
Occurrence of *Benlightfootia* from the Ib-River Coalfield, Orissa

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Singh, Kamal J. & Chandra, Shaila 1990. Occurrence of *Benlightfootia* from the Ib-River Coalfield, Orissa. In: Jain, K. P. & Tiwari, R. S. (eds)—*Proc. Symp. 'Vistas in Indian Palaeobotany'*, *Palaeobotanist* **38** : 55-57

Benlightfootia Lacey & Huard-Moine has been reported from the Kamthi Formation of Belpahar area, Ib-River Coalfield, Orissa. It is characterised by non-petiolate, cordate, bifid leaves having a deep apical notch. The venation is open, dichotomous, arising from a single thick vein at the base of the leaf. A new species, *B. indica*, has been proposed.

Key-words—Megafossils, Sphenophyllales, Ib-River Coalfield, Upper Permian (India).

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सारांश

इब नदी कोयला-क्षेत्र (उड़ीसा) से बेनलाइटफुटिया की प्राप्ति

कमलजीत सिंह एवं शैला चन्द्रा

उड़ीसा में इब नदी कोयला-क्षेत्र में बेलपहाड़ क्षेत्र के कामथी शैल-समूह से बेनलाइटफुटिया लैसे व हार्डमॉयन अभिलिखित किया गया है। यह पत्ती वृत्तहीन, हृदयाकार, द्विशाखित एवं अग्रस्थ कटान युक्त है। इस पत्ती के आधार से एक मोटी शिरा निकलती है जो द्विभाजित एवं खुला शिरान्यास बनाती है। बेनलाइटफुटिया इंडिका नामक एक जाति प्रस्तावित की गई है।

THE genus *Benlightfootia* was proposed by Lacey and Huard-Moine 1966 for certain unique bifid leaves from the Wankie beds, Zimbabwe. Earlier, such leaves were identified as *Glossopteris* or *Sphenophyllum*. Lacey and Huard-Moine (1966) found that these leaves belong neither to *Glossopteris* nor to *Sphenophyllum*, and thus instituted a new genus—*Benlightfootia*.

The type species *B. mackii* is characterised by non-petiolate, bifid, cordate leaves occurring singly or in apparent clusters. A deep apical notch exists between the two apical lobes. The venation of the leaf is open, dichotomous, arising from a single, thick vein at the base of the leaf. The veins by repeated dichotomy reach the margins and extremities of the lobes which are slightly rounded having smooth margins. The venation of two halves of the leaf is completely distinct from near the base.

MATERIAL AND METHODS

The material was collected from the outcrops of the Kamthi Formation in Ib-River Coalfield, Orissa,

near Belpahar railway station. The specimens are impressions on light reddish-brown to reddish-grey, fine-grained, calcareous shales. There is no carbonised matter on the specimens.

DESCRIPTION

Genus—*Benlightfootia* Lacey & Huard-Moine 1966

Benlightfootia indica sp. nov.

Pl. 1, figs 1, 2; Text-fig. 1

Diagnosis—Leaves bifid, sessile, occurring in a cluster of two or three; spreading out at 45°-55° from a common middle portion; shape basically cordate with a deep apical notch; venation open, dichotomous, arising from a thick, one or two veins at the base of the leaf; vascular system of the two halves of leaf completely distinct from near the base. Apices of lobes sharp and somewhat acute in shape with 3-4 slight depressions along the margins.

Holotype—Specimen no. BSIP 36387; Kamthi Formation, near Belpahar railway station, Ib-River Coalfield, Upper Permian.

Description—In all, there are three specimens in the collection, out of which, the best preserved specimen has two leaves. Leaves are cordate, 3.8 to 4.2 cm long and 2 to 2.2 cm wide at their widest part with a 1 to 1.2 cm deep terminal notch. The L:W ratio is 2:1. The leaves are sessile. Each lobe is 1 to 1.1 cm in width at the widest part of the leaf. The apices of lobes are sharp and acute having 3-4 slight depressions along the margin. A single major vein enters the base of the leaf and soon divides into two which by repeated dichotomy form two separate sets

of veins (about 20-22 veins at the widest part of each lobe) supplying to each half of the leaf. The bases of leaves are acute-cuneate. All the three leaves are directed towards a common point suggestive of a part of a whorl.

COMPARISON

Benlightfootia indica superficially resembles *Parasphenophyllum crenulatum* Maithy 1978 and *Sphenophyllum utkalensis* Pant *et al* 1985 as they

