

Additional features of *Aristolochioxylon prakashii* Kulkarni & Patil from Nawargaon Intertrappeans, Maharashtra

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ABSTRACT

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The present paper deals with the additional characters of *Aristolochioxylon prakashii* Kulkarni and Patil recovered from Nawargaon Intertrappeans, district Wardha, Maharashtra. It is characterised in having complete cortex, less primary xylem poles and intact parenchymatous pith. This is the second report of occurrence of family Aristolochiaceae from Deccan Intertrappean beds of Wardha District.

Key-words—*Aristolochioxylon*, Deccan Intertrappean beds, Maharashtra, India.

महाराष्ट्र के नवरगाँव अंतर्द्वीपीय से प्राप्त एरिस्टोलोकीऑक्सिलॉन प्रकाशी कुलकर्णी एवं पाटिल के अतिरिक्त
लक्षण

कल्पना दतार एवं के.एस. पाटिल

सारांश

वर्तमान शोध-पत्र महाराष्ट्र में वर्धा जिले के नवरगाँव अंतर्द्वीपीय से प्राप्त एरिस्टोलोकीऑक्सिलॉन प्रकाशी कुलकर्णी एवं पाटिल के अतिरिक्त लक्षणों से संबंधित है। यह पूर्ण वल्कुट, अल्प प्राथमिक जाईलम स्तम्भों एवं असततच्छदी मृदूतिकामय मज्जा से अभिलक्षित है। यह वर्धा जिले के दक्खन अंतर्द्वीपीय संस्तरों से प्राप्त एरिस्टोलोचिएसी कुल की उपस्थिति का द्वितीय अभिलेख है।

संकेत-शब्द—एरिस्टोलोकीऑक्सिलॉन, दक्खन अंतर्द्वीपीय संस्तर, महाराष्ट्र, भारत।

INTRODUCTION

THE Deccan Intertrappean beds exposed in Nawargaon- Maragsur area (21° 01' North; 78° 35' East), Wardha District, Maharashtra are rich in

angiospermic remains. A number of dicotyledonous fossil woods have already been described from this area showing their close affinities with extant genera (Bande, 1986; Bande & Prakash, 1984; Bande & Srivastava, 1995; Bande *et al.*, 1986; Bonde, 1997; Khare *et al.*,

2000; Kulkarni & Patil, 1977; Shete & Kulkarni, 1982). Family Aristolochiaceae has a meagre fossil record, so far only one fossil wood *Aristolochioxylon prakashii* Kulkarni & Patil (1977) has been described. The present account is based on a single specimen collected from Nawargaon, the place from where *A. prakashii* was originally described by Kulkarni and Patil (1977). This is the second report of occurrence of the family Aristolochiaceae from Deccan Intertrappean beds of Wardha District, Maharashtra. The specimen and slides are housed in the Botany Department, Shivaji University, Kolhapur.

SYSTEMATICS

Family—ARISTOLOCHIACEAE

Genus—ARISTOLOCHIOXYLON Kulkarni & Patil, 1977

Aristolochioxylon prakashii Kulkarni & Patil, 1977

(Pl. 1.1-7)

Description—The fossil specimen very small piece of externally ribbed dicot wood measuring 3.3 cm in length and 0.5 cm in diameter. Cross section of the specimen shows epidermis, cortex, vascular tissue and pith (Pl. 1.1). Epidermis single layered of barrel shaped cells. Cortex 0.48 mm in radial extent, divided into three zones—outer and inner cortex parenchymatous, while middle one sclerenchymatous. Outer cortex 4-5 celled and about 160 μm in radial width, individual cells thin walled with very small intercellular spaces; inner cortex 4-5 celled and 208 μm in radial width, cells thin walled, round and compactly arranged. Middle cortex 3-4 celled and 112 μm in thickness, cells thick walled. Primary xylem poles 22, more or less equidistantly placed around the periphery of the pith (Pl. 1.2, 3). Average distance between two primary xylem poles 320 μm . Each pole with 2-3, 48 x 48 μm oval to round metaxylem vessel elements and 1-5 circular protoxylem elements measuring 4-8 μm in diameter. Primary xylem elements show annular and spiral thickenings (Pl. 1.5, 6). Secondary vascular tissue divided into 22 radial

