

STUDIES ON INDIAN ECHINODERMS—I
REDISCOVERY OF THE ECHINOID, *BREYNIA VREDENBURGI*
ANDERSON FROM ANDAMAN SEA, WITH AN EMENDED
DESCRIPTION*

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INTRODUCTION

Breynia vredenburgi Anderson was until recently known only from a single young specimen 39 mm. long which was dredged from Port Blair, Andaman Islands and described by Anderson in 1907. Clark (1946) in discussing the genus *Breynia* remarked 'Although there are supposed to be two species in this genus the northern one, from Andaman Island, is still little known'. The northern species referred to is *Breynia vredenburgi*. Mortensen (1951) could not give any additional information on the species in his monograph of the Echinoidea for want of specimens.

Recently, two adult specimens of *B. vredenburgi* from the Andaman Sea have been kindly made available to the author by Mr. G. Luther of this Institute and an examination of these indicates that a redescription of the species is desirable. In the present account a redescription of the species together with a suitably modified key to living species of *Breynia* are presented.

***Breynia vredenburgi* Anderson**

Breynia vredenburgi Anderson, 1907, p. 45 : Port Blair. Mortensen, 1951, p. 145.

Material : Two specimens from Jungli Ghat, Port Blair (South Andaman Islands) (Pl. 1 A and B), depth less than 3 metres. Their respective measurements are given below.

	<i>Length</i> (mm.)	<i>Breadth</i> (mm.)	<i>Height</i> (mm.)
Specimen 1.	77	61	36
„ 2.	69	54	30

DESCRIPTION

Test : Test very fragile, thin, oval in outline, broadest at middle. Posterior one-third of test tapers toward blunt posterior end. Aboral surface more or less flat, low arched. Oral surface flat except for slightly raised plastron and slightly

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protruding labrum. Peristome, slightly concave. Edge of test rounded, vertex behind the special system (Fig. 1, A).

Ambulacra: Petals short, triangular. Anterior pair of petals shorter and broader than posterior pair. Pores of equal size, conjugate, sunken, separated by a faint ridge upon which lies a single row of tubercles.

Size of specimen (mm.)	Series	Number of pore pairs in each petal			
		II	IV	I	V
69	Anterior	7	7	14	14
	Posterior	12	12	11	11

Frontal ambulacrum (Fig. 1, B) very narrow, about one-third breadth of other ambulacra, slightly sunken forming a broad faint depression in frontal edge of test. Pore pairs small. Middle of anterior ambulacrum appears naked, being covered only by minute tubercles. On dorsal surface on either side of anterior ambulacrum are conspicuous tubercles which appear to be arranged in diagonal rows. Ten pore pairs lie on each side of periproct within the anal fasciole in the specimen measuring 69 mm. in length.

Interambulacra: Primary interamb tubercles within peripetalous fasciole on aboral side very few, irregularly arranged.

Specimen	Length (mm.)	Number of primary tubercles in interambs				
		I	II	III	IV	V
1.	77	—	6	3	3	7
2.	69	—	3	3	4	3

Primary tubercles absent from posterior interambulacrum. Primary tubercles of unequal size (Fig. 1, C), perforate, crenulate with deep areolae. Entire aboral side uniformly covered with miliary tubercles which increase in size near ambitus. Plastron broad and thickly tuberculated. Tubercles of plastron do not continue on to posterior end of labrum. First two and anterior one-fourth of third ambulacral plates adjoin labrum (Fig. 1, D); remainder of ambulacral plates adjoin plastron.

Apical system situated slightly towards anterior end. In both specimens the four genital pores large; both probably females. Madreporite pear-shaped, with posterior end rounded and anterior end pointed. Peristome oval, two sides slightly concave, producing slight dumb-bell shape. Periproct (Fig. 1, E) almost circular in outline, slightly pointed above and below; placed at upper edge of sloping posterior end of test, not visible from above. Periproctal plates numerous, those along lower edge of periproct enlarged.

