

REVISION OF SOME FOSSIL PLANTS FROM THE KARHARBARI FORMATION, GIRIDIH COALFIELD, BIHAR

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ABSTRACT

Revision of the fossil plants described earlier under *Schizoneura wardii*, cf. *Cyclodendron* sp. and *Sagenopteris* (?) *stoliczkana* from the Karharbari Formation of the Giridih Coalfield has been done on the basis of examination of type specimens. In addition to this a new species of *Rubidgea emarginata* is reported.

INTRODUCTION

FOSSIL plants from the Karharbari Formation of Giridih Coalfield are known since long. Feistmantel (1879) first recorded them from the Passerabha, Buriadih and adjoining localities. Later Zeiller (1902) also reported some new plants. Some of the fossil records were revised by Seward and Sahni (1920). In recent years megafossils were described by Maithy (1965 a-f, 1970). The present paper deals with the revision of some earlier reported fossil plants by Feistmantel and Zeiller along with a record of new species of *Rubidgea*.

DESCRIPTION

Schizoneura wardii Zeiller, 1902

Pl. 1, fig. 1

This species was first described by Zeiller (1902, pl. 6, figs. 5-9) from Passerbahia, Giridih Coalfield. According to him the species has articulated stem with smooth surface; leaves numerous, partly connate at the base or altogether free, 15-30 mm long and 1.5-2 mm broad, erect, more rarely arched and recurved, narrow, linear-lanceolate with not a very distinct median nerve. In addition to this Maithy, 1965 (pls. 1, 2; figs. 4, 6) referred some specimens to *S. wardii* from the Giridih Coalfield.

Recently the specimens of *Schizoneura wardii* described by Zeiller (1902) preserved at the Geological Survey of India, Calcutta have been examined by me. The examination shows that the specimens are entirely different in organisation than it was thought to be. The best preserved specimen figured

by Zeiller (1902) in pl. 6, fig. 8 is figured here. The specimens are bract-like leaves, measuring 7 cm, broadly spatulate with a narrow base, apical margin deeply incised into 34 fine segments, measuring 2.5 cm and 2 mm broad. Median groove or venation is not present. In the middle region, near the point from where the segments start, a pair of rounded scars (see figs. 1, 3) are preserved. The scars are 3 mm in diameter. Associated to this specimen some articulated stems are preserved, but no organic connection in between the two have been noticed. The present observation shows that *S. wardii* represents a distinct plant and does not fall under the generic circumscription of *Schizoneura*. *Schizoneura* was originally proposed by Schimper and Mougeot (1844) for the forms with articulated axis with multi-nerved leaf sheaths usually split into two.

Plumstead (1962) published a fructification of *Gangamopteris* under the name *Vannus gondwanensis*. She opined that this fructification is remarkably similar to *S. wardii*. She has little doubt that they are generically or possibly specifically identical. The present study shows that the specimens do agree in some aspect with *Vannus gondwanensis*, but are morphologically distinct.

The specimens of *S. wardii* described by Zeiller (1902) agrees morphologically to *Palmatophyllites* Maithy (1965b). Hence, it is proposed here to transfer the specimen of *Schizoneura wardii* described by Zeiller (1902, pl. 6, figs. 5-8, Geological Survey of India, Calcutta; Specimen nos. 7301-7304) to *Palmatophyllites* under a new combination *P. wardii* (Zeiller) n. comb.

Two species of *Palmatophyllites* are known, *P. lacerata* Maithy (1965b) and *P. debilis* Maithy (1967). From both the species *P. wardii* differs by the presence of large number of segments at the apical margin, whereas in the above named two species the segments are few.

The placement of the specimens of *S. wardii* described by Zeiller (1902) under *Palmatophyllites* poses problem for the other specimens later described under *S.*

wardii (Maithy, 1965d, pls. 1, 2, figs. 4, 6). The two specimens referred by Maithy (1965d) show distinct articulated stems, with 10-16 leaves arising from nodes, partly conate at the base. Leaves 1.5-4 cm long and 1.5-3 mm broad. Each leaf has one distinct median vein. Morphologically these specimens are closer to *Phyllothea*. They are comparable to *Phyllothea crassa* Maithy (1969) recorded from the Karharbari Formation of Daltonganj Coalfield. Hence, it is proposed to transfer the forms of *S. wardii* described by Maithy (1965d) to *Phyllothea crassa*.

cf. *Cyclodendron* sp. Maithy, 1965

Pl. 1, fig. 2

Maithy (1965d, pls. 1, 2, figs. 5, 8; text-fig. 4) described few imperfectly preserved unbranched cylindrical stem casts with small leaf scars, centrally depressed, 2 mm wide, transversely oval or sub-circular, closely placed, arranged somewhat spirally under cf. *Cyclodendron* sp. due to its superficial resemblance with *Cyclodendron* Kräusel. Recently in a collection, a large number of stem remains have been recorded from the Karharbari Formation, Giridih Coalfield. Some of the stems, which are large enough in size show at certain portions scars as described above, however, several portions of these stems are devoid of scars. This irregular arrangement of scars cast doubt on the lycopodaceous affinity of the stems. Recently I have studied the stem remains of *Buriadia sewardii* Sahni with leaf bearing shoots and also with remnants of branch scars. The branch scars of *Buriadia* agree morphologically and in their arrangements as in cf. *Cyclodendron* Maithy. Similar specimens have also been figured in their study of *Buriadia* by Pant and Nautiyal (1967, pl. 4, fig. 2). Therefore, the present study leads to the conclusion that the stem remains earlier referred to cf. *Cyclodendron* sp. belong to *Buriadia*.

