black in preservative. Atrial languet originating from the upper rim of the atrial aperture. Long club shaped posterior abdomen is present. Cloacal apertures are protruded from the surface on conical elevations.

Colour: The colony greenish brown or brown in living condition.

Habitat: Colony attached with seaweed cage, seaweeds and seaweed culture rope. Distributed from 2 to 9m depth, where it is found on hard substrata in protected embayment's and harbours.

Distribution in India: Palk Bay and Gulf of Mannar. Elsewhere: Previously recorded (see Kott 2005): Southern Australia from Albany to Western Port (Victoria) and Port Davey (Tasmania). New record: Tasmania (Bellerive Bluff-Derwent Estuary, QM G308829). New South Wales (Lower E coast).

Remarks: This species is reported for the first time in India. The present species agrees with the *P. nudum* Kott, 1992 in all respects. The characteristics of the species colony are cushioning shaped dark black in preservative. Cloacal apertures are protruded from the surface on conical elevations, no sands on the either surface of the test or embedded within the colony. Long club shaped posterior abdomen is present. Cloacal apertures are protruded from the surface on conical elevations.

ACKNOWLEDGEMENTS

The authors are thankful to Prof. Dr. T. Balasubramanian, Director CAS in Marine Biology, Annamalai University, Parangipettai, for the encouragement and facilities provided and to the UGC, New Delhi for financial assistance.

REFERENCES

1. Karthikeyan, M.M., 2010. Studies on Ascidians from Palk Bay region Southeast coast of India. Ph.D., Thesis, Annamalai University, India, pp: 1-33.
2. Naranjo, S.A., J.L. Caraballo and J.C. Garc ya-Gomez, 1996. Effects of environmental stress on ascidian populations in Algeciras Bay (Southern Spain). Possible marine bioindicators. Mar. Ecol. Prog. Ser., 144: 119-131.
3. Oren, U. and Y. Benayahu, 1998. Didemnid ascidians: Rapid colonizers of artificial reefs in Eilat (Red Sea). Bull. Mar. Sci., 63: 199-206.
4. Lambert, C.C. and G. Lambert, 1998. Non-indigenous ascidians in Southern California harbours and marinas. Mar. Biol., 130: 675-688.
5. Lambert, C.C. and G. Lambert, 2003. Persistence and differential distribution of non indigenous ascidians in harbours of the Southern California Bight. Mar. Ecol. Prog. Ser., 259: 145-161.
6. Sebastian, V.O., 1952. A new species of synascidian from Madras. Curr. Sci., 21: 316-317.
7. Sebastian, V.O., 1954a. On *Polyclinum indicum*, a new synascidian from the Madras coast of India. Washington Acad. Sci., 44(1): 18-24.
8. Sebastian, V.O., 1954b. Dedifferentiation on the colony of *Policlinum indicum* Sebastian. J. Madras Univ, 24: 363-371.
9. Sebastian, V.O., 1957. Study of the effect of centrifuging on the larvae of *Policlinum indicum*. (in) studies on an ascidian of Madras coast University of Madras, pp: 5-24.
10. Sebastian, V.O. and C.V. Kurian, 1981. Indian ascidians. Oxford and IBH Publishing Co. New Delhi, pp: 1-144.
11. Renganathan, T.K., 1981. On the occurrence of a colonial ascidian, *Didemnum psammathodes* (Sluiter, 1895) from India. Curr. Sci., 50(20): 922.
12. Renganathan, T.K., 1985. On a occurrence of a colonial ascidian, *Symplegma brakenhielmi* Michaelsen 1904 from Tuticorin Coast of India. Geobios New Reports, 4: 74-75.
13. Gopinadha Pillai, C.P., 1969. Distribution corals or reef at Mandapam (Palk Bay). J. Mar. Biol. Ass. India, 11(1): 62-72.
14. Kott, P., 1985. The Australian Ascidiacea. Part 1, Phlebobranchiata and Stolidobranchiata. Memoirs of the Queensland Museum, 23: 1-440.

15. Kott, P., 1990. The Australian Ascidiacea. Part II; Aplousobranchia (1). Mem. Queensl. Mus., 29(1): 1-226.
16. Kott, P., 1992. The Australian Ascidiacea. Part III; Aplousobranchia (2). Mem. Queensl. Mus., 32(2): 375-620.
17. Kott, P., 2005. New and little known species of Didemnidae (Ascidiacea:Tunicata) from Australia (Part 3). J. Nat. Hist., 39(26): 2409-2479.