

**ON THREE RARE DORIDIFORM NUDIBRANCH MOLLUSCS
FROM KAVARATTI LAGOON, LACCADIVE ISLANDS**

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ABSTRACT.

The paper deals with *Asteronotus caespitosus* (van Hasselt) under the family Dorididae and *Phyllidia (Phyllidia) varicosa* Lamarck and *Phyllidia (Phyllidiella) zeylanica* Kelaart under the family Phyllidiidae. All the three are new records for the Laccadive group of Islands. The first two have not been recorded even from the coasts of the main land of India. The descriptions of external morphology and colouration of all the three forms are based on fresh living material examined in the field. Their geographical distribution and some aspects of the internal anatomy are also dealt with. In the Indo-Pacific region, there seems to be only one species under the genus *Asteronotus* Ehrenberg, namely *A. caespitosus*. *A. mabilla* Bergh, *A. bertrana* Bergh, *A. exanthemata* (Kelaart), *A. crescentica* (Collingwood), *A. hemprichi* (Ehrenberg), and *A. fuscus* O'Donoghue are also shown to be synonymous with *A. caespitosus*. *P. (P) zeylanica* is an extremely rare and little known species which has been recorded only for the third time in the past 113 years after its first description by Kelaart in 1859.

INTRODUCTION

THE Laccadive group of Islands forms a distinct geographical entity with characteristic faunal assemblages of their own, the study of which because of their intrinsic interest has received much attention of the Indian National Science Academy under a Scientific project 'Investigations of the Arabian Sea Islands'. A large number of molluscan species inhabiting Kavaratti and nearby Islands have been collected under the project. The present account deals with three rather rare and interesting species of nudibranchiate molluscs viz., *Asteronotus caespitosus* (van Hasselt), *Phyllidia (Phyllidia) varicosa* Lamarck and *Phyllidia (Phyllidiella) zeylanica* Kelaart. All the three are new records for the Laccadive group of Islands. The first of these has not been on record even from the mainland of India. Phyllidiidae to which the other two belong is a little known family by the scarcity of the nominal species occurring along the Indian coast. Stanley Gardiner's Fauna and Geography of the Maldive and Laccadive Archipelagoes which gives an account of the distribution of the nudibranchiate mollusca by Eliot (1906b) records *Phyllidia varicosa* from the Maldives and not from the Laccadives. It however, does not deal with either of the other two species presented in this report.

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Family *DORIDIDAE**Asteronotus caespitosus* (van Hasselt)

Locality : Kavaratti Lagoon in the Laccadive archipelago.

Date : 19th October, 1972.

Distribution : The general distribution of the species is along the coasts of the Indian and the Pacific Oceans. It has been recorded earlier from the Red Sea, Ceylon, East Africa including Zanzibar, Madagascar, Chagos Archipelago, Seychelles, Mauritius, China Sea, Japan, Vietnam, Philippines, Indonesia, Samoa Islands, Hawaiian Islands and Australia. The present record extends its distribution to the Laccadive Island group in the Arabian Sea.

Synonyms : Some of the synonyms under which the species has been reported earlier are : *Doris caespitosus* van Hasselt (1824); *Asteronotus hemprichii* (*hemprichi*) Ehrenberg (1831), Bergh (1877), Eliot (1903 & 1908), Eales (1938); *Doris crescentica* Collingwood (1881); *Doris mauritiana* Quoy & Gaimard (1832); *Doris exanthemata* Kelaart (1859); *Doris foetida* Pease (1860); *Doris mabilla* Abraham (1877); *Asteronotus mabilla* and *Asteronotus bertrana* (1878, 1880); *Asteronotus caespitosus* Bergh (1905), Baba (1936), Gohar and Soliman (1967), Marcus and Marcus (1970), Kay and Young (1969); *Asteronotus caespitosus* Edmunds (1971).

Description : Three specimens measuring 35 mm to 60 mm in length were obtained from the reef of the Kavaratti Island. The animals are doridiform, broadly ovate and have a thin mantle edge extending widely all round the body beyond the foot. The dorsum is highly tuberculate. Mid-dorsally there is a ridge with a row of moderately large tubercles. Close-set small tubercles are arranged in 4 concentric rows parallel to the edge of the mantle. At right angles to the median ridge, there are on either side rather irregularly arranged lateral ridges. Between the median ridge and the marginal rows of tubercles, the dorsum has some distinctly large tubercles. About 10 mm from the anterior margin is a pair of rhinophore sheaths with thick prominently lobed margins. The rhinophores which are retractile into the sheaths are conical and perfoliated, borne on short fleshy peduncles. Mid-dorsally in the posterior half of the dorsum there are six branchiae which are quadripinately branched. The anus is situated on an elevated papilla in the centre of the circlet of branchiae (Fig. 1 a-c).