Sagenopteris (?) *stoliczkana* Feistmantel, 1879

Pl. 1, fig. 3

Feistmantel (1879, pl. 13, fig. 4) figured two leaves on one specimen from Domahani, Giridih Coalfield. He considered them to be connected together, forming so a fingered leaf. According to Feistmantel, the longer

leaf represents the middle portion and the other would represent the lateral portion of a palmate frond. Therefore, he placed this form under *Sagenopteris*. Arber (1905: 92) considered it to be *Glossopteris* and very possibly leaves of *Glossopteris decipiens* Feistmantel. Recently this specimen no. 5012 preserved at the Geological Survey of India, Calcutta has been examined by me.

On careful examination I found that there is no organic connection in between two leaves. Therefore, their placement under *Sagenopteris* is not correct. Arber (1905) has also mentioned this fact and considered them to be *Glossopteris*. However, this too is also incorrect. The specimens show Gangamopteroid type of venation and in their morphological characters are comparable to *Gangamopteris angustifolia* McCoy. The specimens are linear in outline, with 3 median subparallel veins with interconnections. Lateral veins emerge at acute angle, course straight, narrow elongate meshes are formed by coalescence. In view of this it is proposed here to transfer the specimens described by Feistmantel (1879) under *Sagenopteris* (?) *stoliczkana* to *Gangamopteris angustifolia* McCoy.

Rubidgea emarginata sp. nov.

Pl. 1, figs. 4, 5

Diagnosis — Leaf obovate shape, apex broad, emarginate in the middle, median region of leaf occupied by 7 subparallel veins, which gradually reduces in number towards the apical point, lateral veins arise at acute angle $\pm 50^\circ$, passes to the leaf margin with a gentle curve, dichotomising 2 or 3 times before reaching to the margin, interconnections absent, density of veins 8-10 in one cm width.

Holotype — 35204/424, B.S.I.P., Lucknow.

Locality — Central pit, Srirampur Colliery, Giridih Coalfield, Bihar.

Age — Karharbari Formation, Lower Gondwana (Lower Permian).

Description — Only a solitary specimen is recorded in the collection. The leaf is incomplete at the base. However, in the preserved basal portion 7 parallel running veins are present in the median region. Lateral veins emerge from the different median veins at different levels as detailed. The outer median pair is persistent up to 1/3 level from base, and then totally disolutes into lateral veins. The subsequent

inner pair is persistent up to 1/2 length of leaf from base and the innermost pair up to 3/4 length of leaf from leaf base before disolving into lateral veins. The central median vein is persistent nearly to the apical point. The lateral veins course in most portion of the leaves show a gentle radial curvature, while near the apex the veins are \pm straight. Each vein dichotomises two or three times before reaching to the margin. Anastomoses in between the veins are totally absent.

Comparison — Till now only three species of *Rubidgea* Tate are known from the Glossopteris flora. *Rubidgea mackayi* Tate (1967) recorded from the Karoo beds of South Africa compares in shape but has rounded apex. *Rubidgea obovata* Maithy (1965a) recorded from the Karharbari Formation of Giridih Coalfield has obtuse apex and the median portion is occupied by few parallel running veins. *Rubidgea lanceolata* Maithy (1965a) differs in its lanceolate shape and acute apex.

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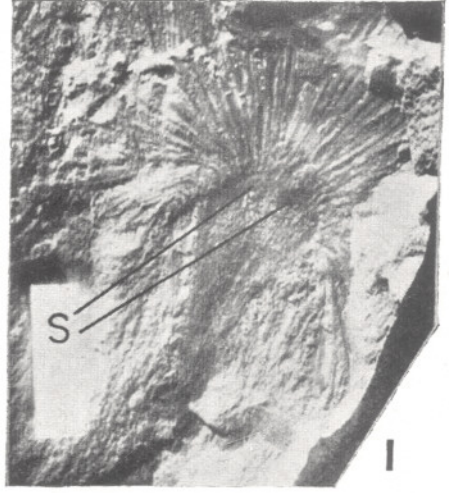
EXPLANATION OF PLATE

PLATE 1

1. *Palmatophyllites wardii* n. comb., 7303, Geological Survey of India, Calcutta, $\times 1$.
2. Stem remain of *Buriadia*, 8571, Birbal Sahni Institute of Palaeobotany, $\times 1$.
3. *Gangamopteris angustifolia* McCoy, 5012, Geological Survey of India, Calcutta, $\times 1$.
4. *Rubidgea emarginata* sp. nov., 35204/424, Birbal Sahni Institute of Palaeobotany, $\times 1$.
5. A portion of Fig. 4 enlarged to show venation $\times 4$.



4



1



2



5



3