Spines: Spines only slightly curved at base. Those of dorsal side of medium length, directed backwards. Sections of spines (Fig. 1, F) show calcareous material arranged in single row in radiating fashion around central calcareous mesh. Each spine (Fig. 1, G) curved, hollow with small expanded formation at the base. Secondary spines at dorsal side within peripetalous area form dense covering. Labrum appears sparsely tuberculated; plastron with dense coat of spines.

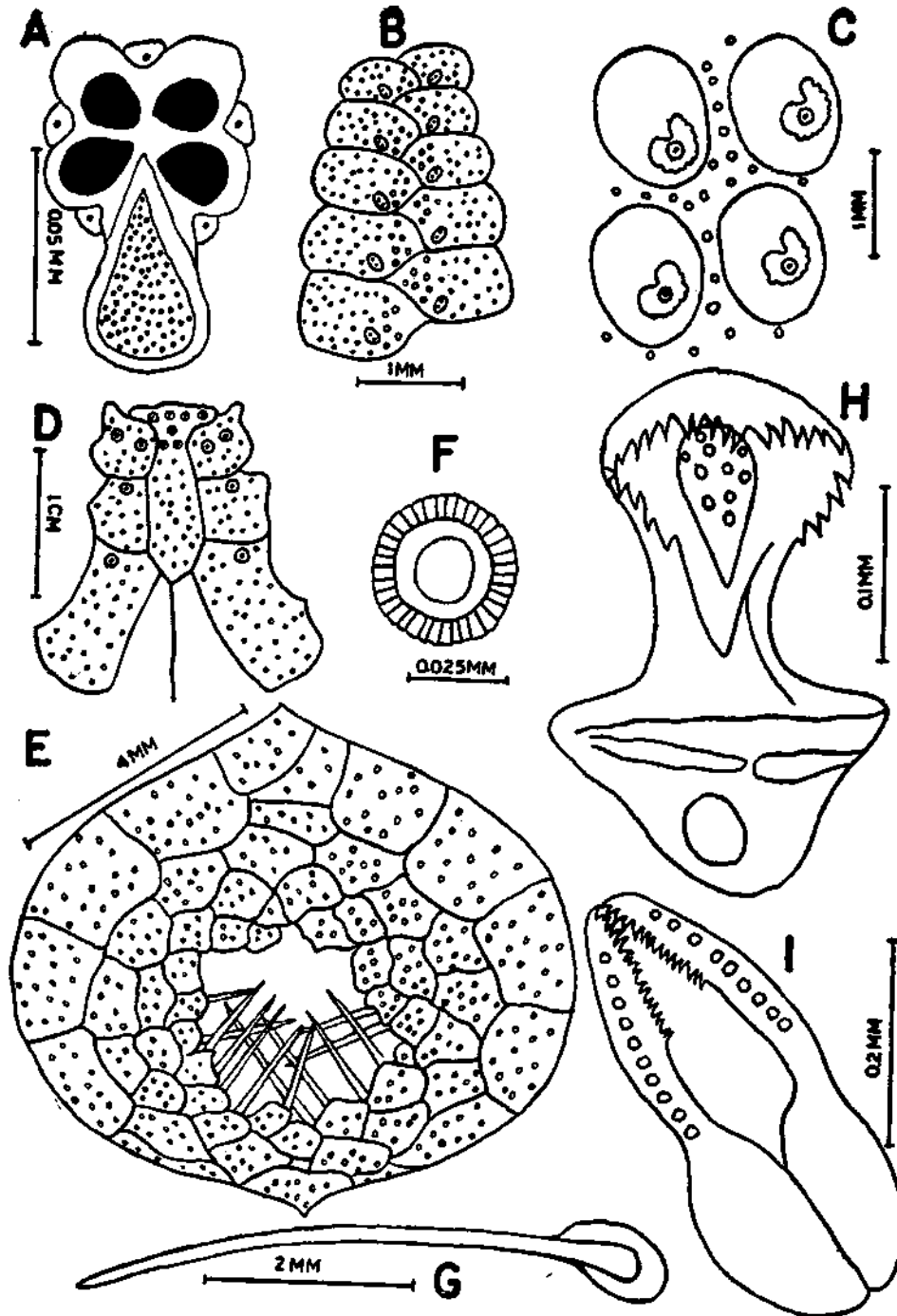


FIG. 1. A. Apical system. B. Ventral portion of frontal ambulacrum. C. Primary tubercles on the interambulacrum of the oral side. D. Labrum and plastron. E. Periproct. F. Section of primary spine. G. Secondary spine. H. Valve of rostrate pedicellaria. I. Valves of tridentate pedicellaria.