The foot (Fig. 1d) is flat and elongated and has a thin narrow margin extending all round. In the largest specimen it was 46 mm long and 17 mm wide. It is broadly round in front but in one of the specimens in which the buccal mass was partly protruded, it was notched in the middle. The mouth opening is anterior and median between the mantle and the foot, and is bounded by labial thickenings which are confluent in the middorsal region immediately below the mantle. The oral tentacles are moderately long, rather thin and flat, one on either side of the mouth. The genital aperture is antero-lateral on the right side at a distance of 10 mm from the mouth opening. The margin of the orifice is slightly wavy. In one of the specimens a small conic papilla with a stylet was seen protruding through the orifice. The sides of the body were obliquely raised from a little behind the edge of the foot to the mantle leaving in the latter a fairly broad rim when it was viewed from the ventral surface.

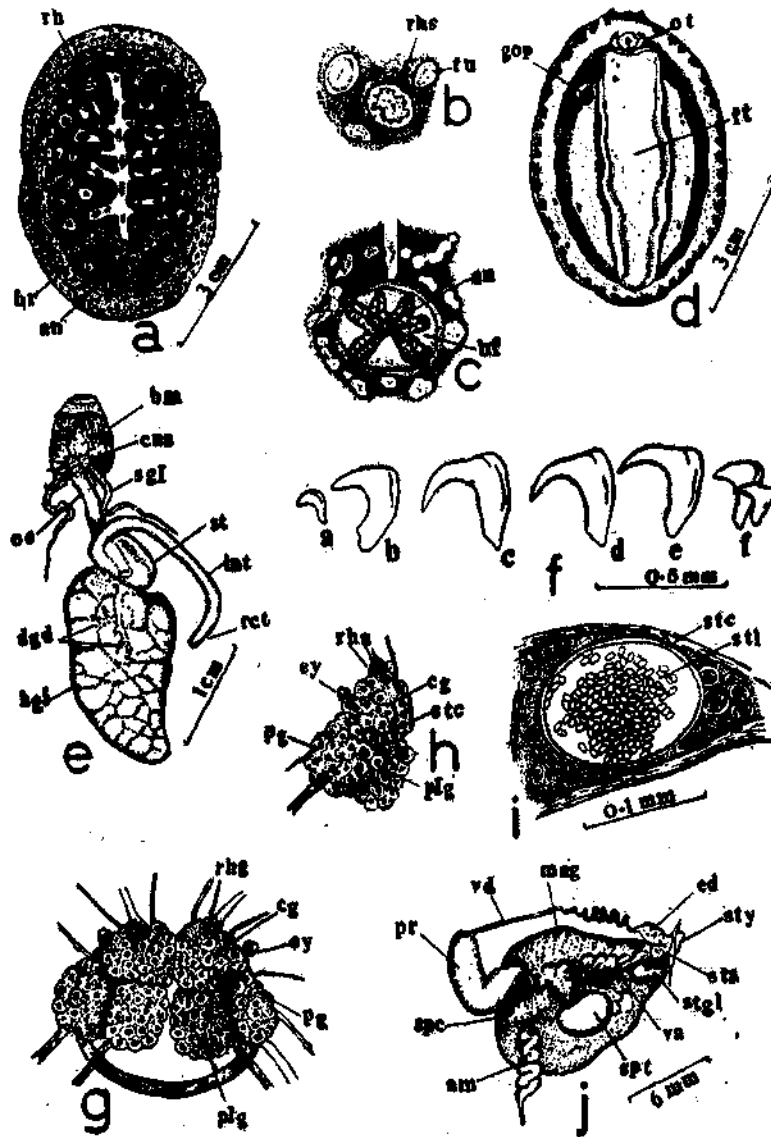


Fig. 1. *Asteronotus caespitosus* (van Hasselt)— a. Dorsal view of the entire animal; b. Enlarged view of rhinophore sheath with marginal thickenings and surrounding tubercles; c. Branchial aperture with branchiae contracted showing prominently the branchial folds; d. Ventral view of the entire animal; e. Digestive organs; f. Teeth in one half of a row in the radula, a & b last two teeth, c & d two middle teeth, e & f first two teeth; g. Dorsal view of the central nervous system with ganglia; h. Ventral view of one half of the central nervous system showing statocyst; i. Statocyst enlarged showing statoliths; and j. Reproductive organs in the anterior genital mass.

