

Fossil wood of *Xanthophyllum* from the Cuddalore Sandstone near Pondicherry

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Awasthi, Nilamber (1987). Fossil wood of *Xanthophyllum* from the Cuddalore Sandstone near Pondicherry. *Palaeobotanist* 35(3) : 314-317.

A fossil dicot wood from the Cuddalore sandstones exposed at Murattandichawadi near Pondicherry has been described. In all its anatomical features the fossil shows resemblance with the woods of the genus *Xanthophyllum* of Polygalaceae and hence named as *Xanthophyllum cuddaloreense* sp. nov.

Key-words—Xylotomy, *Xanthophyllum*, Polygalaceae, Cuddalore Sandstone, Mio-Pliocene (India)

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सारांश

पाण्डिचेरी के समीपस्थ कुडलोर बालुकाश्म से जैन्थोफिल्लम की अश्मित काष्ठ

नीलाम्बर अवस्थी

पाण्डिचेरी के समीपस्थ मुरट्टंडीचावडी में विगोपित कुडलोर बालुकाश्म से प्राप्त एक अश्मित काष्ठ का वर्णन किया गया है। सभी शारीरिक लक्षणों में यह काष्ठ पोलीगैलेसी कुल के जैन्थोफिल्लम से समानता दर्शाती है अतएव इसे जै० कुडलोरेन्से नव जाति से नामांकित किया गया है।

THE Cuddalore Sandstone exposed around the village Murattandichawadi about 8 km north-west of Pondicherry is well known for rich deposits of petrified angiospermous and gymnospermous woods. The woods studied so far belong to Podocarpaceae, Palmae and nearly 15 tropical dicotyledonous families. They have been reviewed by Awasthi (1974), who subsequently described more dicotyledonous woods from the same area (Awasthi, 1975a, 1975b, 1977a, 1977b, 1979, 1980, 1981a, 1981b; Awasthi *et al.*, 1982). Some of them are phytogeographically significant as their modern counterparts presently occur in the evergreen forests of Malaya, Java, Sumatra and neighbouring Islands. The wood of *Xanthophyllum* being described here is the first authentic report of the occurrence of Polygalaceae in India in the geological past.

DESCRIPTION

Genus—*Xanthophyllum* Roxb.
Xanthophyllum cuddaloreense sp. nov.
Pl. 1, figs 1-5

Wood diffuse-porous. *Growth rings* not seen. *Vessels* small to medium, t.d. 100-180 μ m, r.d. 120-280 μ m, typically solitary, very rarely in radial multiples of two, circular to oval, mostly oval due to lateral compression before fossilization, irregularly distributed, sometimes crowded at places (Pl. 1, fig. 1) as well as very few (Pl. 1, fig. 2), about 2-10 vessels per sq mm; perforations simple, transverse to slightly oblique; vessel-members about 250-750 μ m in height; intervessel pits not well-preserved, seemingly small; tylosis-like structure occasionally seen in some vessels. *Parenchyma* paratracheal and apotracheal, paratracheal parenchyma usually scanty and limited to a few cells around vessels forming narrow or incomplete sheath (Pl. 1, fig. 3); apotracheal parenchyma diffuse or continuous or broken 1-2 seriate lines, irregularly and closely placed (Pl. 1, figs 2, 3), about 10-15 lines per mm; strands up to 8 cells; cells bigger than the usual size, oval radially, about 40 μ m in diameter. *Rays* fine, 1-2 seriate, about 12-18 per mm in cross-section, 6-40 cells in height, heterogeneous, consisting of procumbent cells in the middle portion and one to

