

A new fossil dicot wood from the Deccan Intertrappean beds of Mandla District, Madhya Pradesh

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A fossil dicotyledonous wood, *Euphorioxylon deccanense* sp. nov., of Sapindaceae has been described from the Deccan Intertrappean beds of Mehdwani, Mandla District. Small to medium-sized vessels, scanty paratracheal parenchyma, almost exclusively uniseriate xylem rays and non-septate fibres are the diagnostic features of the fossil wood.

Key-words—Xylotomy, Sapindaceae, *Euphorioxylon*, Deccan Intertrappean beds, Early Tertiary (India).

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सारांश

मध्य प्रदेश में मंडला जनपद की दक्खिन अन्तर्द्वीपी संस्तरों से एक नवीन द्विबीजपत्री अशिमत काष्ठ

राकेश चन्द्र मेहरोत्रा

मंडला जनपद में महदवानी की दक्खिन अन्तर्द्वीपी संस्तरों से सेपिन्डेसी कुल की यूफोरिऑक्सीलॉन दक्खिनेन्से नव जाति की अशिमत काष्ठ वर्णित की गई है। लघु से मध्य-आकार की वाहिकायें, अत्यल्प पराबाहिकी मृदूतक, प्रायः अत्यधिक एकपक्षितक दारु किरण एवं अपटी तंतु इस काष्ठाश्रम के प्रधान लक्षण हैं।

A LARGE number of fossil plants, mostly in the form of petrified woods, have been described from various Deccan Intertrappean localities of Mandla District, Madhya Pradesh (Mehrotra, Prakash & Bande, 1984; Bande, Mehrotra & Prakash, 1986). Recently a new locality, Mehdwani (22° 54' N; 80° 40' E), was discovered in the same area, which lies about 70 km north-east of Mandla proper. A number of palm woods and a few dicotyledonous woods were collected from here. One of the dicotyledonous woods from this collection has been found to resemble certain xylotomically closely related genera of Sapindaceae and is being described here.

SYSTEMATIC DESCRIPTION

Genus—*Euphorioxylon* Awasthi, Guleria & Lakhanpal, 1982

Euphorioxylon deccanense sp. nov.

Pl. 1, figs 1, 3, 4, 6, 7

Material—A small piece of well preserved secondary wood about 2 cm in length and 1.7 cm in width.

Description—Wood diffuse-porous (Pl. 1, fig. 1). Growth rings indistinct. Vessels usually small to medium-sized, sometimes very small, t.d. 40-120 μ m, r.d. 40-140 μ m, mostly solitary, occasionally in radial multiples of 2-4, rarely in tangential pairs, circular to oval when solitary, with flat contact walls when in multiples, sometimes deformed due to compression, 9-23 per sq mm (Pl. 1, figs 1, 3); tyloses occasionally present; vessel members 180-330 μ m long with oblique to horizontal ends; perforations simple (Pl. 1, fig. 4); intervessel pit-pairs bordered, alternate, 6-8 μ m in diameter, circular to oval in shape with lenticular apertures (Pl. 1, fig. 7). Parenchyma scanty paratracheal (Pl. 1, fig. 3), parenchyma cells thin-walled, 24-60 μ m in length and 16-20 μ m in diameter. Xylem rays 7-10 per mm, almost exclusively uniseriate, sometimes with paired cells, usually made up of procumbent cells, sometimes with both procumbent and upright cells, 8-12 μ m in width and 2-42 cells or 30-520 μ m in height (Pl. 1, fig. 4); ray tissue heterogeneous, procumbent cells 12-20 μ m in tangential height and 28-40 μ m in radial length; upright cells 28-40 μ m in tangential height and 8-12 μ m in radial

