
Occurrence of a solenoporoid alga in the Deccan Intertrappean beds of Mohgaonkalan, Chhindwara District, Madhya Pradesh

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A fossil red alga *Solenopora* Dybowski of Solenoporaceae has been described for the first time from the Deccan Intertrappean beds of Mohgaonkalan, Chhindwara District, Madhya Pradesh. Its occurrence supports the presence of marine conditions in this area during the Early Tertiary period

Key-words—*Solenopora*, Red alga, Deccan Intertrappean beds, Early Tertiary (India).

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सारांश

छिंदवाड़ा जनपद (मध्य प्रदेश) में मोहगाँव कलाँ की दक्खिन अन्तर्द्वीपी संस्तरों में एक सोलीनोपोरोयडी शैवाल की उपस्थिति

राकेश चन्द्र मेहरोत्रा

छिंदवाड़ा जनपद (मध्य प्रदेश) में मोहगाँव कलाँ की दक्खिन अन्तर्द्वीपी संस्तरों में सोलीनोपोरोसी कुल का सोलीनोपोरा डाइबोव्स्की नामक एक लाल शैवाल पहली बार वर्णित किया गया है। इस शैवाल की उपस्थिति से प्रारम्भिक तृतीयक कल्प में इस क्षेत्र में समुद्री परिस्थितियों के होने की पुष्टि होती है।

A NUMBER of algal remains, known from various Deccan Intertrappean localities, have been listed by Prakash (1960) and Lakhanpal (1973). Majority of them belongs to Charophytes. In addition, some more algal forms in the last decade have been described by several other workers (Shivarudrappa, 1972a, 1972b, 1977, 1981; Bhatia & Mannikeri, 1976; Biradar, 1977; Bande, Prakash & Bonde, 1981; Barlinge & Paradkar, 1982; Marathe, Barlinge & Paradkar, 1984; Mishra & Maithy, 1984; Trivedi, Bajpai & Trivedi, 1985). Two of them, *Distichoplax raoi* Varma and *Peyssonnelia antiqua* Johnson, are important. The former is indicative of Palaeocene-Eocene age while the later indicates marine conditions.

SYSTEMATIC DESCRIPTION

Family—Solenoporaceae

Genus—*Solenopora* Dybowski 1878

Solenopora sp.

Pl. 1, figs 1-6

Material—While studying the slides of the chert material, several algal specimens almost similar in structure but differing in thickness of the thallus were discovered. Three of them have been selected for the present study.

Description—The thalli are nodular and crustose ranging in thickness from 170-1200 μm (Pl. 1, figs 1, 2, 6). The thallus is undifferentiated into hypothallus and perithallus and in vertical section the tissue is occurring as vertical files or tubules of more or less rectangular cells, with prominent vertical walls (Pl. 1, figs 3, 4, 6). Sometimes, cells appear variously shaped due to poor preservation. Their size varies from about 17-120 μm in length and 13-95 μm in width. Septa are present in the tubules but at irregular intervals (Pl. 1, fig. 5). Reproductive structures are absent.

DISCUSSION

The family Solenoporaceae is an extinct group of fossil marine organisms, nodular or encrusting in habit and formed internally of closely packed