The space of the dorsum between the median ridge and the marginal rows of tubercles is splashed with grayish brown. The rhinophore sheaths, the median dorsal ridge, its lateral branches and also the spaces between the marginal rows of tubercles are whitish. The back is also uniformly tinged with a shade of purple. The larger of the lateral tubercles on either side of the median ridge are relatively darker with their basal regions distinctly whitish. The pinnules of the branchiae are whitish while the rachii are brown. The anal papilla is whitish. The general colouration of the mantle ventrally and of the sides of the body is pale white. The mantle, viewed ventrally, to a width of about 4 mm all round has a diffused pale grayish wavy margin. Starting from the mouth opening and extending mid-laterally up to the posterior end on each side in the ventral aspect of the animal is a wide conspicuous purplish brown band. Also in the ventral aspect at the junction of the foot with the mantle, there is another narrower circular band of purplish brown. In addition, a few small brownish spots are often met with on the lateral surface of the body. The ventral surface of the foot is grayish in the larger specimens, but more or less pale white in the smaller younger individuals.

The mouth leads into a spacious buccal mass (Fig. 1e: b.m.) which is provided with dorsally and ventrally situated retractor muscle bands. They have their insertions on the buccal mass and origins in the body wall. The labial disc is smooth and without rodlets. The radula is well developed, broad and ribbon like with hamate teeth. The innermost and the outermost ones in each row are much smaller and poorly developed (Fig. 1f). The radular formula is 49 X 80.0.80. Arising from the mid-dorsal aspect of the buccal mass and passing through the nerve ring is the narrow and moderately long oesophagus. There is a pair of long salivary glands (sgl), rather stout proximally and tapering distally. Posteriorly the oesophagus (oe) leads into an enlarged stomach (st) situated anterior to the compact digestive gland which is enveloped by the hermaphrodite gland (hgl). The stomach is fairly thick walled and more or less orbicular when gorged with food or elongately saccular when partially full. Both the conditions were met with in the specimens examined. On the posteroventral aspect of the stomach, opens a stout much branched duct of the digestive gland (dgd). The digestive gland is dark greenish coloured. At the junction of this duct with the stomach is a minute hepatic pouch embedded in the digestive gland as in *Kalinga ornata* (Rao, 1936). The intestine (int) arises from the left side of the anterolateral aspect of the stomach. It immediately turns to the right and is continued hindwards beneath the dorsal wall, leading to the short rectum (rct) which turns upwards and opens at the centre of the branchial chamber by the anus.

Associated with the circulatory system is the blood gland formed of two lobes of brownish colouration. The central nervous system (Fig. 1g, h & i) consists of paired cerebral (cg.), pleural (plg) and pedal ganglia (pg) placed in a concentrated tiny mass enclosed in a thick transparent connective tissue capsule situated over the roof of the buccal mass at the root of the oesophagus (Fig. 1e: cns). The individual ganglia are distinctly demarcated externally. With the cerebral ganglia are connected a pair of sessile rhinophoral ganglia (rhg). The paired eyes (ey) each with a crystalline lens and a retinal cup are anterolateral over the cerebral ganglia. Paired buccal ganglia are also present, as in other dorids, connected to the cerebral ganglia by cerebrobuccal connectives. At the junction of the cerebral, pleural and the pedal ganglia of each side, there is an oval statocyst (Fig. 1h & i: stc) innervated from the cerebral ganglion. The statocyst contains numerous statoliths (stl).

In the largest of the specimens of the present collection measuring 60 mm in mantle length, the reproductive organs are only partially developed (Fig. 1j). The

various structures could be yet made out with some difficulty. The hermaphrodite gland (Fig. 1e: hgl) completely envelops the digestive gland. The hermaphrodite duct is narrow and slender as it emerges from the hermaphrodite gland, but becomes enlarged and convoluted (Fig 1j: am). As it enters the anterior genital mass, it becomes narrow again and distally bifurcates into the male and female portions. The male branch leads into a stout, bilobed prostate gland (pr) which is continued by a long and narrow vas deferens (vd). Proximally the vas deferens is straight but distally it is coiled and continued by an enlarged short ejaculatory duct (ed). The female portion of the hermaphrodite duct enters the fertilization chamber in the muco-albuminous gland (mag) of the anterior genitalia. The albuminous gland portion which is more or less opaque and much coiled lies pressed against the larger mucous gland portion opening to the exterior by the oviducal passage.

