STUDIES IN THE GLOSSOPTERIS FLORA OF INDIA — 16
DADOXYLON JAMUDHIENSE, A NEW SPECIES OF FOSSIL WOOD FROM THE RANIGANJ STAGE OF JHARIA COALFIELD, BIHAR

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ABSTRACT

A new species of fossil wood, *Dadoxylon jamudhiense*, is described from the Raniganj stage of Jharia coalfield, Bihar. The wood is distinguished by the presence of a large percentage of partly biseriate xylem rays, 1-2 or 3 seriate, alternate or opposite, mostly circular radial pits and 1-4-simple and broadly oval to circular pits in the cross-field.

INTRODUCTION

FROM the Lower Gondwanas of India so far six species of the genus *Dadoxylon* are known. Four species, viz., *Dadoxylon indicum* Holden (1917), *D. bengalense* Holden (1917), *D. barakarense* Surange & Saxena (1959) and *D. parenchymosum* Surange & Maithy (1963) belong to the Barakar stage while the remaining two, viz., *D. zalesskyi* Sahni (1932) and *D. parbeliense* Rao (1935) are known from the Raniganj stage.

The present fossil wood was collected from a place near Telmucha in the Jharia coalfield, Bihar, and as such belongs to the Raniganj stage (Upper Permian).

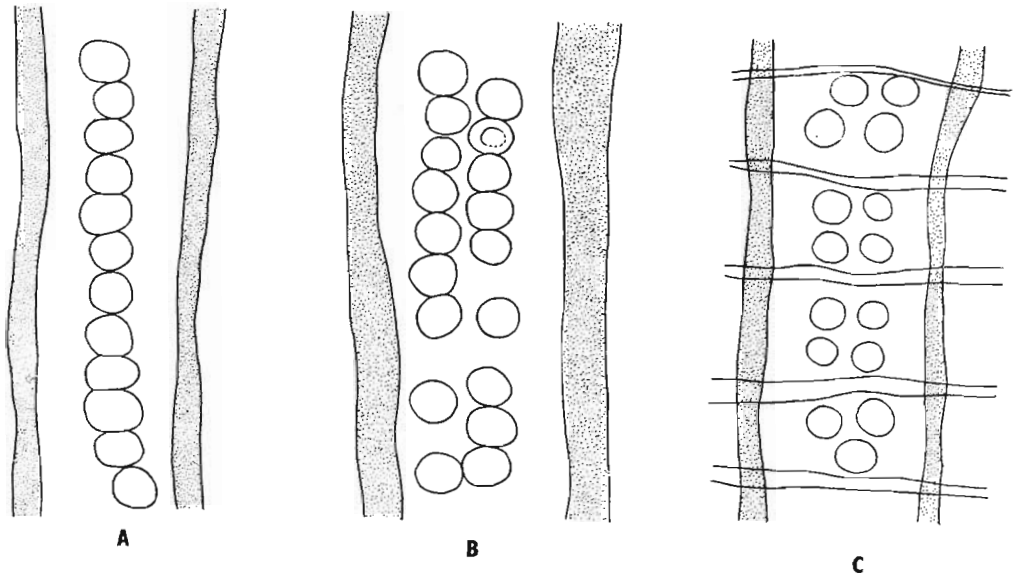
DESCRIPTION

Dadoxylon jamudhiense sp. nov.

The specimen is 21 cm. in length and 7·2 cm. at the greatest diameter. It consists of a decorticated piece of secondary wood of a stem and is devoid of pith and primary xylem. The colour is grey to light brown unlike that of the specimens from the Raniganj stage of the Raniganj coalfield, Bengal, which are dark brown in colour. The growth zones are not visible to the unaided eye but at places reddish brown streaks give the appearance of the growth rings. Under the microscope at certain places small cells recalling that of the autumn wood zone are seen (PL. 1, FIG. 1) but they seem to be the result of crushing and the presence of definite growth rings is doubtful. In cross section the tracheids are thick-walled, polygonal or squarish to rectangular in shape. The average dimensions of the tracheids are 30-54 μ × 25-46 μ.

Xylem Rays — The xylem rays (PL. 1, FIG. 2) are homogeneous, numerous, uniseriate or partly biseriate, the average frequency of uniseriate and partly biseriate rays being 55 and 45 per cent respectively. The rays are 1-18 cells deep, average depth being 5-6 cells. When biseriate, not infrequently the rays are fusiform in shape (PL. 1, FIG. 3). Tangentially the ray cells are higher than broad, measuring 28 × 22 μ. Radially they are several times as long as high, each cell spanning 2-8 tracheids. Tangential walls of the tracheids are smooth. Xylem parenchyma is absent.

Pitting — Due to bad preservation pitting on the radial walls of the tracheids is not very clear. However, in better preserved parts bordered pits on the radial walls of the tracheids are seen. The pits are uniseriate (PL. 1, FIG. 4; TEXT-FIG. 1A) or biseriate (PL. 1, FIG. 5; TEXT-FIG. 1B), very rarely triseriate. Pits are alternate, separate or contiguous and circular or flattened. When biseriate the pits are sometimes in two files and opposite or subopposite. Rarely they become hexagonal due to contact. Rims of Sanio are absent. The average dimension of circular pits is 10·5 × 10·5 μ, and that of the flattened pits is 8 × 10 μ (coefficient, e = d/D, where 'e' is the coefficient, 'd' is the height and 'D' the breadth of the pits, is 1-0·76). The pit pore, which is rarely seen, is central and circular. Diameter of the pore is 3·5-5 μ. Owing to the thinness of xylem ray walls the pits in the cross-field are rarely preserved. At places where the preservation is good pits in the cross-



TEXT-FIG. 1 — Tracheids in radial longitudinal section showing, A. uniseriate pits, B. biseriate pits and C. pits in the cross-field. × 500.

field number 1-4 and are simple and broadly oval to circular (PL. 1, FIG. 6; TEXT-FIG. 1C).

