

A NEW CYANOPHYCEAN REMAIN FROM THE KARHARBARI FORMATION, GIRIDIH COALFIELD, BIHAR

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ABSTRACT

The present paper reviews the earlier work done on the Indian Permian algae and records a new Cyanophycean alga, *Palaeowestiellopsis karharbariensis* gen. et sp. nov., studied in cellular pulls taken from the stem surface of *Phyllothea indica* Bunbury collected from the Karharbari Formation in Bengal-Nagpur Open Quarry. This new fossil alga is characterized by true branching, coiling of few branches and lack of sharp demarcation between the main filament and branches.

Key-words — Cyanophyceae, Algae, *Palaeowestiellopsis*, *Phyllothea*, Karharbari Formation, Lower Permian (India).

सारांश

गिरीडीह कोयला-क्षेत्र (बिहार) में करहरबारी शैल-समूह से प्राप्त एक नवीन सियॅनोफ़ाइसीय अवशेष — प्रभात कुमार माइती एवं प्रदीप कुमार मिश्रा

इस शोध-पत्र में फ़िल्लोथीका इन्डिका वनदरी के तनाश्म की सतह से उपलब्ध कोशिकीय छापांशों से पेलियो-वेस्टियॅल्लोप्सिस करहरबारीयेन्सिस नव वंश व नव जाति नामक एक नवीन सियॅनोफ़ाइसीय शैवालाश्म वर्णित किया गया है। यह फ़िल्लोथीका का तनाश्म बंगाल नागपुर ओपॅन-क्वेरी में स्थित करहरबारी शैल-समूह से एकत्रित किया गया था। इसी शोध-पत्र में भारतीय परमी युगीन शैवालों पर किये गये शोध-कार्य की समीक्षा भी की गई है। यह नवीन शैवालाश्म वास्तविक शाखाओं, कुछ कुण्डलित शाखाओं तथा मुख्य तंतु एवं शाखाओं के बीच स्पष्ट सीमांकन की अनुपस्थिति से अभिलक्षित है।

INTRODUCTION

A PERUSAL of available literature on the Indian fossil algae reveals that only a few reports on the Permian algae have been published so far. In 1850, McClelland for the first time recorded *Fucoides* from the Permian of West Bengal (in Sastri & Gururaja, 1980). Oakley (1941) has mentioned the occurrence of *Solenopora* in the Upper Permian rocks of Sikkim. Rao (1948) and Rao and Varma (1953) described some taxa of *Gymnocodium* from Punjab Salt Range (now in Pakistan). Mehta (1954) described two taxa comparable with the species of *Aphanocapsa* from South Rewa Basin of the Lower Gondwanas. A fossil resembling *Pediastrum* was reported

from the Barren Measure Sequence of the Jharia Coalfield, Bihar by Kar (1968). While describing microfossils from the Barakar Stage of the Lower Gondwanas in Madhya Pradesh, Sinha (1969) reported *Botryococcus* spp. a and b from the Middle Permian. Kalia (1974) and Mehrotra *et al.* (1976) have given a good account of the Permian algae from oolitic shell bearing limestone in Garhwal, Uttar Pradesh.

The material for the present communication was studied in cellular pulls taken from the carbonised compressions preserved on the stem of *Phyllothea indica* Bunbury, collected by one of us (Maithy) from the Bengal-Nagpur Open Quarry in the Giridiḥ Coalfield belonging to the Karharbari Formation.

SYSTEMATIC DESCRIPTION

FAMILY — STIGONEMATACEAE

Genus — *Palaeowestiellopsis* gen. nov.

Diagnosis — Filamentous with true branching, branches more or less thinner than main filament, sheath lacking, filaments constricted at septa; cells somewhat barrel-shaped to rectangular or polygonal, 4.0-7.5 μm long and 4.5-6.0 μm broad, usually terminal or sometimes intercalary portion of filaments with a group of closely arranged, overlapping, more or less spherical or slightly polygonal structures comparable with pseudohormocysts, at places branch filaments show coiling; heterocysts not seen.

Genotype — *P. karharbariensis* sp. nov.

Palaeowestiellopsis karharbariensis sp. nov.

Pl. 1, figs 1-10

Diagnosis — As per the genus.

Holotype — B.S.I.P. slide no. 6937.

Locality — Bengal-Nagpur Open Quarry, Giridih Coalfield.

Horizon — Karharbari Formation (Lower Permian).

Remarks — In general shape and size this alga is comparable with the modern genus *Westiellopsis* Janet (Janet, 1941, p. 167; Desikachary, 1959, p. 596), the only member of the family Stigonemataceae lacking sheath, but in the fossil specimen, though at certain places the branches are significantly thinner than main filament, the general demarcation is not as sharp as found in the modern alga. Besides, the coiling in few branches of the present fossil taxon is not known as in the modern genus

Westiellopsis Janet. The branches in our specimen arise in several planes and directions but the distinction between primary and secondary filaments has not been observed clearly since the material is in the form of carbonised compressions.

Biradar (1977, p. 204) has described *Westiellopsis mahabalei* sp. nov. from Mohgaonkalan in the Deccan Intertrappean Series. His species is almost similar to the living type and differs only in the filaments being faintly or not at all constricted at septa and in very close arrangement of pseudohormocysts. However, our Permian specimen differs from Biradar's Eocene alga in exhibiting relatively broader filaments, marked constriction at cross walls and coiling of branches at few places.