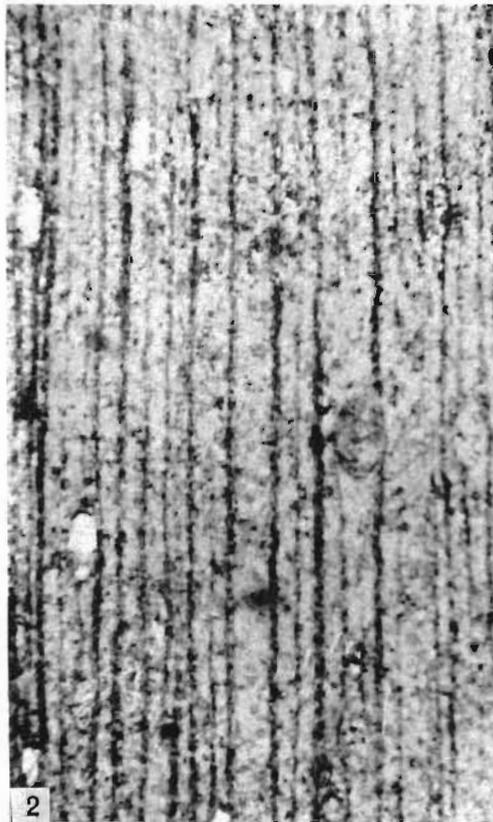
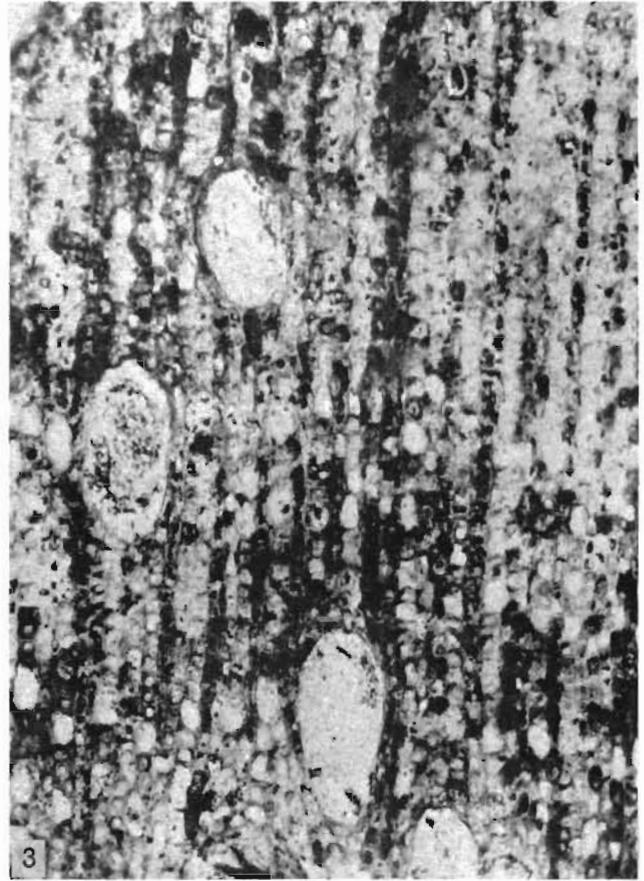
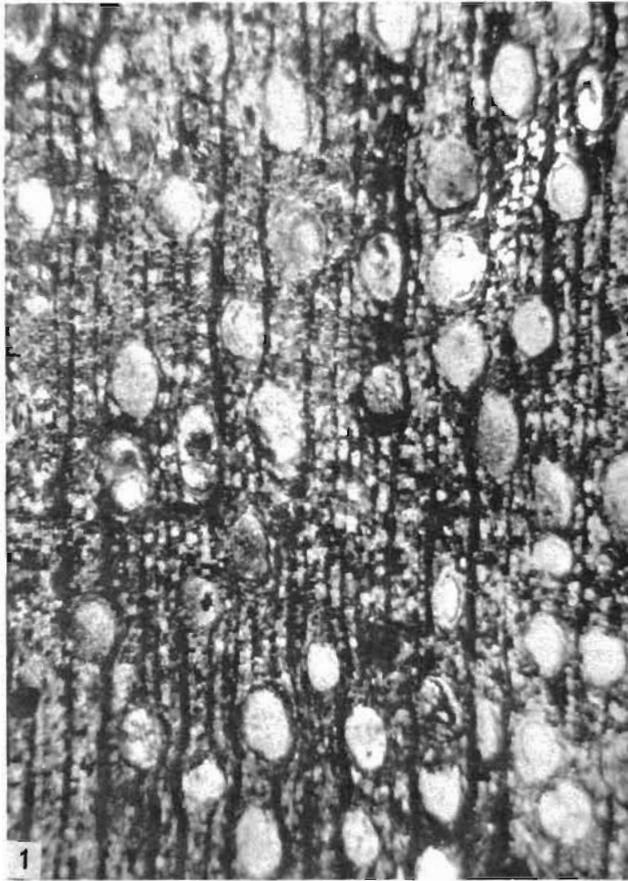


PLATE 1

several uniseriate marginal rows of upright or square cells at both the ends, end to end fusion common; upright cells 20-48 μm in tangential height and 40-100 μm in radial length; crystals present. *Fibres* aligned in radial rows, 12-32 μm in diameter, thick-walled, walls 4-6 μm in thickness, nonseptate, pits not satisfactorily preserved, rarely seen, small, bordered, about 4 μm in diameter.