Fascioles : Internal fasciole broad, with distinct constriction at posterior end. Fasciole open at frontal groove becoming double where it bends towards anterior ambulacrum. Peripetalous fasciole narrow, indistinct and triangular.

Pedicellariae : Tridentate and rostrate pedicellariae occur around peristome. Rostrate type more abundant, with three, very rarely four valves, length varying from 0.675 to 0.785 mm. Each valve (Fig. 1, H) with broad rounded base and rounded anterior end connected to base by narrow neck. Anterior margin of blade serrate. The length of the valve varies from 0.186 to 0.235 mm. Tridentate pedicellariae, with short stalk and long narrow valves, base of valve (Fig. 1, I) slightly enlarged, anterior part narrow, serrate on both sides. Length of each valve about 1 mm.

Colour : Specimens uniformly whitish brown and spines uniformly silvery-white, not banded. Cleaned tests light brown.

Distribution : This species has formerly been reported only from Port Blair, Andaman Island (Anderson, 1907). Here it is again described from the same locality ; perhaps it is restricted to this area.

REMARKS

In referring to *B. vredenburgi*, Mortensen (1951) correctly remarked that ' It may be possible that larger specimens will prove to have more aboral primary tubercles perhaps also a few in the posterolateral interambulacra ' but he separated the species in his key with the character ' Primary aboral tubercles only in the anterior interambulacra '. The observations made by the present author show that the species cannot be distinguished on the basis of this character alone as adult specimens have been found to possess tubercles in the posterior interambulacra also, as do other species in the genus *Breynia*. It is now necessary to revise Mortensen's key using characters of adult specimens of *B. vredenburgi* for the purposes of separation. After a study of detailed descriptions of *B. australasiae*, *B. desorii* and *B. elegans* and examination of the two specimens of *B. vredenburgi* the author is convinced that the pattern of arrangement of the ambulacral plates near labrum and plastron differs distinctly in all four species. Two complete ambulacral plates adjoin the labrum in *B. australasiae* (Fig. 2, A) whereas three complete ambulacral plates adjoin the labrum in *B. elegans* (Fig. 2, B). In case of *B. desorii* in addition to the first two ambulacral plates the anterior three-fourths of the third ambulacral plate adjoins the labrum (Fig. 2, C) and in *B. vredenburgi* in addition to the first two ambulacral plates the anterior one-fourth of the third ambulacral plate adjoins the labrum (Fig. 2, D). A revised key to the living species is given below:

1. More than two ambulacral plates adjoin the labrum..... 2
Only two ambulacral plates adjoin the labrum..... *B. australasiae*
2. Two and part of third ambulacral plate adjoin the labrum..... 3
Three complete ambulacral plates adjoin the labrum..... *B. elegans*
3. Two complete ambulacral plates and one-fourth of the third ambulacral plate adjoin the labrum ; primary aboral tubercles scarce
B. vredenburgi
Two complete ambulacral plates and three-fourths of the third ambulacral plate adjoin the labrum ; primary aboral tubercles numerous
B. desorii

SUMMARY

A redescription of *Breynia vredenburgi* with a revised key to the known extant species of the genus *Breynia* is given.

