

Two new records of Nudibranch *Kalinga Ornata* (Alder and Hancock, 1864) and *Hexabranchnus Sanguineus* (Ruppell & Leuckart, 1828) from the vizhinjam coast of Kerala, India.

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Introduction

This paper records the first report of the Sea slug *Kalinga ornata* (Alder and Hancock, 1864) and *Hexabranchnus Sanguineus* (Ruppell & Leuckart, 1828) for the first time from the Vizhinjam coast of Kerala, India.

Nudibranchs (Order Nudibranchia) are gastropod molluscs that form the major part of the sea slug belonging to the Opisthobranchia [1]. There are about 3000 described species of opisthobranchs from all over the world and 40 % from these have been found exclusively from Indo - Pacific region [2]. Nudibranchs can be found in all the world's oceans, and in most marine habitats, and they vary in size from 4 mm to 60 cm [3]. Due to loss of adult shell, they have evolved various anti-predator strategies, like chemical defense, use of nematocysts obtained from cnidarian prey, warning or aposematic coloration, camouflage and mimicry [4-9]. Because of the presence of biochemically active compounds, dietary or biosynthetic, nudibranchs have gained increasing interest in natural products research [10,11].

Earlier studies on the opisthobranchs of Kerala coast have been reported [10-16]. This paper documents the two new records of opisthobranchs from vizhinjam coast of Kerala, India [17-21].

Materials and Methods

This two nudibranchs were caught among the by catch in motorized fishing crafts operated along the vizhinjam coast of Kerala, India. The collected specimens were brought in to vizhinjam research centre of CMFRI and were photo documented live. The collected specimens were preserved in 70 % ethyl alcohol and deposited in CMFRI museum collections. Cross examination of the specimen was done by Garry Cobb, Australia.

Taxonomic Notes

Infra-class: Opisthobranchia

Order: Nudibranchia

Superfamily: Anadoridoidea

Family: Polyceridae

Genus: *Kalinga*

Kalinga Ornata (Figure 1)

Description

This species is large with a broad oral veil with elongate velar tentacles. Body translucent white with numerous rounded tubercles and bright red pigmented areas. Oral veil with knobby tentacles. Dorsal surface with reticulate pattern of dark grey lines. Outer branches of gills with red pigment. Large papillae on dorsal surface of body and foot bright red. Many unpigmented papillae on body and dorsal surface of foot. The foot is broad, flat and muscular. Rhinophore sheaths with red and yellow marginal knobs. Rhinophores yellowish with basal red band. The *Rhinophores* are lamellate with stout and a short pedicle. Anal spout red. Genital aperture shortly behind oral veil, close to dorsal margin. The total length and weight of the specimen were 124.32 mm and 44.32 g respectively. It is the only species belongs to the genus *Kalinga* and only type species of sub-family *Kalinginae*. This species is nocturnal, reaching sizes of at least 130 mm, and found from shallow to deeper water (at least 182 m), prefers sandy or silty substrate.

Remarks

Kalinga Ornata has been known for a long time. It was originally described by Alder and Hancock from the coromandel coast, India [22]. This species is widespread in the Indo - West Pacific [2,23]. Previously in India this species was reported from Gulf of Mannar [24-26]. Lakshadweep Islands, Chennai and West Bengal [27-31]. It has been shown to feed on brittle stars, a completely unique diet for a nudibranch [32]. This is the first report of *Kalinga ornata* from the Kerala coast of India.

Taxonomic Notes

Infra-class : Opisthobranchia

Order : Nudibranchia

Superfamily : Polyceroidea

Family : Hexabranchnidae

Genus : *Hexabranchnus*

Hexabranchnus Sanguineus (Figure 2)

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Figure 1: *Kalinga ornata* (Alder and Hancock, 1864).

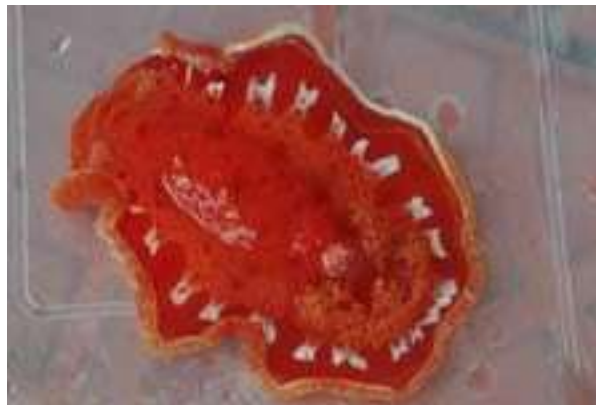


Figure 2: *Hexabranthus Sanguineus* (RUPPELL & LEUCKART, 1828).