The vaginal passage (va) which is at first stout joins the ejaculatory duct and they together open to the exterior by a common passage. The continuation of the vagina is a long narrow passage, slightly convoluted before it enters a large globular spermatheca (spt). A narrow duct leads out from it to a small lobulate spermatocyst (spc). The outgoing duct from the latter enters the fertilization chamber in the muco-albuminous gland complex. The oviducal passage opens directly to the exterior close to the common opening of the vagina and the ejaculatory duct. At the junction of the vagina with the ejaculatory duct is a small dilation, the style sac (sts), which lodges a straight small rodlet or stylet (sty). In one of the specimens examined the stylet was seen partly protruding out. Close to the style sac there is a small stylet gland (stgl) which by a narrow duct opens into the style sac.

The present writers have not observed the breeding behaviour of this species. Gohar and Soliman (1967) had described its mating, oviposition and early development. The freshly laid egg ribbon has been stated to be reddish orange, measuring 1034 mm long and 27 mm in width, deposited in concentric coils, containing nearly 5 million eggs in the largest of the ribbons, each egg having a diameter of 65 to 75 μ . The larvae were 120 μ long, 100 μ high and 75 μ broad with a smooth shell, having a light violet hue for most part but deeply coloured at the initial region of the spire.

Discussion : In the list of synonyms, the order of priority of nomenclature has been indicated, Ehrenberg (1831) erected a valid genus *Asteronotus* but his type species *A. hemprichii* is identical with and preceded by *Doris caespitosus* of van Hasselt (1824). *A. mabilla* (Abraham), *A. Bertrana* Bergh and *A. crescentica* (Collingwood) have all been considered by Bergh (1905) as synonymous with *A. caespitosus*. A large number of the Indo-Pacific species under the genus were considered by Eliot (1908) to be referable to *A. hemprichi* a view which overlooks the priority of the specific name *caespitosus* of van Hasselt (1824). O'Donoghue's (1924) *A. fuscus* from Abrolhos Islands and his (1932) yet another species *A. madrasensis* from the Gulf of Mannar along the Indian coast were based on the examination of preserved specimens, which could not show the external morphological characters and colouration clearly. Gohar and Soliman (1967) find that *A. fuscus* is synonymous with *A. caespitosus* and that *A. madrasensis* a closely related species if not identical with *A. caespitosus*.

A. caespitosus has been included by Kay and Young (1969) under the super-family Doridacea, family Dorididae and sub-family Kentrodoridinae. The sub-family has members of the dorid group possessing a leathery smooth or spiculate mantle surface, labial cuticle with or without rodlets, buccal mass without jaws, radula with hamate teeth and ejaculatory duct without armature but with a lateral stylet in the

male genitalia. It has been pointed out by the same authors that the inclusion of *Asteronotus* under Kentrodoridinae is justified because of the presence of the lateral stylet, although Bergh, according to them, treated the same under the sub-family Platydoridinae. In this context, it is worth noting the remarks of Edmunds (1971). He is of the opinion that the division of the Dorididae into subfamilies as Archidoridae, Discodoridinae, etc. is rather unsatisfactory because of the over-lapping characters and that if this family were to be subdivided at all, there should be only two sub-groups viz., one for the typical dorids like *Discodoris*, *Platydoris*, etc. and the other for *Chromodoris*, *Hypselodoris*, etc.

A. caespitosus being a very widely distributed species throughout the Indo-Pacific region, certain geographical variations could reasonably be expected, but information on the subject is lacking. From the available literature, it is seen that the species attains a length upto 185 mm (Gohar and Soliman, 1967) but most descriptions are based on specimens measuring much less than one half of that size on record. Some variations in the external markings and colour pattern at different growth stages can also be expected. Gohar and Soliman (1967) have observed that the general colour of the back changes with light intensity, appearing darker by day and lighter by night.