In general morphology the present taxon approaches the genus *Hyella* Born. et Flah. but in this Pleurocapsalean alga the filaments form nemato- or pseudoparenchymatous thallus showing thick mucilaginous sheath. But our specimen lacks such features. Moreover, the plant *Hyella* has been reported from the aquatic (marine) habitats, while the present fossil alga found on the stem of *Phyllothea indica* reveals its terrestrial habitat as of the modern plant.

Those morphological comparisons with the modern alga *Westiellopsis* Janet and its known fossil representative *W. mahabalei* Biradar (1977) distinguish our specimen in the presence of coiling of few branches, lack of sharp demarcation in the width of main filament and branches and the marked constrictions at cross walls. Hence, a new genus *Palaeowestiellopsis* with its type species *P. karharbariensis* has been created. The specific name is after the locality from where it was collected.

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EXPLANATION OF PLATE

Palaeowestiellopsis karharbariensis gen. et sp. nov.

All figured specimens are magnified. $\times 1000$. The figured slides and negatives are preserved at the Birbal Sahnî Institute of Palaeobotany Museum.

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| <p>1, 3. Showing true branching (B) of the filaments.</p> <p>2, 5, 9. Pseudohormocysts-like structures (P) at the terminal position.</p> <p>4, 8. Pseudohormocysts-like structure (P) in intercalary position.</p> | <p>6. A branch filament showing coiling (C).</p> <p>7. A single terminal pseudohormocysts-like body.</p> <p>10. Showing intercalary pseudohormocysts (P) and a branch filament (B) probably secondary in origin.</p> |
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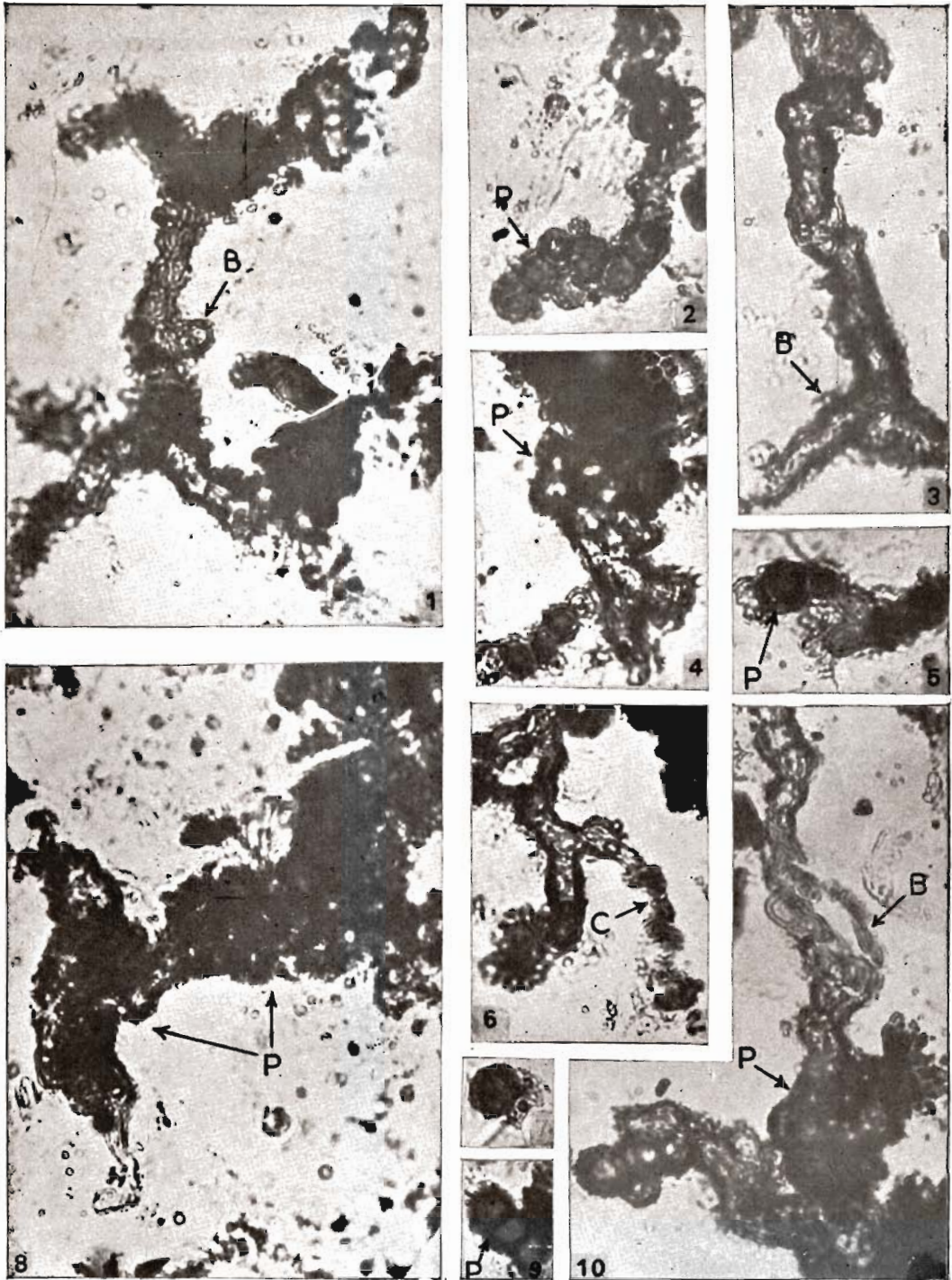


PLATE 1