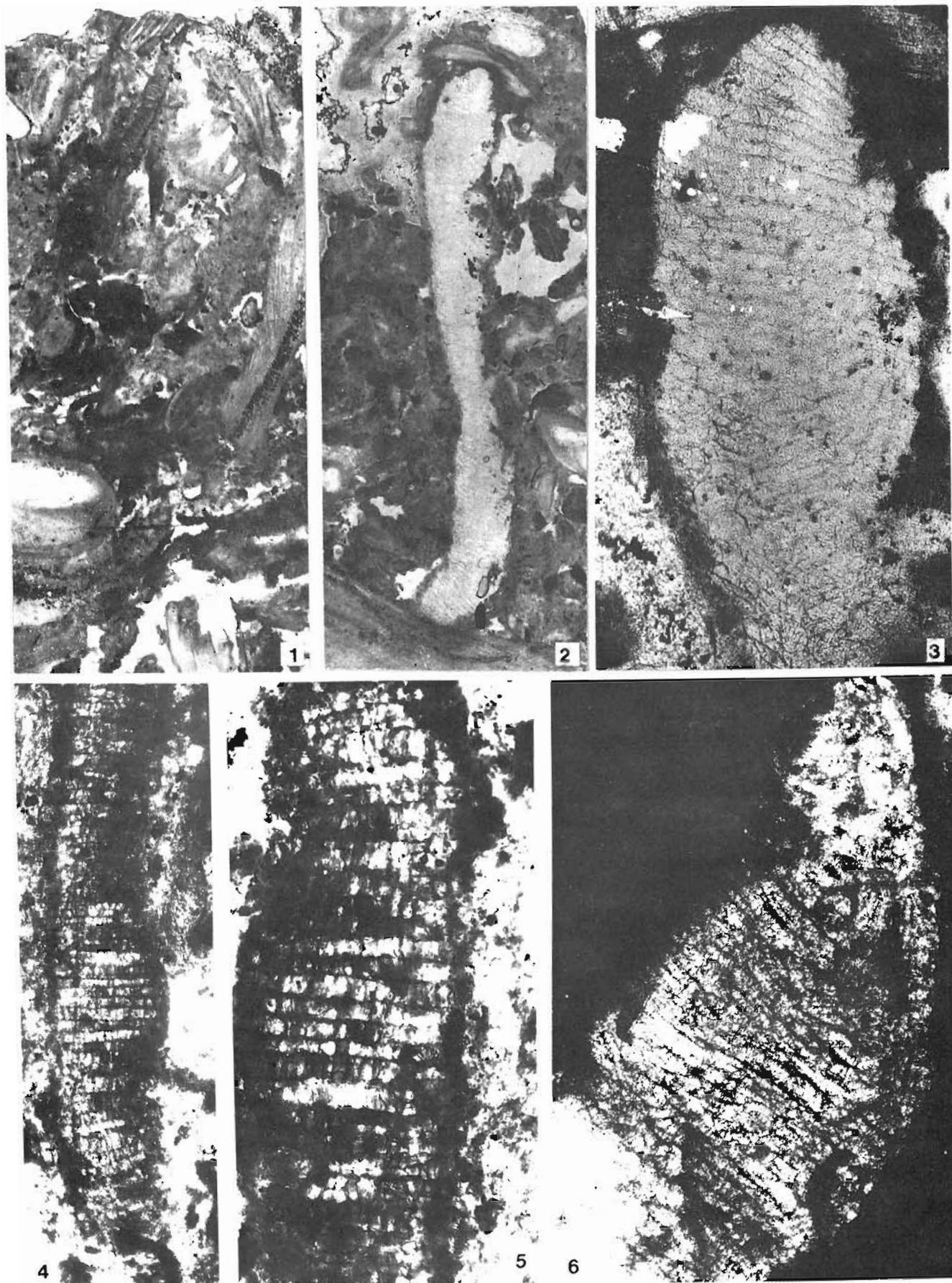


PLATE 1

radially or vertically divergent rows of elongate cells. Occasionally referred to various animal groups, they are usually interpreted as calcareous algae related to the living Corallinaceae, which resemble closely in growth-form and general internal structure. The thallus is undifferentiated into hypothallus and perithallus and the cell diameters are almost always greater than those of corallines. In Solenoporaceae, though the vegetative tissue is similar to that of the corallines, reproductive structures are relatively uncommon and almost doubtful and obscure except in *Neosolenopora* (Elliott, 1965). The family consists of four valid taxa, viz., *Solenomeris*, *Parachaetetes*, *Solenopora* and *Neosolenopora*. They are classified almost entirely on the types of cellular tissue. The important aspects considered are: (i) presence or absence of filament partitions (horizontal cell walls), (ii) regular or irregular spacing of partitions, and (iii) shape of cells in cross section (Wray, 1977).

Solenomeris is characterized by a marked irregularity in its cellular tissue. In vertical section individual cells appear to be irregular in shape, because cell partitions alternate in position with adjacent filaments giving zig-zag effect. In *Parachaetetes*, filaments have well-defined, regularly spaced partitions between cells, which give the tissue a grid-like pattern in vertical section (Wray, 1977). There is no regularity in the occurrence of septum in the fossil, therefore, it may be either *Solenopora* or *Neosolenopora*. As the reproductive structures are very common in the latter, a Miocene genus, the present fossil has been kept under the genus *Solenopora* which was instituted by Dybowski in 1878 (Elliott, 1973; Flügel, 1977).