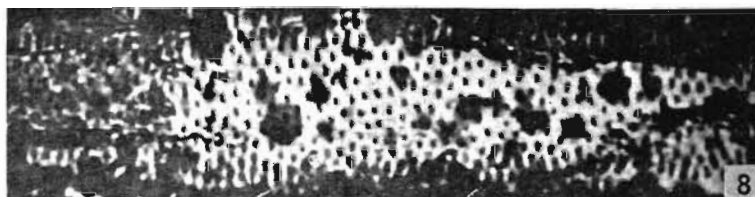
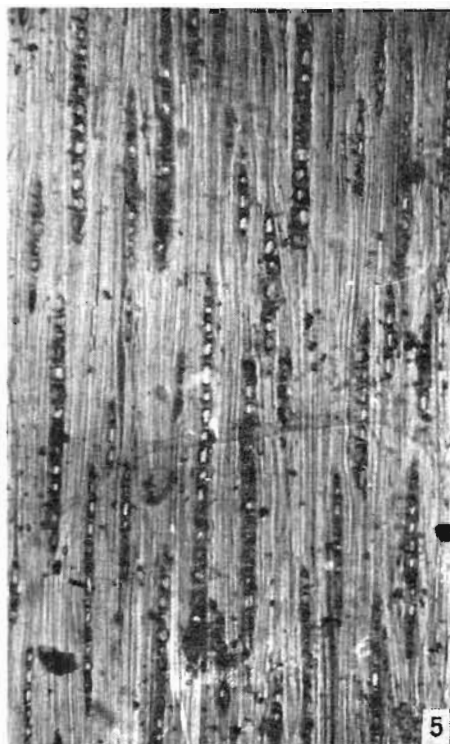
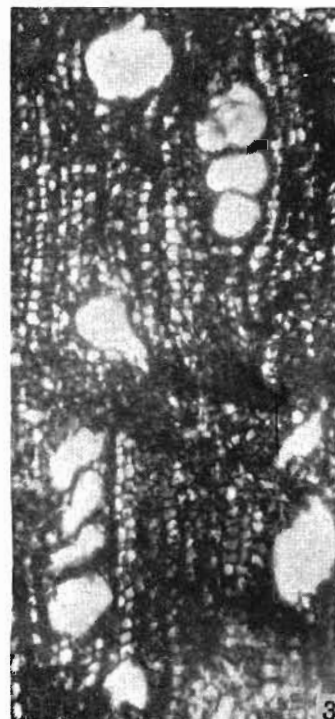


PLATE 1

length (Pl. 1, fig. 6). *Fibres* semi-libriform, oval to polygonal in cross section (Pl. 1, fig. 3), non-septate, 12-20 μm in diameter and 240-800 μm in length (Pl. 1, fig. 4).

Affinities—The important characters of the fossil wood are small to medium-sized vessels, scanty paratracheal parenchyma, almost exclusively uniseriate xylem rays, heterogeneous ray tissue and non-septate fibres. These characters are met with in the families Sonneratiaceae and Sapindaceae (Pearson & Brown, 1932; Metcalfe & Chalk, 1950; Kribs, 1959; Miles, 1978). In Sonneratiaceae, only the genus *Sonneratia* L. shows some similarity with the fossil in gross features. However, the presence of vested pitting and absence of parenchyma differentiate it from the present fossil (cf. Kazmi, 1982). As far as Sapindaceae is concerned, Ramesh Rao (1963, pp. 212-213) has given a key for separating different genera of this family on the basis of wood anatomy. A perusal of the key indicates that the fossil shows close resemblance with *Nepbelium* Linn., *Schleichera* Willd. and *Xerospermum ferrugineum* C.E.C. Fisher. *Schleichera* can be differentiated from the fossil in having diffuse as well as terminal parenchyma and 1-2 seriate xylem rays while *Xerospermum ferrugineum* can be distinguished in possessing comparatively smaller number of vessels (4-9 per sq mm). Hence, the fossil shows maximum resemblance with *Nepbelium* (sensu lato).

In its wider sense, *Nepbelium* consists of about 30 species. However, according to Radlkofer (in Brandis, 1971) they should be grouped under four distinct genera—*Euphoria*, *Litchi*, *Otonephelium* and *Nepbelium*. On the basis of xylotomy, *Nepbelium*, in its restricted sense, can be differentiated from the other three genera by the amount of wood parenchyma which is best developed in the former and is rather sparse in the latter three.

Wood anatomy of *Euphoria*, *Litchi* and *Otonephelium* has been described by Ramesh Rao (1963) and according to him they are indistinguishable. Besides consulting the description of Ramesh Rao (1963, p. 226), the wood slides of *Euphoria longana*, *Litchi*

chinensis and *Otonephelium stipulaceum* were also examined by the author who found that though there were some differences in a few anatomical characters of these three taxa, they were not significant enough to warrant a generic differentiation. However, it is felt that a critical examination of the wood slides of a larger number of species of these three genera would be desirable to establish generic identity on the basis of wood anatomy.