Description

Hexabranthus Sanguineus commonly called as ‘Spanish Dancer’, is one of the largest Nudibranch growing up to 55 cm [33,34]. It has a deep red colour with white markings just inside the mantle edges. The *Rhinophores* are deep red and the gills are paler with white axes. These gill has the same colour as the dorsum, with the rachises of the branchial leaves. The dorsum is smooth. Branchial leaves are non-retractile. The anal papillae is prominent, situated in the centre of the branchial circle of leaves. The *Rhinophores* are elongate, ventrally there are two large, flattened and lobate oral tentacles. The anterior border of the foot is simple, lacking a notch and groove. The total length of the specimens were 129.43 mm.

Remarks

The Spanish dancer is widespread throughout the tropical Indo-Pacific, from East Africa and the Red Sea to Hawaii [35]. According to Winck worth, the original description of *Hexabranthus Sanguineus* and some other species of nudibranchs was most likely published in 1830 [36,37]. Previously in India this species was reported from Andaman and Nicobar Islands and Lakshadweep Archipelago. This is the first report of *Hexabranthus Sanguineus* from the Kerala coast of India [38-41].

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References

1. Rocroi JP. Classification and Nomenclature of Gastropod families. *Malacologia*. 2005;47(1-2):1-397.
2. Gosliner TM, Behrens DW, Valdes A. Indo - pacific nudibranchs and sea slugs : A field guide to the worlds most diverse fauna. *Sea challengers natural history books and California Academy of Sciences*. 2008;425.
3. Thompson TE, Brown GH. *Biology of opisthobranch molluscs*. 1976.
4. Gosliner TM. Aposematic colouration and mimicry in opisthobranch molluscs : new phylogenetic and experimental data. *Bollettino Malacologica*. 2001;37:163-70 .
5. Wagele H, Klussmann-Kolb A. Opisthobranchia (Mollusca, Gastropoda) - more than just slimy slugs. Shell reduction and its implications on defence and foraging. *Front Zool*. 2005;2:1-18.
6. Greenwood PG. Acquisition and use of nematocysts by cnidarian predators. *Toxicon*. 2009;54:1065-70.
7. Aguado F, Marin A. Warning coloration associated with nematocyst-based defenses in aeolidiidean nudibranchs. *J Molluscan Stud*. 2007;73(1):23-28