In general, *A. caespitosus* may be stated to be an easily distinguishable dorid characterised by the presence of a mantle of leathery consistency with ridges and tubercles on the notum, 6 quadripinnately branched branchiae retractile into a more or less star-shaped branchial space bounded by a smooth angular ridge, labial disc without rodlets and radula with hamate teeth. In the preserved specimens often the branchiae are retracted and contracted to such an extent that it is not possible to make out the main rachii from the pinnules to arrive at their exact number. As pointed out by Gohar and Soliman (1967) this might be the reason for O'Donoghue's (1924) finding that the specimen from Abrolhos Islands had only 5 branchiae although the branchial pocket had six lobes.

It has been found by the earlier workers that while the general pattern of arrangement of teeth in the radula remains the same, there are variations in regard to the number of transverse rows and the number of teeth in each row in the specimens examined. In a 32 mm long specimen described by Eales (1938) from the Gulf of Aden, the radular formula was $45 \times 53.0.53$; Gohar and Soliman (1967) for the Red Sea form give it as $50 \times 67.0.67$; Kay and Young (1969) in two specimens from Hawaiian Islands find the radular structure to be $30-36 \times 35-59.0.35-59$; in the the specimens from Tanzania, Edmunds (1971) finds it to be $45 \times 75.0.75$; in the 60 mm long specimen from Laccadive Sea described in the present paper it has been found to be $49 \times 80.0.80$. It may be seen that these numerical variations have no taxonomic significance.

Satyamurti's (1952) account of *A. madrasensis* O'Donoghue conforms in a general way to the description of *A. caespitosus* (van Hasselt) as given by most authors except for the presence of dark brown spots and blotches on the ventral surface of the foot in the former. It may possibly be an individual variation which needs checking up with fresh material from the same locality. In the present account also in one of the specimens alone from the Laccadive region a few very small dark brown spots in the anterior half of the ventral aspect of the foot have been noticed although it agreed in all other respects with the two other specimens obtained simultaneously from the same locality.

The special features of the reproductive organs are the hermaphrodite gland completely enveloping the digestive gland, the ampulla wide and tubular thrown into flexions, a prostate gland in two distinct lobes, a narrow coiled vas deferens, an ejaculatory duct without armature, a lateral stylet within a firm muscular style sac, a coiled vagina leading to a smooth walled spermatheca, a much convoluted spermatocyst and a lobate stylet gland, with a distinct duct opening close to the style sac at the junction of the ejaculatory duct with the vagina. The description given in the present account agrees with those given by Gohar and Soliman (1967) and Edmunds (1971) but differs from that given by Kay and Young (1969) for the Hawaiian specimen which is stated to be possessing a lobulate gland communicating by its ducts with the muco-albuminous gland complex. Eales (1938) in a small unripe specimen had found the hermaphrodite gland to be embedded in the digestive gland on its dorsal side only.

Family *PHYLLIDIIDAE*

Phyllidia (*Phyllidia*) *varicosa* Lamarck

Locality : Kavaratti Lagoon in the Laccadive Islands.

Date : 19th October, 1972.

Distribution : Red Sea, East Africa including Zanzibar, Madagascar, Chagos Islands, Aldabra Islands, Maldive Islands, Malaya, Indonesia, Vietnam, Philippines, Japan, and many of the Central and the Western Pacific Islands viz., the Hawaiian, Marshal, Mariana, Palau, Caroline, Gilbert, Rotuma, and Solomon Islands and the Bismark Archipelago. The general distribution of the species is in the Indian and the Pacific Oceans. Relevant references to the localities of occurrence are given by Edmunds (1971).

Synonyms : *Phyllidia varicosa* Lamarck (1801), Eliot (1904, 1908), non Farran (1905), Edmunds (1971); *Phyllidia trilineata* Cuvier (1804), Quoy & Gaimard (1829 & 1832).

Description : Two specimens of this species were obtained one measuring 31 mm in length by 13 mm in width by 8 mm in height and the other 46 mm in length by 25 mm in width by 20 mm in height. The animals are elongate, ovate, dorid-like in appearance but without the plumose branchiae encircling the anus. Both the individuals showed three prominent yellow longitudinal ridges, one median and two lateral, bearing orange coloured tubercles. These longitudinal ridges are separated from each other by deep dark gray almost black channels in which the notum is bare without tubercles. On either side, there is a series of irregular transverse marginal ridges, running across to the mantle edge. Some of these ridges make V-shaped loops (Fig.2a). The tubercles are of varying sizes, both on the median, lateral and marginal ridges. The mid-dorsal ridge terminates abruptly at about the level of the rhinophores (rh). The two other lateral longitudinal ridges one on either side of the median ridge extend in front up to the basal regions of the rhinophores. The rhinophores are conical stalked and perfoliated, each bearing about twenty leaflets. There are no prominent rhinophoral sheaths. The rhinophores are retractile into notal depressions, the wall of which are only slightly raised. Posteriorly the two lateral longitudinal ridges unite with the median longitudinal ridge. Behind the junction of these three ridges, there is a prominent elevated tubercle pierced by the