The geologic range of Solenoporaceae is from Lower Palaeozoic to mid-Tertiary (Elliott, 1973). So far five species of *Solenopora* have been described from various parts of the country. These are *Solenopora hookeri* from the Upper Permian of North Sikkim (Oakley, 1941), *S. jurassica* as well as *S. coramondalensis* from the Jurassic of Cullygoody Limestone, Trichinopoly, Tamil Nadu (Narayana Rao, 1946), and *S. sabnii* and *S. tiruchiensis* from the Cretaceous of Trichinopoly, Tamil Nadu (Rama Rao

& Gowda, 1954). However, due to poor preservation the present fossil could not be compared with the above species. Therefore, under the circumstances, it has been described as *Solenopora* sp. Besides, *Parachaetetes asvapatii* from the Niniyur (Upper Cretaceous) Group of Trichinopoly, Tamil Nadu (Rama Rao & Pia, 1936), *Solenomeris* (?) *douvillei* from the Lower Eocene (Laki) rocks of Nanmal Gorge, Salt Range (Narayana Rao & Varma, 1953) and *Neosolenopora ramaraoi* from the Miocene of Limestone Hut Bay Formation of Andaman Island (Gururaja, 1977) are also known from India.

The ecological distribution of the family Solenoporaceae is largely comparable to some modern coralline algae. The sedimentological record indicates that it occupied open-marine environments of normal salinities (Wray, 1977). The family Solenoporaceae has been described here for the first time from the Deccan Intertrappean beds of India. Based on the presence of fossils of coastal plants like *Cocos*, *Nipa* and *Sonneratia* from the Deccan Intertrappean beds of Mohgaonkalan in Chhindwara District, Lakhnupal (1970, 1974) has already envisaged the presence of an arm of Tethys sea in Central India during this period. A few years later, Bande, Prakash and Bonde (1981) described two marine red algal forms, *Peyssonnelia* and *Distichoplax*, from the same beds. Thus obviously the present finding of *Solenopora* of Solenoporaceae from the same beds gives further support to this theory.

Specimen—No. BSIP 35940; Mohgaonkalan, Deccan Intertrappean beds; Early Tertiary.

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PLATE 1

1. *Solenopora* sp.—Section of chert in low power showing nature of thallus. $\times 15$; Slide no. BSIP 35940-I.
2. *Solenopora* sp.—Section of chert in low power showing nature of another thallus. $\times 9$; Slide no. BSIP 35940-II.
3. *Solenopora* sp.—Vertical section of thallus (shown in fig. 2) in high power showing nature of filaments. $\times 45$; Slide no. BSIP 35940-III.
4. *Solenopora* sp.—Vertical section of thallus (shown in fig. 1) in high power showing nature of filaments. $\times 90$; Slide no. BSIP 35940-I.
5. *Solenopora* sp.—Magnified view of thallus (fig. 4) showing nature of cells. $\times 175$; Slide no. BSIP 35940-I.
6. *Solenopora* sp.—Vertical section of another thallus in high power showing nature of filaments. $\times 40$; Slide no. BSIP 35940-III.

