

Report of a Fossil Wood of Mimosoideae from the Latest Cretaceous Sediments of Maharashtra, India

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ABSTRACT

I. INTRODUCTION

A petrified fossil wood described in the present paper is collected from Mahurzari of Nagpur District and lies at 21° 14' N., 79° 1' E. which is about 20 kms from Nagpur. So far there are fossil records from the Deccan Intertrappean sedimentary of Mahurzari which is of uppermost Cretaceous to lower Eocene age.

Various Wood fossils are reported from Deccan Intertrappean beds includes *Chitaleoxylon deccanese* (Sheikh, 1971). Previous workers have been collected and described in detail many fossil woods from the exposure of Mahurzari resembling the family Burderaceae/ Burseraceae, Simarubiaceae, Lecithidaceae, Tiliaceae, Guttiferae etc were worked out in detail by Uttam Prakash (Prakash, 1962) and Shallom (Shallom, 1959). Fossil megafloreal records from this locality, that include a monocot fruit *Viracarpou sahnii* (Chitale et al., 1969), a monocot wood *Palmoxyton eocenium* (Prakash, 1962a), few dicot leaf impressions (Trivedi, 1956), Dicot wood like *Ailanthoxyton mahurzariense* (Shallom, 1959a; Idem, 1961), *Anacardioxyton semicarpoides* (Prakash and Dayal, 1965a), *Aeschynomene tertiara* (Prakash, 1962b,c; Idem 1962), *Dryoxyton mahurzarii*, *D. intertrappea*, and *D. filiacoidea* (Trivedi, 1976), Wood of Burseraceae (Shallom, 1958), Wood of Rutaceae (Chitale and Shallom, 1962), *Elaeocarpoxyton antiquum* (Prakash and Dayal, 1964), *Grewioxyton mahurzariense* (Prakash and Dayal, 1963), *G. indicum* (Prakash and Dayal, 1965), *Simarubaceoxyton mahurzarii* (Idem, 1959; Shallom, 1959b), *S. indicum* (Prakash, 1962d), *Leoxyton multiseriatum* (Prakash and Dayal, 1964), *Barringtonioxyton eopterocarpu* (Prakash and Dayal, 1965b), *Hibiscoxyton intertrappeum* (Trivedi and Ambwani, 1971), *Perrottelioxyton mahurzarii* (Chitale et al. 1971), *Shoreoxyton mahurzarii* (Paradkar, 1972), *Rutaceoxyton mahurzarii* (Chitale and Khubalkar, 1974), *Sterculioxyton baradense* (Sheikh and Kolhe, 1980), and *Erythroxyton mahurzarii* (Kapgate, 2007), *Ochnaceoxyton tertiara* (Ramteke 2016) However, the present specimen is also the record of fossil wood resembling the living genus *Albizia* of family Mimosaceae from this locality.

II. MATERIAL & METHOD

A wood specimen is collected during the field visit in situ condition. It is petrified and well preserved. The specimen is cut in Transverse, Transverse Longitudinal and Radial longitudinal plane. Cellulose acetate peel sections are taken after etching with Hydrofluoric Acid were prepared along transverse, transverse longitudinal and radial longitudinal plane (Darrah, 1936). The peels were mounted in DPX as mountant and observed under microscope for detail study.

III. DISCUSSION

The specimen described here measures about 12 inches in diameter and 23 inches in length. The primary tissue is absent. The secondary wood is decorticated, diffused porous and without growth rings. It consists of vessels, wood parenchyma, wood rays and wood fibers.

Vessels

Vessel are medium sized and can be seen with naked eyes. They mostly solitary as well as radial in multiples of 2-3 and some seen obliquely placed (Plate Fig. B). Each vessel measures 130 to 170 μm in diameter. Their walls are moderate thick. The solitary vessels are circular to sub-circular in transverse plane. The vessel frequency 5 to 75 per sq. mm. Rays are seen uniseriate contiguous with vessels at places (Plate Fig.B). Vessel members are long and measures 2.4 to 2.8 mm. Perforation plates are simple and oblique (Plate Fig. D, E). The intervascular pits are simple, alternate, bordered and hexagonal and measures 5 to 6 μm in diameter. Pit pores are oval in shape (Plate Fig.-F). Tyloses are absent.

Xylem parenchyma

Xylem parenchyma cells are thin walled with transverse diameter 23 μm and height 58 μm . Paratracheal, vasicentric and in single tyre around the vessel. Medullary rays are not seen with naked eyes. They are larger and 22 to 27 cells in height, 125 μm broad and 16 to 18 per sq. mm. The rays are uni to multiseriate. They are long, broad and homogenous made up of procumbent cells. The uniseriate ones are 75 to 125 μm high and 20 μm wide. Pits to ray cells are very clear and are seen to be bordered and fine.