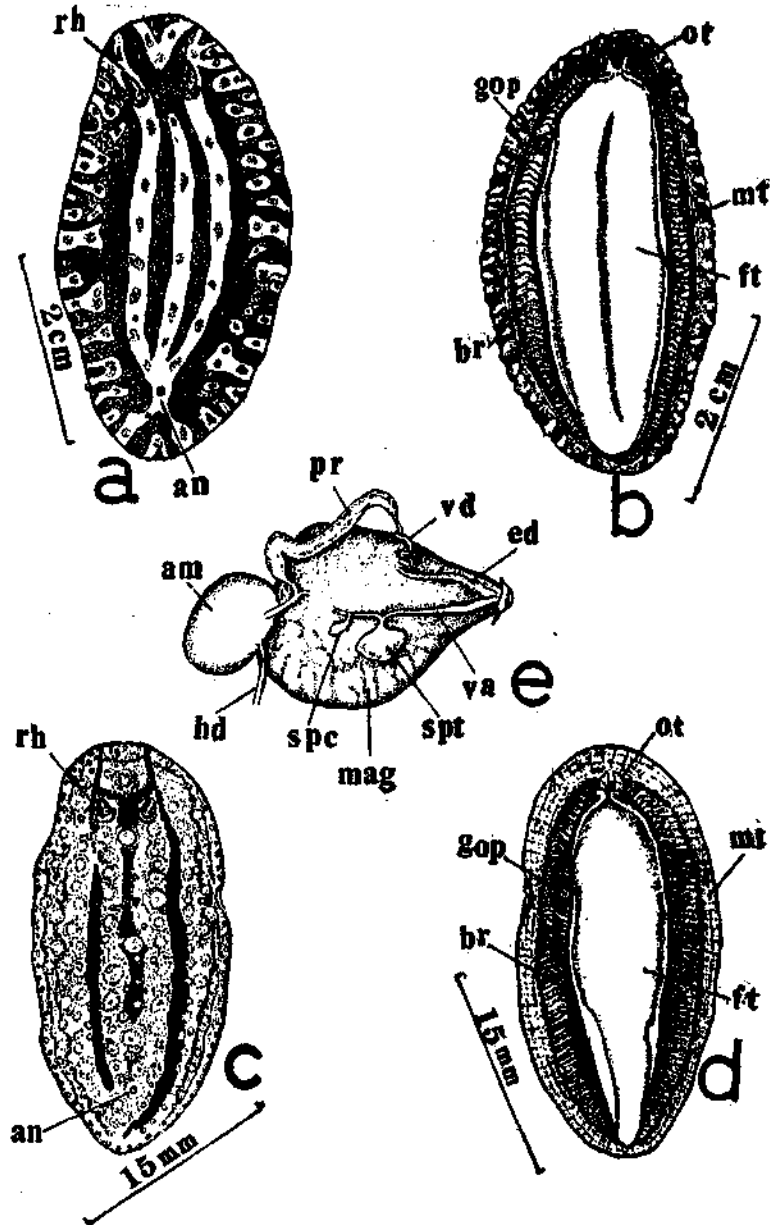


Fig.2. *Phyllidia (Phyllidia) varicosa* Lamarck. a. Dorsal view of the entire animal; b. Ventral view of the entire animal; c-e. *Phyllidea (Phyllidiella) zeylanica* Kelaart: c. Dorsal view of the entire animal; d. Ventral view of the entire animal; and e. Reproductive organs in the anterior genital mass.

anus. It is whitish, situated at the terminal region of the rectum the exposed region of which is gray.