DIAGNOSIS

Dadoxylon jamudhiense sp. nov.

Growth rings not distinguished; tracheids radially 30-54 μ, tangentially 25-46 μ. Xylem rays homogeneous, uniseriate or partly biseriate, percentage being 55 and 45 respectively, 1-18 cells deep, average depth 5-6 cells; ray cells 28 μ high, 22 μ broad. Tangential walls of the tracheids smooth.

Radial pits bordered, uni- or biseriate, rarely triseriate, alternate, separate or contiguous, circular or slightly flattened; pits 8-10·5 μ × 10·5 μ; pit pore central and circular, 3·5-5 μ. Pits in the cross-field 1-4, simple and broadly oval to circular.

Holotype — 20902, Birbal Sahni Institute of Palaeobotany, Lucknow.

Horizon — Raniganj stage.

Age — Upper Permian.

Locality — South Jamudhia, near Telmucha, Jharia coalfield, Bihar.

Comparison — The radial pitting and character of the xylem rays of the present wood do not entirely conform to the generic diagnosis of the genus *Dadoxylon* Endlicher. When a better specimen is found, it will perhaps form a new genus. However, for the present this specimen is being described as a species of the genus *Dadoxylon*. The principal difference from the other Dadoxyla of the southern hemisphere is in the apparent absence of definite growth zones. At certain places cells resembling those of autumn wood zone have been found but they do not form continuous rings. These cells more look like tangentially flattened tracheidal cells than the elements of autumn wood. Then in *Dadoxylon jamudhiense* a large percentage of the xylem rays is biseriate, which is only paralleled in *Dadoxylon lukugense* Grambast (1960) where about 25 per cent of the xylem rays are biseriate. However, in the latter species the xylem rays are comparatively deeper (1-62 cells) and the radial pits are of typical 'araucarian' type with 3-8 bordered pits in the cross-field while in the present specimen the xylem rays are only 1-18 cells deep, radial pits are not absolutely 'araucarian' and the 1-4 simple pits in the cross-field are also a difference. In *Dadoxylon meridionale* White (1908) growth rings are absent but the radial pits are only uniseriate. Growth rings are also not found in *Dadoxylon maneiroi* Kräusel & Dolianiti

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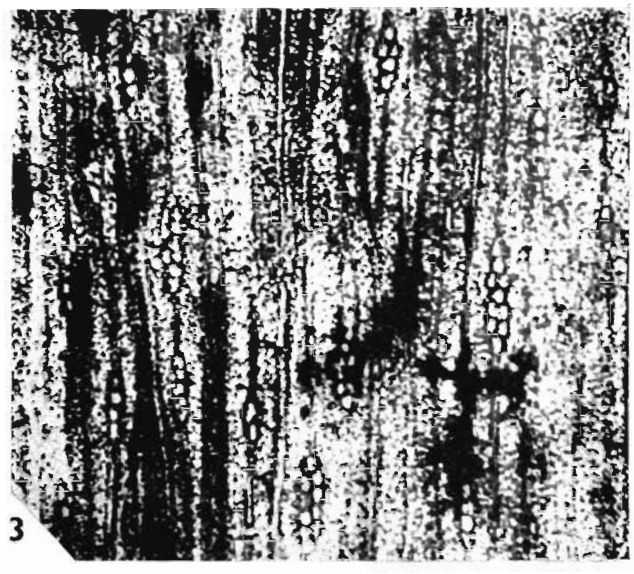

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(1958) which is different from the present wood in having uniseriate xylem rays, up to 4-seriate radial pits and 1-7 pits in the cross-field.

Out of the Dadoxyla from the Gondwana rocks of India *Dadoxylon indicum* Holden (1917) resembles the present wood in having 1-4 simple pits in the cross-field and 1-2-seriate flattened radial pits. But in *D. indicum* the xylem rays are uniseriate and 2-7 cells deep while in *D. jamudhiense* the xylem rays are 1-18 cells deep and up to 45 per cent biseriate. *Dadoxylon zalesskyi* Sahni (1932) also resembles the present wood in 1-4 simple pits in the cross-field but in the former species the radial pitting is up to 5 seriate and the rays are mostly uniseriate. There is no point of resemblance between *Dadoxylon jamudhiense* and other fossil woods from Lower Gondwanas of India.

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EXPLANATION OF PLATE 1

1. Transverse section through the fossil. × 45.
2. Tangential longitudinal section through the fossil showing distribution of xylem rays. × 45.
3. Tangential longitudinal section through the fossil showing large number of partly biseriate xylem rays. × 90.
4. Radial longitudinal section through the fossil showing uniseriate tracheidal pits. × 275.
5. Radial longitudinal section through the fossil showing biseriate tracheidal pits. × 275.
6. Radial longitudinal section through the fossil showing pits in the cross-field. × 575.