strips, each corresponding to one primary xylem pole (Pl. 1.2, 4). The two consecutive strips separated by broad medullary rays. Each strip of secondary xylem 1300 μm long, 560 μm broad in the middle part, narrowed towards pith and slightly broaden towards the phloem side. Vessels more or less evenly distributed in each strip mostly solitary, very few in radial or tangential pairs and average distribution 20 per sq. mm. Vessels round in outline, t.d. 64–240 μm , r.d. 80–240 μm , average length 320 μm , wall 5 μm thick, intervessel pits distinct, simple, alternate, contiguous, 4 μm in diameter, perforation plate transverse to oblique porous and vessel parenchyma pits bordered. Xylem parenchyma paratracheal and vasicentric forming 1-2 layered sheath around the vessel; parenchyma cells tubular to rectangular and longitudinally elongated. Secondary xylem rays lacking. Xylem fibres libriform, hexagonal and somewhat tangentially flattened in cross section, r.w. 16 μm , t.w. 20 μm , common walls about 2 μm thick, 192 μm in length. Radial and tangential walls with a single row of bordered pits (Pl. 1.7), pit diameter 4 μm and lumen lenticular. Medullary rays 64–66 μm and 8-12 cells wide in cross section. Cells thin walled and radially elongated. Each xylem strip capped over by phloem patch, which covered by lunate fibrous cap on the cortical side (Pl. 1.4). Phloem patch 208 μm high and 576 μm broad in the middle. Phloem tissue not preserved. Fibre cap of the phloem 80 μm high. Consecutive fibre caps marginally fused forming more or less continuous lobed fibrous cylinder enclosing the vascular tissue. Pith cells (Pl. 1.3) progressively increase in size from periphery to centre; peripheral cells polygonal, 12 μm in diameter and compactly arranged; inner cells thin walled, round, 48 μm in diameter and loosely arranged.

DISCUSSION

Comparison with the modern woods—The features mentioned above occur mainly in the families whose members are adapted to climbing habit. These are Ranunculaceae, Menispermaceae, Berberidiaceae, Lardizabalaceae (=Sargentodoxaceae), Cucurbitaceae and Aristolochiaceae.