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8. Haber M, Cerfeda S, Carbone M, et al. Coloration and defense in the nudibranch gastropod *Hypselodoris Fontandraui*. MBL. 2010;218(2):181-8.
9. Putz A, König GM, Wagele H. Defensive strategies of *Cladobranchia* (Gastropoda Opisthobranchia). Nat Prod Rep. 2010;27:1386-402.
10. Avila C. Natural products of opisthobranch molluscs: A biological review. Oceanogr Mar Biol. 1995;33:487-559.
11. Dean LJ, Prinsep MR. The chemistry and chemical ecology of nudibranchs. Nat Prod Rep. 2017;34:1359-90.
12. Narayanan KR. On three opisthobranchs from the south - west coast of India. J Mar Bio Ass India. 1968;10:377-80 .
13. Valdes A, Mollo E, Ortea JA. Two new species of *Chromodoris* (Mollusca: Nudibranchia Chromodorididae) from southern India with a redescription of *Chromodoris trimarginata* (Winckworth 1946). Proc Calif Acad Sci. 1999;51:461-72.
14. Ravinesh R, Biju Kumar A. Comparison of intertidal biodiversity associated with natural rocky shore and seawall: A case study from Kerala coast. Indian J Mar Sci. 2013;42:223-35.
15. Ravinesh R, Jabir T, Biju Kumar A, et al. First record of sea slug *Polybranchia Orientalis* (Sacogloss: Caliphyllidae) from the south-west coast of India. Mar Biodiver Rec. 2014;7:1-2 .
16. Biju Kumar A. Marine animals of Kerala coast (Malayalm). Kerala State Biodiversity Board, Thiruvananthapuram, India. 2012;304.
17. Chinnadurai S, Bhav V, Apte D, et al. First record of long-tailed pelagic sea slug *Stylocheilus longicauda* (Gastropoda : Opisthobranchia) from southwest coast of India. J Mar Biol Ass India. 2014;56:81-4.
18. Sheeja MS, Padmakumar K. New Record of *Plakobranchnus ocellatus* Van Hasselt, 1824 from Kerala coast, India. Indian J L Sci. 2014;4:1-5 .
19. Sheeja MS, Padmakumar K. First report of the Pleurobranchomorpha, *Berthellina citrina* (Rüppell & Leuckart, 1828) (Mollusca: Gastropoda) from Southwest coast of India. J Bio and Env Sci. 2014;5:229-33.
20. Venkataraman K, Raghunathan C, Raghuraman R, et al. Fascinating sea slugs and flatworms of Indian seas. ZSI. 2015;149.
21. Apte D, Desai D. Field Guide to sea slugs of India. BNHS. 2017;459.
22. Alder J, Hancock A. Notice of a collection of Nudibranchiate, Mollusca made in India by Walter Elliot, Esq., with descriptions of several new genera and species . Trans Zool Soc Lond. 1865:113-47
23. Rudman WB, Darwell BW. Opisthobranch molluscs of Hong Kong: part 1. Goniodorididae, Onchiodorididae, Triophidae, Gymnodorididae, Chromodorididae (Nudibranchia). Asian Marine Biology 1990;7:31-79.
24. Farran GP. Report on the opisthobranchiate Mollusca collected by Professor Herdman, at Ceylon, in 1902. In: Report to the government of Ceylon on the pearl oyster fisheries of the Gulf of Manaar. Supplementary Report. 1905;3(21):329-64.
25. Eliot CNE. On the Nudibranchs of southern India and Ceylon, with special reference to the drawings by Kelaart and the collections belonging to Alder and Hancock preserved in the Hancock Museum at Newcastle-on-Tyne. Proc Zool Soc. 1906;636-91 .
26. Sundaram KS, Sarvesan R, Mohamed KH, et al. Catalogue of molluscs, prawns, stomatopods and marine algae in the reference collections of the central marine fisheries research institute. Bulletin of CMFRI. 1969;9:1-52 .
27. Rao KV. The morphology of *Kalinga ornata* (Ald and Han). Rec Indian Museum. 1936;38(1):41-79.
28. Rao KV, Sivadas P, Kumary LK. On three rare doridiform nudibranch mollusks from Kavaratti Lagoon, Laccadive Islands. J Mar Biol Assoc. 1974;16(1):113-25.
29. Gravely FH. Shells and other animal remains found on the Madras beach. II. Snails, etc. (Mollusca Gastropoda). Bulletin of the Madras Government Museum, New Series, Natural History Section 1942;5(2):1-110.
30. Satyanarayan S, Phalguni P. Record of the sea slug, *Kalinga Ornata* Alder & Hancock, 1864 from the inshore waters of Bay of Bengal along Chennai coast. Indian J Fish. 2012;59(1):151-4.
31. Subha Rao NV, Dey A, Barua S. Estuarine and marine mollusks. Fauna of West Bengal Part 9 (State fauna series 3). ZSI. 1992;129-268.
32. Rie N, Jiro U, Toshihiko F, et al. *Kalinga ornata* Alder and Hancock 1864 (Nudibranchia : Polyceridae) : a unique case of a Seaslug feeding on Echinoderms. J Molluscan Stud. 2011;77(4):413 - 16 .
33. Double T. Here be Giants. BBC Wildlife. 1992;10(5):34-40.
34. Debelius H. Nudibranchs and sea snails. Indo-Pacific Field Guide. 1996;321.
35. Thompson TE. Observations on *Hexabranchnus* from the Australian Great Barrier Reef Gastropoda Opisthobranchia Veliger. 1972;15:1-5 .
36. Winck worth R. A note on Rang, Leuckart and Ehrenberg. J Molluscan Stud. 1942;24(5-6):290.
37. Apte D, Salahuddin VK. Record of *Hexabranchnus Sanguineus* (RUPPELL & LEUCKART, 1828) from Lakshadweep archipelago, India. J Bombay Nat Hist Soc. 2010;107(3).
38. Sreeraj CR, Raghunathan C, Yogesh Kumar JS, et al. Guide to the Opisthobranchs of Andaman and Nicobar Islands : 1-198. Zoological Survey of India. ISBN. 2010;978(81):8171-2615.

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39. Apte D, Desai D. Field Guide to sea slugs of India. Bombay Natural History Society. 2017;459.
40. Rüppell E, Leuckart FS. New Invertebrates of the Red Sea. In Atlas on the voyage in North Africa. 1830;1-12.
41. Sneha Chandran BK, Shrinivaasu V, Ravinesh R, et al. Opisthobranch (Mollusca: Gastropoda) fauna of Kerala, India: A citizen science initiative. J Mar Biol Ass India, 2017;59(1).

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