REFERENCES

- Bande, M. B., Prakash, U. & Bonde, S. D. 1981. Occurrence of *Peyssonnelia* and *Distichoplax* in the Deccan Intertrappeans, with remarks on the age of Chhindwara traps and palaeogeography of the region. *Geophytology* **11**(2) : 182-188.
- Barlinge, S. G. & Paradkar, S. A. 1982. Record of new fossil algal and fungal forms from the Deccan Intertrappean of Mohgaon-Kalan, M.P., India. *Botanique* **10** (1-4) : 163-174.
- Bhatia, S. B. & Mannikeri, M. S. 1976. Some Charophyta from the Deccan Intertrappean beds near Nagpur, Central India. *Geophytology* **6**(1) : 75-81.
- Biradar, N. V. 1977. On the occurrence of cyanophycean member, *Westiellopsis* in the Deccan Intertrappean Series, M.P., India. *Geophytology* **7**(2) : 204-207.
- Elliott, G. H. 1965. Tertiary solenoporacean algae and the reproductive structures of the Solenoporaceae. *Palaeontology* **7** (4) : 695-702.
- Elliott, G. H. 1973. A Miocene solenoporoid alga showing reproductive structures. *Palaeontology* **16**(2) : 223-230.
- Flügel, E. 1977. *Fossil algae, recent results and developments*. Springer-Verlag, Berlin, Heidelberg, New York.
- Gururaja, M. N. 1977. A solenoporoid alga from Miocene of Andaman. *Geophytology* **7**(2) : 264-268.
- Lakhanpal, R. N. 1970. Tertiary floras of India and their bearing on the historical geology of the region. *Taxon* **19**(5) : 675-694.
- Lakhanpal, R. N. 1973. Tertiary floras of the Deccan Trap Country, in: *Symp. on Deccan Trap Country*. Indian National Science Academy, New Delhi: 127-155.
- Lakhanpal, R. N. 1974. Physical conditions of the Indian Tertiary in the light of palaeobotanical evidence, pp. 516-524 in: K. R. Surange *et al* (eds)—*Aspects and appraisal of Indian palaeobotany*. Birbal Sahni Institute of Palaeobotany, Lucknow.
- Marathe, K., Barlinge, S. G. & Paradkar, S. 1984. On the importance of *Fritschiella intertrappea* sp. nov. from the Deccan Intertrappean cherts of the Deccan Mohgaonkalan, Chhindwara District, M.P., India, in: *Symp. on Evolutionary Botany and biostratigraphy*, Prof. A. K. Ghosh Comm. Vol. 83-88.
- Mishra, P. K. & Maithy, P. K. 1984. Occurrence of cyanophycean remains from the Deccan Intertrappean beds, Madhya Pradesh. *Palaeobotanist* **32**(2) : 120-125.
- Narayana Rao, S. R. 1946. On two species of *Solenopora* from the Cullygoody Limestone of Trichinopoly District, South India. *M.O.P. Iyengar Comm. Vol., J. Indian bot. Soc.* : 331-337.
- Narayana Rao, S. R. & Varma, C. P. 1953. Fossil algae from the Salt Range. *Palaeobotanist* **2** : 19-23.
- Oakley, K. P. 1941. Upper Palaeozoic fauna of north Sikkim. *Rec. geol. Surv. India Palaeont. indica* n. ser. **31**(1) : 74-78.
- Prakash, U. 1960. A survey of the Deccan Intertrappean flora of India. *J. Palaeontol.* **34** (5) : 1027-1040.
- Rama Rao, L. & Gowda, S. S. 1954. Solenoporaceae from the Cretaceous rocks of South India. *Curr. Sci.* **23** (6) : 177-179.
- Rama Rao, L. & Pia, J. 1936. Fossil algae from the uppermost Cretaceous beds (Niniyur Group) of the Trichinopoly District, South India. *Mem. geol. Surv. India Palaeont. indica* N. S. **21**(4) : 1-49.
- Shivarudrappa, T. V. 1972a. On *Gyrogonites medicaginula* and *Chara wrightii* from the Intertrappeans of Gurmatkal, Gulbarga District, Mysore State. *Proc. II Colloq. Indian Micropalaeont. stratigr.* : 115-119.
- Shivarudrappa, T. V. 1972b. On the occurrence of charophytic remains from the Intertrappeans of Gurmatkal, Gulbarga District, Mysore State. *Curr. Sci.* **41**(1) : 21-23.
- Shivarudrappa, T. V. 1977. First report of fossil charophytes from the Intertrappean sediments of Biligi, Bijapur District, Karnataka State. *Proc. IV Colloq. Indian Micropalaeont. Stratigr.* : 196-200.
- Shivarudrappa, T. V. 1981. Charophytic remains of the Deccan Intertrappeans—a case study from Gurmatkal locality, Gulbarga District, Karnataka, India, in: *Symp. on Deccan volcanism and related basalt provinces in other parts of the world Mem. geol. Soc. India, Bangalore* (3) : 292-295.
- Trivedi, B. S., Bajpai, S. K. & Trivedi, G. K. 1985. A new cyanophycean fossil alga from the Deccan Intertrappean beds of Mohgaonkalan, Chhindwara District (M.P.), India. *J. Indian bot. Soc.* **64** : 393-394.
- Wray, J. L. 1977. *Calcareous algae: Developments in palaeontology and stratigraphy*. **4**. Elsevier Scient. Publ. Co., Amsterdam : 1-185.