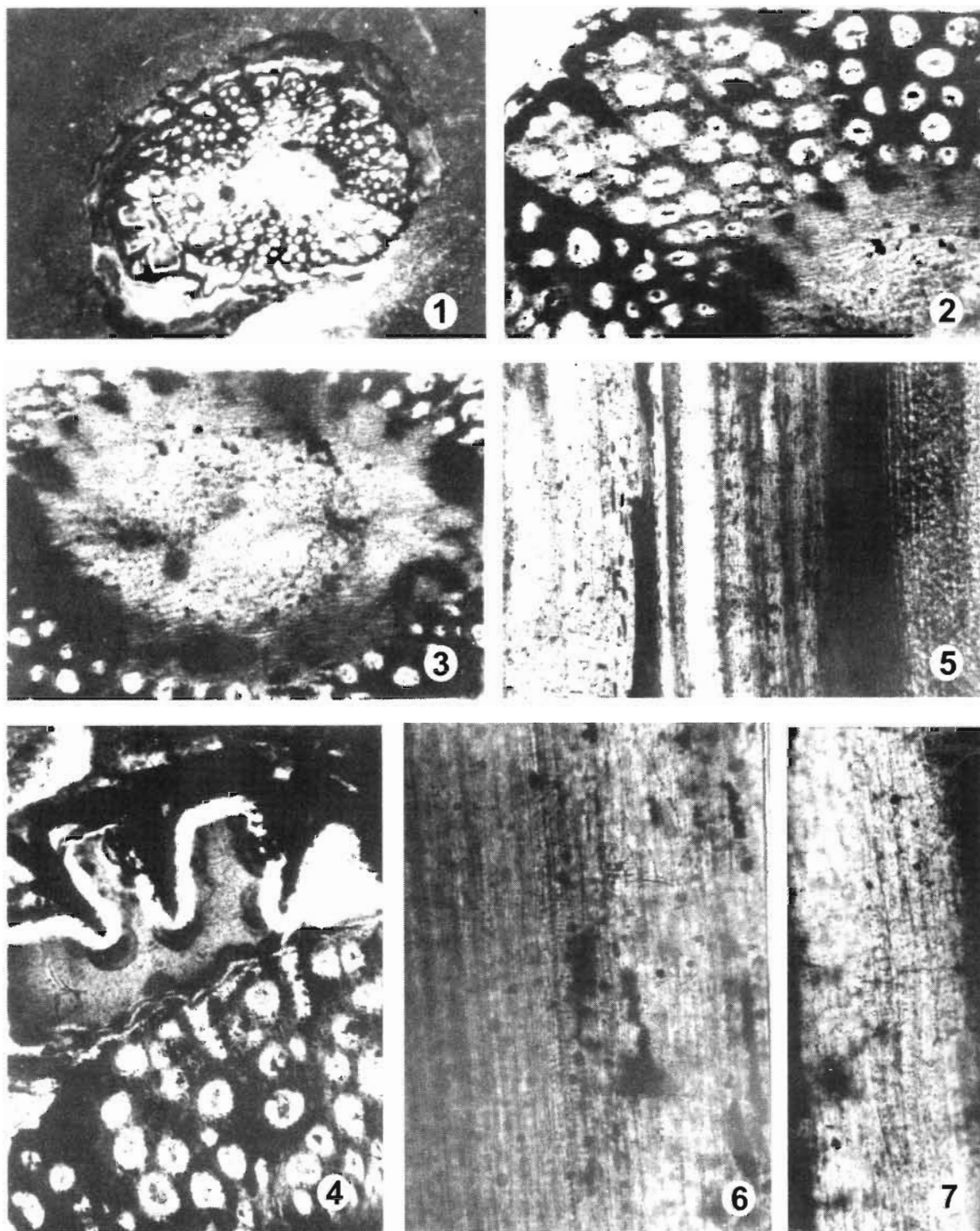


PLATE 1

Aristolochioxylon prakashii Kulkarni & Patil

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| <p>1. Cross section of the wood showing the broad medullary rays and lunate pericyclic caps. x 8.7.</p> <p>2. Cross section in magnified view to show the distribution of vessels, medullary rays and pith. x 83.3.</p> <p>3. Cross section showing solid pith region. x 83.3.</p> | <p>4. Cross section magnified to show lunate pericyclic caps over the secondary phloem patches. x 83.3.</p> <p>5, 6. Intervessel pitting. 5. x 83.3. 6. Same magnified. x 137.</p> <p>7. Bordered pits on the fibres. x 78.2.</p> |
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Detailed analysis of the anatomical features of families (Metcalfe & Chalk, 1950), family Aristolochiaceae and particularly *Aristolochia indica* shares number of common characters with the present fossil. The common characters are medium to large vessels, distributed singly, large intervacular pit pairs, paratracheal vasicentric parenchyma, absence of secondary vascular rays and fibres with large (6-8 µm) bordered pits.

Genus *Aristolochia* consists of 120 species (Mabberley, 1997) distributed mostly in tropics, rarely in temperate region. In India, *Aristolochia* is represented by seven species of which six species are climbers (Hooker, 1879).

Fossil records and comparison with the species—*Aristolochioxylon prakashii* Kulkarni and Patil (1977) is the only fossil record of the family Aristolochiaceae described from the Tertiary of India. The present fossil shows common features with *Aristolochioxylon prakashii* like externally ribbed axis, secondary xylem without vascular rays, phloem patches capped over by lunate fibrous patches, vessels medium to large, distributed singly, fibres with bordered pits on their radial and tangential walls and parenchyma paratracheal, vasicentric forming 1-2 layered sheath around the vessel.

However, the present fossil differs from *A. prakashii* in possessing preserved cortex, which differentiated into 3 zones—outer and inner zones parenchymatous and middle zone sclerenchymatous, less thick pericyclic fibre caps. Moreover, 22 primary xylem poles, secondary vascular tissue divided into 22 radial strips alternating with broad medullary rays, 20 vessels per sq. mm and parenchymatous solid pith are additional characters observed in the present specimen.

These differences could exist within the same plant depending upon the age and thickness of the stem. The present specimen appears to be younger part of *A. prakashii* as it shows less number of xylem poles

(22 instead of 30), characters of cortical tissues (3 zones) and intact pith.

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