Fibers

The fibers are short, broad, thin walled to moderately thick walled. In transverse section they are completely arranged in regular bids of 3 to 7 in between xylem rays. The aseptate, non-storied nature of these fibers are very well seen in RLS of the specimen. They are 0.4 to 0.5 mm long and varied from 38 to 76 μm in radial diameter and 45 to 90 μm in tangential diameter. The inter fiber pits seems to be in spiral arrangement. Inter cellular spaces are visible in transverse section.

IV. DISCUSSION AND IDENTIFICATION

The above described specimen revealed following important details for its identification

- Wood diffuse porous.
- Vessels mostly solitary as well as radial in multiples of 2-3.

- Rays uniseriate contiguous with vessels.
- Perforation plates simple and oblique.
- Intervascular pits simple, alternate, bordered and hexagonal.
- Xylem parenchyma cells paratracheal, vesicentric and in single tyre around the vessel.
- Rays uni to multiseriate, long, broad and homogenous made up of procumbent cells.
- Fibers short, broad, aseptate and non-storied.

Comparison with fossil woods

Following fossil woods of Leguminoceae have been described from the different localities. *Acacioxylon indicum* (Ramanujam, 1954), Another wood from Tertiary of Madras *Ceasapinioxylon sitholeyi* (Ramanujam, 1954), differs from the fossil specimen. *Acacioxylon mohgaonense* (Shallom, 1963), from the Deccan Intertrappean beds of Mohgaonkalan.

By considering above features, for identification of the present fossil wood, key given by Records and Chattaway (1939), Metcalfe and Chalk (1950) and Shallom (1963) were used. Taking into consideration of the characters observe following modern families are comparable- Celastraceae, Hippocrataceae and Caesalpinaceae & Mimosaceae of Leguminosae (Metcalf & Chalk, 1950; Esau, 1970; Fahn, 1989).

It is comparable with Celastraceae in paratracheal parenchyma, simple perforation plates, bordered & alternate pits and multiseriate, homogeneous and aseptate fibers but differs in having typically small vessels.

With Hippocrataceae it is comparable in medium sized vessels, paratracheal, simple perforation plates and homogeneous aseptate fibers but differs in exclusively uniseriate rays.

In Caesalpinaceae the living wood of *Cercidium* and *Zuccanginia* differ from the fossil wood in medullary rays which are 4 to 7 cells wide in *Cercidium* and numerous uniseriate in *Zuccanginia* (Metcalf & Chalk, 1950). The typical characters of fossil wood are the presence of intercellular spaces in the fibers which character is absent in modern woods of Caesalpinaceae but is present in Mimosaceous woods. Hence the present specimen is come closer to the family Mimosaceae. Further the comparisons are made with Mimosaceous woods. *Pithocelebium dulce* differs from the fossil specimen in nature of vessels and in nature of medullary rays. In *Pithocelebium dulce* uniseriate medullary rays are predominant which character is absent in present specimen. *Albizzia labbeck* differs in vessels diameter, vessels frequency (5 to 75 per sq. mm) and typically uniseriate rays. The present specimen resembles more with *Albizzia labbeck* in having medium sized vessel diameter (130 to 170 µm), vessel frequency 5 to 75 per sq. mm, uni to multiseriate rays, homogeneous, 16 to 24 cell high, paratracheal, vesicentric parenchyma, pit pairs alternate, bordered and hexagonal, aseptate and non-storied which characters are matched with present specimen in great extent than the characters of other members.

From the above comparison it is clear that the fossil wood under consideration does not shows any resemblance with any of the reported fossil woods but shows much resemblance with genus *Albizzia labbeck* of modern family Mimosaceae. Thus it is included under family Mimosaceae under a genus *Albizzia* and named as *Albizioxylon mahurzarii* sp. nov. The generic name after the genus *Albizzia* of modern family Mimosaceae and specific name after the locality from where it is collected.

V. DIAGNOSIS

Albizioxylon gen. nov.

Vessel solitary with radial multiples of 3-4, medium sized. Perforation simple; intervacular pits alternate, bordered; parenchyma paratracheal vasicentric. Rays mostly multiseriate with few uniseriate, homogeneous, procumbent, fibers long, non-septate, moderately thick with intercellular spaces.