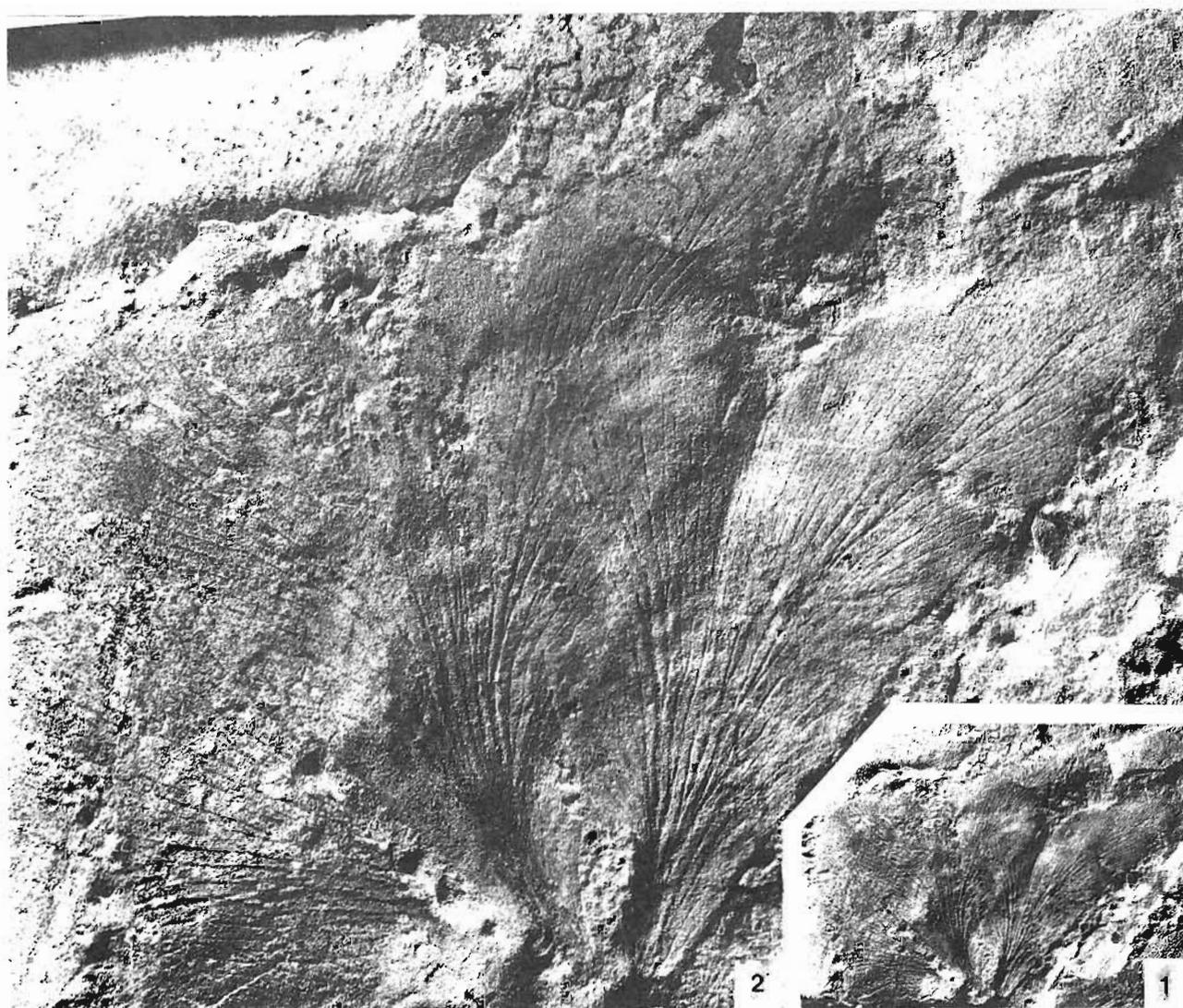


PLATE 1

- 1 *Benlightfootia indica* sp. nov., holotype showing two sessile bifid and cordate leaves. Specimen no. BSIP 46387 × 1
- 2 Leaves in fig. 1 enlarged to show the deep terminal notches, acute apices having depressions along the margins and one of

two major veins at the base in each leaf dichotomise to form two separate sets of veins supplying each half of the leaf × 3.5



Text-figure 1—*Benlightfootia indica* sp. nov.: The sessile, bifid and cordate leaves showing terminal notches, acute apices with depressions along the margins and one or two thick veins at the base dichotomise to form two separate sets of veins supplying each half of the leaf; Specimen no. BSIP 36387 $\times 2$.

have bifid leaves and apical notches. *B. indica* further resembles *S. utkalensis* in its sessile nature and sharp acute apices. The apices in *S. utkalensis* are comparatively more pointed. *B. indica* differs from *S. utkalensis* in having 3-4 depressions in the apices along the margins of lobes and in having two separate sets of main veins supplying each half of the leaf. It seems that the vascular supply of the two halves in *B. indica* is completely separate from the base itself. The apical margins in *S. utkalensis* are smooth and its venation is also different from *B. indica*.

The apical margins of both *Benlightfootia indica* and *Parasphenophyllum crenulatum* have crenulations but the shape of the leaves is different. In *B. indica* the leaf is cordate and sessile whereas the leaf of *Parasphenophyllum crenulatum* is triangular and petiolate. The vascular system in both the genera are also distinctly different.

Benlightfootia indica may, however, be compared with some northern species of *Sphenophyllum* in having apically notched leaves. The comparable northern species are *Sphenophyllum*

longifolium, *S. majus*, *S. oblongifolium*, *S. orbicularis*, *S. sarrensis*, *S. saxonicum* and *S. seawardii* (in Boureau, 1964). All these species are different from *Benlightfootia indica* in having variously toothed apical margins and unusual sphenophyll venation.

Benlightfootia indica differs from the type species *B. mackii* in having sharp and acute apices and 3-4 depressions along the margins of lobes, whereas the apices in *B. mackii* are obtuse, or somewhat rounded, and the margins of the apical lobes are smooth.

DISCUSSION

Lacey and Huard-Moine (1966) placed *Benlightfootia* under *incertae sedis* as they could not ascertain its affinity; they, however, opined that *Benlightfootia* could be a ginkgoalean leaf of a non-petiolate form, comparable with *Ginkgoidium*, *Ginkgoites*, *Baiera*, or *Psymnophyllum*. In the absence of any fertile part, it is difficult to place it under any known group of plants. However, its close external morphological resemblance with the known Sphenophyllales inadvertently includes it under this group. *Benlightfootia* must have been a small plant like *Raniganjia*, *Sphenophyllum* and *Lelstotheca* with leaves borne at the nodes in clusters.

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