AFFINITIES

In having the important as well as characteristic features, such as medium to large-sized solitary vessels, vasicentric and closely placed 1-2 seriate apotracheal parenchyma lines, 1-2 seriate heterocellular xylem rays and nonseptate thick-walled fibres with small bordered pits—the fossil wood is comparable with the woods of *Xanthophyllum* of the family Polygalaceae. According to Metcalfe and Chalk (1950, p. 135) *Xanthophyllum* is the only genus of Polygalaceae which is characterised by apotracheal parenchyma occurring as 1-2 seriate and closely spaced continuous or broken lines in addition to scanty paratracheal ones. This further confirms the identification of the fossil wood as *Xanthophyllum*. Amongst the various species of *Xanthophyllum* thin sections of the woods of *Xanthophyllum glaucum*, *X. andamanicum*, *X. flavescens*, *X. griffithii*, *X. virens* and *X. affini* were critically examined for identification of the fossil up to specific level. It was observed that the fossil resembles all these species in gross features. However, the nature and distribution of vessels, amount and distribution of parenchyma and width and height of rays show that the fossil wood appears to be closer to *Xanthophyllum flavescens*, though the frequency of vessels in the former is relatively more than in the latter.

Regarding the nomenclature of fossil wood the recommendation of Lakhnupal and Prakash (1980) has been followed. Accordingly the fossil wood is assigned the modern generic name *Xanthophyllum*. As pointed out above, the fossil wood slightly differs from *Xanthophyllum flavescens* in size and

frequency of vessels, hence a new specific name *Xanthophyllum cuddalorensis* is given to it. The specific name indicates its occurrence in the Cuddalore Sandstone.

Holotype—Specimen no. BSIP 35854; Murattandichavadi near Pondicherry; Cuddalore Sandstone; Miocene-Pliocene.

DISCUSSION

The genus *Xanthophyllum* Roxb. consists of about 60 species distributed in the Indo-Malayan region (Willis, 1973, p. 1229). *Xanthophyllum flavescens* seemingly the nearest living counterpart of the fossil, is found in the evergreen forest of Western Ghats, Burma and elsewhere in the Malayan region. In the Western Ghats, India, it occurs in the evergreen forest of the Nilgiris southwards up to 1300 m. In the high level evergreen forest of Palghat (Kerala) it is found in association with *Myristica laurifolia*, *Hydnocarpus laurifolius*, *H. alpina*, *Euphoria longana*, *Lansium anamalayanum*, *Garcinia spicata*, *Elaeocarpus serratus*, *Epiprinus mallotiformis*, *Gomphandra polymorpha*, *Gordonia obtusa*, *Syzygium* sp., *Baccaurea courtallensis*, *Glochidion malabaricum*, *Canthium diococcum*, *Scolopia crenata*, *Nothopodytes foetida*, *Actinodaphne hookeri*, etc. (Champion & Seth, 1968, p. 67).

A large number of taxa, most of which are the important elements of the evergreen to semi-evergreen forests, viz., *Anisoptera*, *Dryobalanops*, *Dipterocarpaceae*, *Shorea*, *Hopea*, *Sterculia*, *Gluta*, *Mangifera*, *Calophyllum*, *Mesua*, *Euphoria*, *Azalia*, *Cassia*, *Cynometra*, *Sindora*, *Duabanga*, *Sonneratia*, *Barringtonia*, *Chrysophyllum* and *Diospyros* are already known from the Cuddalore sandstones near Pondicherry (Awasthi, 1974, 1977a, 1977b, 1979, 1980, 1981a, 1981b; Awasthi *et al.*, 1982). Occurrence of *Xanthophyllum* too in the same deposits further indicates prevalence of excessive humid conditions in this region during the Miocene-Pliocene.

PLATE 1

Xanthophyllum cuddalorensis sp. nov.

1. Cross section showing nature and distribution of vessels and parenchyma. $\times 47$. Slide no. BSIP 35854-I.
2. Another cross section showing uneven distribution of vessels. $\times 45$. Slide no. BSIP 35854-II.
3. Cross section magnified to show the vessels and diffuse parenchyma. $\times 112$. Slide no. BSIP 35854-II.
4. Tangential longitudinal section showing rays. $\times 112$. Slide no. BSIP 35854-III.
5. Radial longitudinal section showing heterocellular rays. $\times 112$. Slide no. BSIP 35854-IV.

ACKNOWLEDGEMENTS

The author is grateful to the authorities of the Forest Research Institute, Dehradun for permission to consult the xylarium.

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