The ventral view of the animal (Fig. 2b) presents an elongated foot (ft) which is prominently gray on its surface in the bigger specimen but of a lighter hue in the smaller one. In both of them there is a dark median longitudinal streak. The mouth opening is median and pore-like between the mantle and the anterior foot edge. It is guarded by two small flatish laterally grooved oral tentacles (ot). The branchial lamellae (br) thin and plate-like are numerous in a close set row extending to entire length of the animal and situated within the groove between the mantle and the lateral edge of the foot on each side. The reproductive opening is on the right side of the animal between the branchial lamellae at about a fourth of the animal's length from the mouth end.

Embedded within the entire body wall are a close-set bundles of spicules. The peritoneum enveloping the viscera is pigmented dark. The mouth leads into a narrow oral tube surrounded by numerous small oral glands. The buccal bulb is enlarged laterally and the oesophagus passing through the nerve ring makes a short loop to the left side. The stomach is enveloped by the digestive gland mass and the intestine and the rectum are short. Jaws, radula or any other hard parts are wanting. Connected with the blood vascular system, a whitish flattened recemously branched blood gland is present. It lies top-most in the visceral organs on the right side behind the region of the nerve ring.

The reproductive organs are as described by Edmunds (1971). They consist of the hermaphrodite gland, the hermaphrodite duct with the ampulla and the anterior genital complex. The hermaphrodite gland envelops the digestive gland. The ampulla is large and bulbous. In the anterior genitalia the prostate gland is tubular and looped and is continued by the ejaculatory duct, which is provided with minute hooks. The vaginal passage is narrow, leading into a large globular spermatheca and the spermatocyst is relatively much smaller. The vaginal passage and the ejaculatory duct join and open together. The oviducal opening is close-by but distinctly separate.

Phyllidia (Phyllidiella) zeylanica Kelaart.

Locality : Coral fringed lagoon in Kavaratti Island, Laccadives.

Date : 11th March, 1972.

Distribution : The species has hitherto been known only from two localities viz., Trincomalie on the north-eastern coast of Ceylon and in the Piroton Island in the Gulf of Kutch off Jamnagar, India. The present record extends its distribution to the Laccadive Islands in the Arabian Sea.

Synonyms : *Phyllidia zeylanica* Kelaart 1859, Eliot 1906a, Narayanan 1969; *Phyllidia ceylanica* Bergh 1869; *Phyllidia (Phyllidiella) zeylanica* Burn (1970).

Description : A single specimen measuring 30 mm in length, 13 mm in width and 6.5 mm in height was obtained from a coral reef in the lagoon (Fig. 2c, d). The earlier records of the specimens being under 25 mm in length (Burn, 1970) the present one is of a much bigger size. The species is characterised by the presence of three black concentric bands running round the notum and an interrupted median dark band. The median band and the first concentric dark band close to the former are

prominent. The concentric band is incomplete posteriorly leaving a small gap. The other two more marginally situated bands are very narrow and inconspicuous. In between the dark concentric bands are prominently elevated greenish yellow longitudinal ridges bearing tubercles of varying sizes. These ridges run across in front of the rhinophore and behind the anal region. The rhinophores are situated at about one-sixth of the length of the body from the anterior end of the notum. They arise from deep depressions in the body-wall into which they are retractile. There are no prominent elevated rhinophoral sheaths. The rhinophoral stalks are prominent, each bearing distally 22 leaflets which are almost black.

The mid-dorsal region has a row of a few large tubercles rather widely spaced between which runs the dark gray interrupted band already mentioned. A few scattered rather minute tubercles are also present along the mid-dorsal region. Running parallel to the first concentric band on either side there are rows of small and large tubercles on the notum. Between the two narrow dark gray rather inconspicuous bands already mentioned are tubercles of varying sizes. A single or a double row of small tubercles is also present round the margin of the notum. All the tubercles are of yellowish green colouration with a pale pinkish hue when the animal was observed fresh. On preservation the pinkish hue disappeared and the tubercles appeared only yellowish green.

The anus which is median and dorsal pierces through a prominent tubercle situated posterior to the median interrupted dark band. Viewed from the ventral side, the foot sole is oval with a thin edge extending all round. Its surface is tinged light gray but the dark median line characteristic of *P. varicosa* is absent here. Mid-anteriorly it is much depressed below the mouth opening. The oral tentacles are short, flat and laterally grooved. The branchial lamellae are numerous triangular and plate-like arranged in a series, between the mantle and the foot on either side. The genital aperture is on the right side at about a third of the length of the animal from the anterior end. In the ventral view of the animal the projecting mantle rim all round presents through the integument regularly arranged concentric and radiating muscle strands. A similar arrangement of muscle bands has also been noticed in the smaller specimen of *P. varicosa*.