Thus, as known at present, on the basis of xylotomy the genera *Euphoria*, *Litchi* and *Otonephelium* form a complex whose components are impossible to differentiate. For the fossil woods assignable to this complex, Awasthi *et al.* (1982) had instituted the genus *Euphorioxylon*. Because of the closest resemblance of the present fossil with this complex, it has been placed under the same genus. In the generic diagnosis of *Euphorioxylon*, ray tissue was mentioned as homogeneous. However, due to the occasional presence of upright cells also in the present fossil wood, the ray tissue in its generic diagnosis should be emended as "homogeneous to heterogeneous".

So far the only record of *Euphorioxylon* is *E. indicum* Awasthi, Guleria & Lakhanpal (1982) which is known from the Cuddalore Series of Pondicherry and Kankawati Series of Kutch. This species differs from the present fossil in having homogeneous ray tissue and comparatively fewer vessels (9-14 per sq mm). In addition, vessel multiples are more frequent in it than in the present fossil wood.

As the present fossil is different from *Euphorioxylon indicum*, it has been placed under a new species *Euphorioxylon deccanense*, the specific name indicating its occurrence in the Deccan Intertrappean sediments.

Of the three living species resembling the fossil, *Euphoria longana* is distributed throughout the Western Ghats from the Konkan southwards, extending to Sri Lanka and ascending up to 900 m, Assam, South China, Burma and Malaya. *Litchi chinensis* is a native of China, cultivated in India for its fruits. *Otonephelium stipulaceum* is a handsome medium-sized tree being confined to the evergreen forests of Western Ghats from

PLATE 1

1. *Euphorioxylon deccanense* sp. nov.—Cross section of the fossil wood in low power showing shape, size and distribution of the vessels. $\times 45$; Slide no. B.S.I.P. 35895—I.
2. *Nepbelium stipulaceum*—Cross section of the modern wood showing similar shape, size and distribution of the vessels. $\times 45$.
3. *Euphorioxylon deccanense* sp. nov.—Magnified cross section of the fossil wood showing scanty paratracheal parenchyma and arrangement of the vessels. $\times 100$; Slide no. B.S.I.P. 35895—I.
4. *Euphorioxylon deccanense* sp. nov.—Tangential longitudinal section of the fossil wood showing structure of xylem rays and fibres. $\times 120$; Slide no. B.S.I.P. 35895—II.
5. *Nepbelium stipulaceum*—Tangential longitudinal section of the modern wood showing similar structure of xylem rays and fibres. $\times 120$.
6. *Euphorioxylon deccanense* sp. nov.—Radial longitudinal section of the fossil wood showing heterogeneous ray tissue. $\times 180$; Slide no. B.S.I.P. 35895-III.
7. *Euphorioxylon deccanense* sp. nov.—Magnified intervessel pit-pairs of the fossil wood. $\times 400$; Slide no. B.S.I.P. 35895—II.
8. *Nepbelium stipulaceum*—Magnified intervessel pit-pairs of the modern wood. $\times 400$.

the Nilgiris southwards, ascending up to 900 m (Ramesh Rao, 1963).

SPECIFIC DIAGNOSIS

Euphorioxylon deccanense sp. nov.

Wood diffuse-porous. *Growth rings* indistinct. *Vessels* small to medium-sized, t.d. 40-120 μm , r.d. 40-140 μm , solitary and in radial multiples of 2-4, 9-23 per sq mm, tyloses occasionally present; perforations simple; intervessel pit-pairs bordered, alternate, medium-sized with lenticular apertures. *Parenchyma* scanty paratracheal. *Xylem rays* almost exclusively uniseriate, mostly made up of procumbent cells, 7-10 per mm, 8-12 μm in width and 2-42 cells or 30-520 μm in height; ray tissue heterogeneous. *Fibres* semi-libriform and non-septate.

Holotype—BSIP Museum specimen no. 35895 (the specimen was consumed while preparing the slides).

Locality & age—Deccan Intertrappean beds of Mehdwani, Mandla District, Madhya Pradesh; Early Tertiary.

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