



Fig. 1. Two live specimens of *Berthelinia limax* (Kawaguti and Baba 1959) ( $\times 25$ )

1875 and included it under the sub-family Berthelininae Boets, 1949, of the family Jullidae Dall, 1898. Since then, living members of this genus have been reported from a number of other Pacific localities in Japan<sup>5</sup>, Australia<sup>6</sup>, California<sup>7</sup> and Hawaii<sup>8</sup>, and from Jamaica<sup>9</sup> in the Atlantic. The purpose of this communication is to record the collection of living specimens of *Berthelinia* for the first time from the Indian Ocean region.

Recently, while examining nudibranch molluscs near the jetty of the Central Marine Fisheries Research Institute at Mandapam Camp facing the Gulf of Mannar, I came across four specimens of small bivalve gastropods, found attached to the roots of the green alga *Caulerpa racemosa* (Forsskål) J. Agardh, which on close examination resembled *Berthelinia limax* in all essential features (Fig. 1). The measurements of the four specimens are given in Table 1.

Specimen No.	Length (mm)	Height (mm)
1	2.76	1.94
2	2.53	1.76
3	2.41	1.76
4	2.00	1.35

The habitat of *Berthelinia* appears to be restricted to various species of *Caulerpa* on which it feeds. Its known distribution along with the algal habitat is shown in Table 2.

The present specimens resemble the Pacific species, and the differences noted are very minor and not sufficient to warrant any specific separation. They are, however, distinct from the West Atlantic species, *Berthelinia caribbea* Edmunds<sup>10</sup>, where the shell valves are green or grey-green, often tinged brownish, with more or less distinct yellow rays.

The animals are leaf green in colour with auriculated rhinophores ornamented with opaque white spots. The head, neck and sole are light green in colour, while the

### Record of the Bivalve Gastropod *Berthelinia limax* (Kawaguti and Baba 1959) from the Indian Ocean

A LIVING bivalve gastropod of the order Sacoglossa, found in Japan by Kawaguti and Baba<sup>1</sup> in 1959, was described as a new genus and species *Tamanovalva limax*. Keen and Smith<sup>2</sup>, Baba<sup>3</sup> and Taylor and Sohl<sup>4</sup> synonymized the genus *Tamanovalva* Kawaguti and Baba 1959, with the Eocene Paris Basin fossil genus *Berthelinia* Crosse

Table 2

Spec. No.	Species	Algal habitat	Reference	Locality
1	<i>Berthelinia limax</i>	<i>Caulerpa okamurai</i>	Kawaguti and Baba (ref. 1)	Bisan Seto, Inland Sea, Japan
2	<i>Berthelinia typica</i>	<i>Caulerpa scalpelliformis</i>	Burn (ref. 6)	Torquay, Victoria, Australia
3	<i>Berthelinia australis</i>	<i>Caulerpa scalpelliformis</i>	Burn (ref. 6)	Torquay, Victoria, Australia
		<i>Caulerpa brownii</i>		
4	<i>Berthelinia chloris</i>	<i>Caulerpa simpliciuscula</i>	Keen and Smith (ref. 2)	Puerto Ballandra Bay, Baja, California
		<i>Caulerpa racemosa</i>		
		<i>Caulerpa sertularioides</i>		
5	<i>Berthelinia</i> sp.?	<i>Caulerpa racemosa</i>	Kay (ref. 8)	Koloa, Kauai, Hawaii
6	<i>Berthelinia caribbea</i>	<i>Caulerpa verticillata</i>	Edmunds (ref. 10)	Port Royal, Jamaica
7	<i>Berthelinia limax</i>	<i>Caulerpa racemosa</i>	Present work	Mandapam Camp (Gulf of Mannar, India)

mantle and the liver are deep green. A few irregularly placed dark green spots are present on the liver. The valves of the shell are equal in size, light green in colour, and extremely thin and fragile, with a smooth surface which is marked by fine growth lines. The helicoid protoconch is translucent and of one and half whorls, attached to the posterior extremity of the left valve as in *Berthelinia limax*. The protoconch is directed backwards extending horizontally over the right valve. The position of the yellowish white circular attachment of the adductor muscle is as in *B. limax*.

One of the specimens laid an egg string which was kept under observation. The early development agreed in all essential respects with the observations of Kawaguti and Baba<sup>1</sup> and Kawaguti and Yamasu<sup>11,12</sup> on *B. limax*.

With the record of the genus *Berthelinia* from the Indian coast it could be presumed that the species of the genus are distributed throughout the coastal waters of all the warmer seas. A careful search might prove that it is widely distributed in the Indo-Pacific waters.

I thank Dr. Umamaheswara Rao for identifying the alga, Dr. P. S. B. R. James for advice, and Mr. K. G. Nambiar for the photograph.

K. PRABHAKARA RAO

Central Marine Fisheries,  
Research Institute,  
Mandapam Camp,  
India.

<sup>1</sup> Kawaguti, S., and Baba, K., *Biol. J. Okayama Univ.*, 5, 177 (1959).

<sup>2</sup> Keen, A. M., and Smith, A. G., *Proc. Calif. Acad. Sci.*, 30, 44 (1961).

<sup>3</sup> Baba, K., *Venus, Kyoto*, 21, 389 (1961).

<sup>4</sup> Taylor, W. D., and Sohl, N. F., *Malacologia*, 1, 7 (1962).

<sup>5</sup> Baba, K., *Seto Mar. Biol. Lab.*, 9, 37 (1961).

<sup>6</sup> Burn, R., *Nature*, 186, 179 (1960).

<sup>7</sup> Keen, A. M., *Nature*, 185, 406 (1960).

<sup>8</sup> Kay, E. A., *Nature*, 195, 96 (1962).

<sup>9</sup> Edmunds, M., *Nature*, 195, 402 (1962).

<sup>10</sup> Edmunds, M., *J. Linn. Soc. (Zool.)*, 44, 732 (1963).

<sup>11</sup> Kawaguti, S., and Yamasu, T., *Biol. J. Okayama Univ.*, 6, 133 (1960).

<sup>12</sup> Kawaguti, S., and Yamasu, T., *Biol. J. Okayama Univ.*, 6, 150 (1960).