***Albizioxylon mahurzarii* gen. et sp. nov.**

Wood dicotyledonous, diffuse porous. Vessel 130 to 170 μm in diameter. 14 to 16 per sq. mm. solitary to radial multiples of 2-3. Perforation simple, transverse and oblique. Intervascular pit pairs alternate, bordered. Parenchyma paratracheal vasicentric. Medullary rays mostly homogeneous multiseriate, composed of procumbent cells, uniseriate, 15 to 20 cells in height, 125 μm wide, 16 to 19 per sq. mm. Fibers long moderately thick walled, aseptate with intercellular spaces 30 to 70 in t.d. and 0.5 –0.6 mm in length.

Holotype:- Deposited Deccan Flora Museum and Research center, Sakoli, Dist-Bhandara, Maharashtra, India.

Horizone:- Deccan Intertrappean Series of India.

Locality:- Mahurzari

Age :- Uppermost Cretaceous

VI. ACNOLEDGEMENT

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EXPLANATION OF PLATE FIGURES

Figure:

- A. Locality of Mahurzari
- B. T.S. of Wood showing Vessels (45X).
- C. T.L.S. showing Parenchyma (450X).
- D. T.L.S. showing rays and fibers (90X).
- E. R.L.S. view of wood (45X).
- F. Intervascular pit pairs (450X).

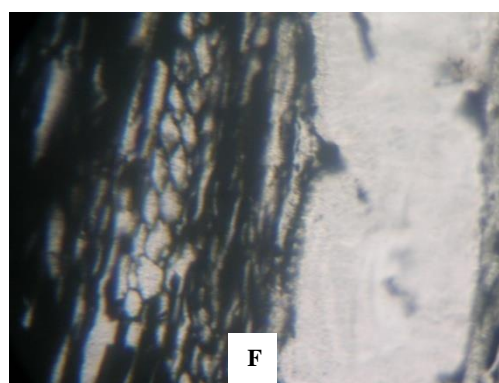
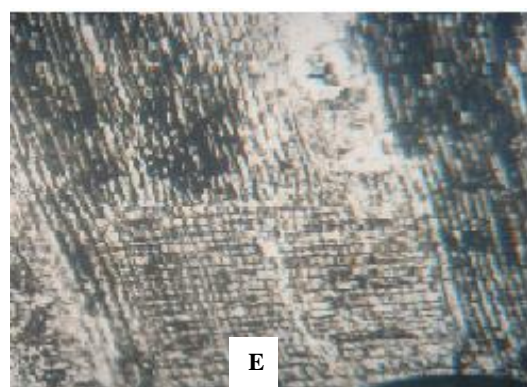
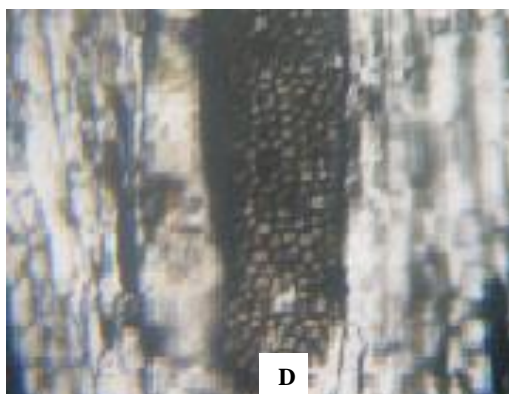
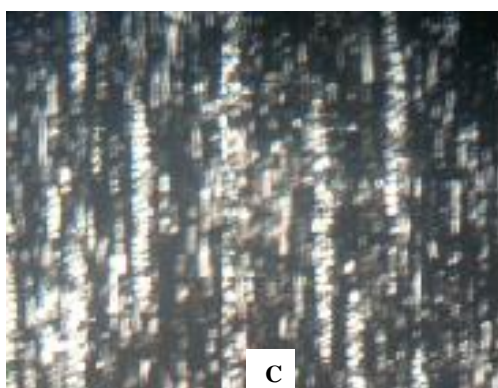
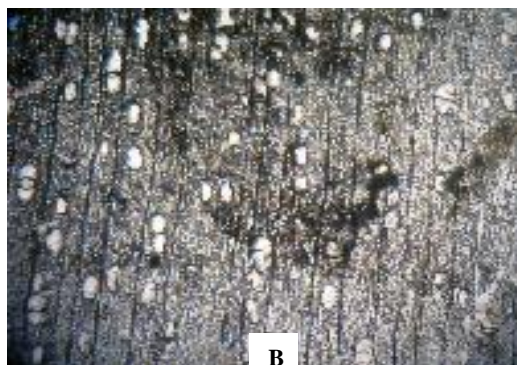


PLATE FIGURES