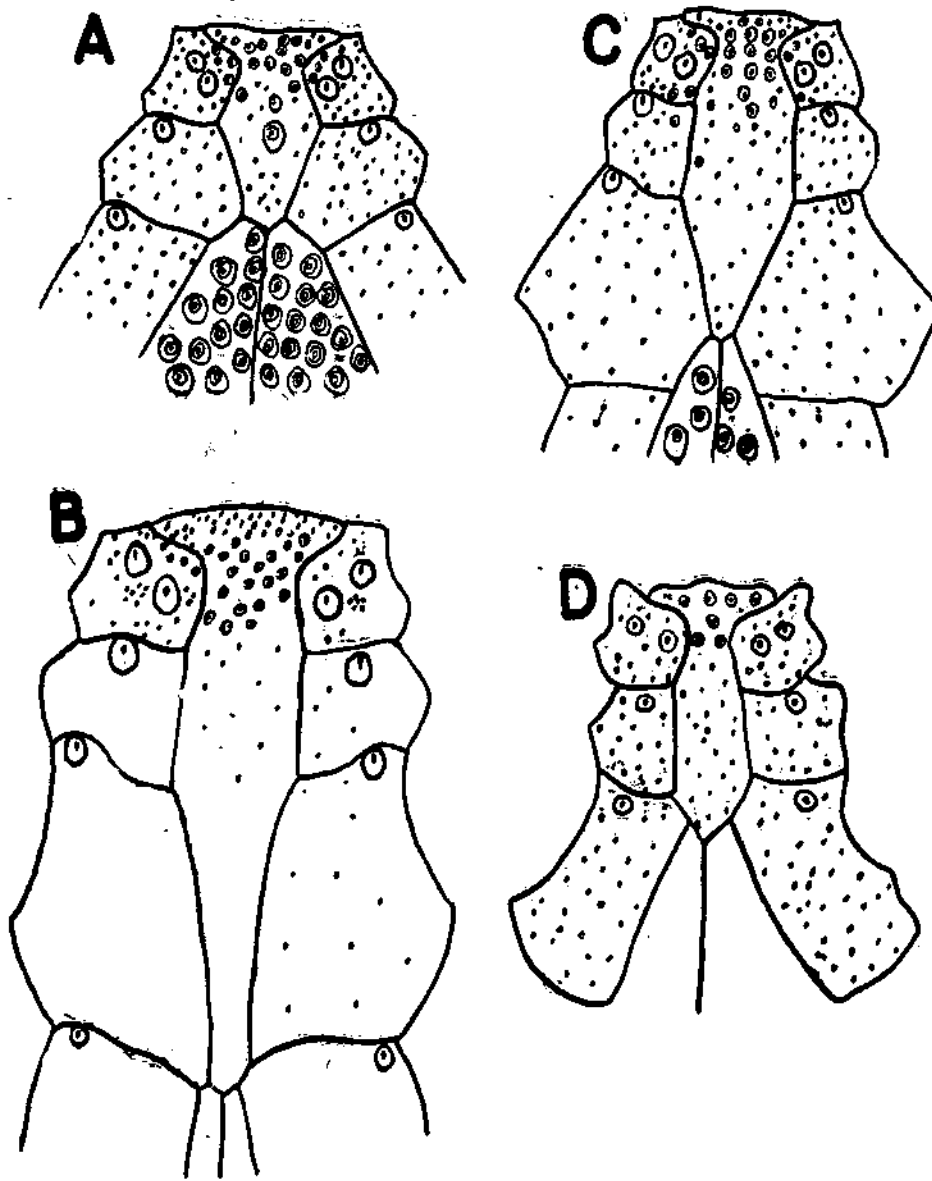


FIG. 2. Arrangement of ambulacral plates² adjoining (the labrum and plastron in (A) *B. australasiae* (B) *B. elegans*. (C) *B. desorii* and (D) *B. vredenburgi* × 4 (Figs. A-C × 4.5 after Mortensen, 1951).

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REFERENCES

- ANDERSON, A. R. S. 1907. *Breynia vredenburgi*, an undescribed echinoid from the Indian Ocean. *J. Asiat. Soc. Beng.*, 2(3) : 145.
- CLARK, H. L. 1946. Echinoderm fauna of Australia, its composition and its origin. *Publ. Carnegie Inst.* 566 : 1-523.
- MORTENSEN, T. 1951. *A Monograph of the Echinoidea*. V. 2 Spatangoida II, 5(2) : 1-593. Copenhagen.