The integument bears numerous spicules both in the foot and the mantle. The mouth opening leads into an oral tube into which open several oral glands. It is continued by a buccal vestibule as described by Burn (1970). No radula and jaws are present. The stomach is completely enveloped by the digestive gland. The intestine is short. Other details in the alimentary system could not be made out as we could get only one small specimen. The reproductive organs are described in the species for the first time (Fig.2e). The animal is immature. The hermaphrodite gland is spread very thinly and superficially over the anterior dorsal half of the digestive gland. The hermaphrodite duct is extremely narrow as it arises from the hermaphrodite gland, but it immediately bulges out into a large roundish ampulla. The outgoing duct from the ampulla which is short joins the anterior genitalia. The prostate gland is an elongated looped tube leading into a short coiled vas deferens which is continued by an ejaculatory duct. Examination of the latter did not show any armature, but its absence cannot be confirmed in view of the smallness of the specimen examined. The vaginal passage leads into a moderately large spermatheca. The spermatocyst is small and pyriform. The mucoalbuminous gland presents the same structure as in other allied opisthobranchs. The ejaculatory duct and the vaginal duct have a common opening to the exterior and the oviducal opening is separate.

Discussion : So little is known of the members of the nudibranchiate family Phyllidiidae occurring along the Indian coasts that it is considered worth recording any available information on the subject accompanied by suitable illustrations of the concerned species. Even in respect of some among the few species on record by the earlier workers, there seems to be some confusion about their nomenclature. Burn (1970) is of opinion that Farran's (1905) *P. varicosa* and *P. nobilis* could possibly be regarded identical with *P. ocellata* Cuvier and *P. elegans* Bergh respectively and that O'Donoghue's (1931) *P. multituberculata* Boetiger is synonymous with *P. ocellata* Cuvier.

While *Phyllidia varicosa* Lamarck is well known, fairly easily recognisable and widely distributed species, *P. zeylanica* has so far been extremely rare in its occurrence and its validity at specific level has been for long in doubt. After the first description by Kelaart in 1859, it was altogether a lost species until Narayanan (1969) obtained it from the Gulf of Kutch and its identification confirmed by Burn (1970). While Bergh (1869, 1892) considered the possibility of *P. zeylanica* being synonymous with *P. varicosa*, Eliot (1906a) opined it might be distinctly separate. However, neither of them had access to the material which formed the basis for the first description by Kelaart (1859). The identification of this species even now is based almost entirely on the external features, chief among them being the presence of three nearly concentric dark lines and a median interrupted dark line with tubercles of varying sizes arranged in ridges in between the dark lines on the notum. Burn (1970) has also pointed out that the distinction between *P. zeylanica* and other members of the subgenus *Phyllidiella* lies in the varying pattern of arrangement of tubercles on the notum in the different species. Information on such internal structural differences as would be of taxonomic importance in differentiating species under the subgenus is lacking. An attempt has been made here to study some aspects of the internal anatomy of *P. zeylanica*, but owing to the reason that the observations had to be confined to one small specimen, details could not be given. Since the present 30 mm long specimen of *P. zeylanica* which is so far the largest on record, has been found to be still immature, the possibility of the species attaining a much larger size cannot be ruled out.

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Key to lettering in text figures 1 and 2.

am. ampulla; *an.* anus; *bf.* branchial fold; *bm.* buccal mass; *br.* branchiae; *Cg.* cerebral ganglion; *cns.* central nervous system; *dgd.* digestive gland; *ed.* ejaculatory duct; *ey.* eye; *ft.* foot; *gop.* genital opening; *hd.* hermaphrodite duct; *hgl.* hermaphrodite gland; *int.* intestine; *mag.* muco-albuminous gland; *oe.* oesophagus; *ot.* oral tentacle; *pg.* pedal ganglion; *plg.* pleural ganglion; *pr.* prostate; *rel.* rectum; *rh.* rhinophore; *rhg.* rhinophoral ganglion; *rhs.* rhinophore sheath; *sgl.* salivary gland; *spc.* spermatocyst; *spt.* spermatheca; *st.* stomach; *stc.* statocyst; *sigl.* stylet gland; *sil.* statolith; *sts.* style sac; *sty.* stylet; *tu.* tubercle; *va.* vagina; *vd.* vas deferens.