

A new species of *Kamthioxylon* from the Kamthi Beds of Maharashtra, India

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Kamthioxylon biradarii sp. nov., has been described from the Kamthi Beds of Nandori, Chandrapur District, Maharashtra. It is characterized by 1-3 seriate circular pits, vestured pits, multiseriate hexagonal pits, bars of sanio, tangential pitting, xylem parenchyma and 2-6 field pits.

Key-words—Fossil wood, *Kamthioxylon*, Kamthi Beds, Chandrapur District, Maharashtra, India.

INTRODUCTION

THE present paper deals with anatomical studies of a new species of *Kamthioxylon* collected from the Kamthi Beds of Maharashtra. Genus *Kamthioxylon* represents fossil coniferous wood showing mixture of characters of two families.

Fossil flora from the Kamthi Formation has been studied by Vagyani and Mahabale (1974), Varadpande (1977a, b), Prasad (1982), Prasad and Chandra (1978a, b, 1981, 1984), Chitnis and Vagyani (1979), Agashe and Gowda (1979, 1982), Chandra and Prasad (1980, 1981), Mahabale and Vagyani (1980), Agashe *et al.* (1981), Biradar and Bonde (1981), Vagyani and Raju (1982), Agashe and Prasad (1984), Vagyani and Jamane (1986) and Agashe and Shashikumar (1997).

The petrified coniferous wood was collected from the Kamthi Beds of Nandori in Chandrapur District of Maharashtra. The sections were prepared by thin ground technique method.

DESCRIPTION

The specimen is a piece of decorticated secondary wood without pith and primary xylem. It is brownish and measures 11 cm x 8 cm.

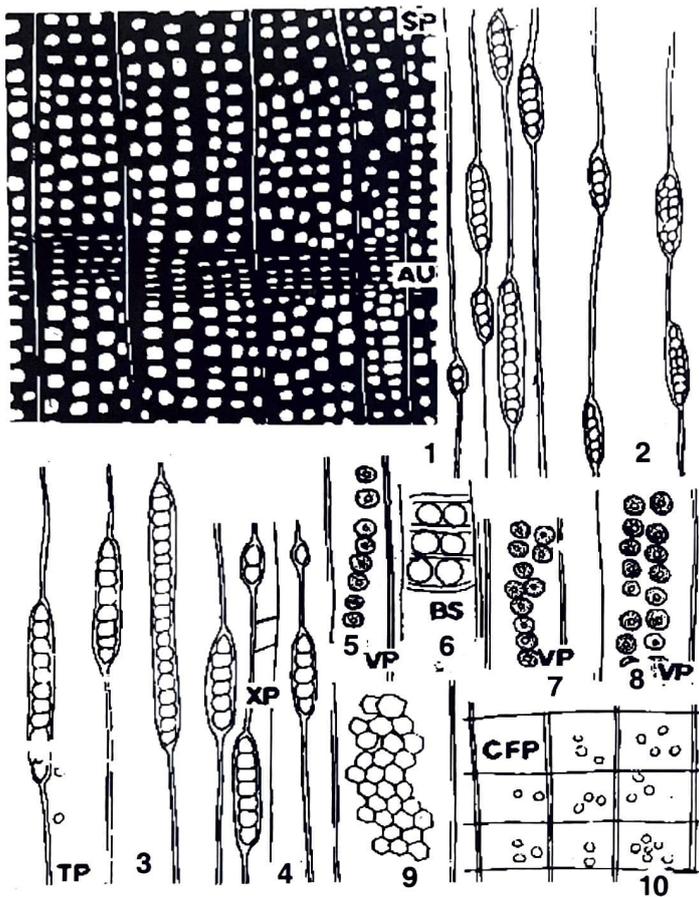
T.S. : It shows 9 distinct growth rings within the distance of 11 cm. Xylem is differentiated into spring wood and autumn wood. The spring wood 197 cells thick, tracheids rectangular, arranged radially and show

broad lumen. Cells measuring 29 x 26 μm . The autumn wood 6 cells thick, tracheids horizontally stretched with narrow lumen, cells measuring 22 x 12 μm (Text-fig. 1, Pl. 1 fig. 1).

T.L.S. : Xylem rays mostly uniseriate, sometimes biseriate, 2 to 19 cells (average 8 cells) high; ray cells barrel-shaped, measuring 22 x 16 μm . Xylem parenchyma present, characterized by horizontal septa. Tangential pitting uniseriate, simple and circular, pits measure 3 x 2 μm (Text-figs. 2-4, Pl. 1 figs. 2-4).

R.L.S. : Pits on the radial walls of the tracheids show following patterns:

- i. Uniseriate pits circular, separate, vestured and measure 7 x 6 μm . Pit pore is round and 3 μm (Text-fig. 5, Pl. 1, fig. 5).
- ii. Circular pits biseriate, becoming occasionally uniseriate, and measure 7 x 5 μm (Text-fig. 7, Pl. 1, fig. 6).
- iii. Biseriate pits circular, alternate, vestured and measure 7 x 5 μm (Text-fig. 8, Pl. 1, fig. 7).
- iv. Multiseriate pits hexagonal, alternate, compact and measure 8 x 6 μm (Text-fig. 9, Pl. 1, fig. 8).
- v. The bars of sanio present between successive pit pairs (Text-fig. 6, Pl. 1, figs. 9-10).
- vi. Cross-field pits simple, circular to oval in shape, 2-6 in number. The pits measure 6 x 5 μm (Text-fig. 10; Pl. 1, fig. 11).



Text-figures 1-10. *Kamthioxylon biradarii* sp. nov. 1. T.S. showing secondary xylem differentiated into spring wood (SP) and autumn wood (AU) x 200. 2. T.L.S. showing uniseriate and biseriate xylem rays x 200. 3. T.L.S. showing uniseriate circular, tangential pits on the tracheid wall (TP) x 200. 4. T.L.S. showing uniseriate xylem rays and xylem parenchyma (XP) x 200. 5. R.L.S. showing uniseriate, circular vestured pits (VP) x 595. 6. R.L.S. showing bars of sanio (BS) present between successive pit pairs x 595. 7. R.L.S. showing biseriate pits occasionally becomes uniseriate and vestured pits VP x 595. 8. R.L.S. showing biseriate circular, alternate and vestured pits (VP) x 595. 9. R.L.S. showing multiseriate hexagonal alternate and compact pits x 595. 10. R.L.S. showing 2-6 circular to oval cross field pits (CFP) x 595.

The present wood agrees with the generic characters of *Kamthioxylon* Mahabale and Vagyani

(1980) in showing vestured pits, bars of sanio, tangential pitting, xylem parenchyma and cupressoid field pits. The genus *Kamthioxylon* is represented by three species, viz., *K. adhariense*, *K. chandrapurensis*, *K. mahabalei*. A comparison of the present wood with the known species is given in Table-1. Since it differs from the existing species, it is reported as a new species *Kamthioxylon biradarii*. The species is named after Dr. N. V. Biradar, retired Head of Botany Department, University of Poona, Pune.

DIAGNOSIS

Secondary xylem consists of spring and autumn wood. Spring wood 197 cells thick. Tracheids rectangular. Autumn wood 6 cells thick. Tracheids horizontally stretched. Xylem rays 1 to 2 seriate, tangential pitting uniseriate, circular. Xylem parenchyma present. Radial pits 1 to 3 seriate, circular pits 1 to 2 seriate and vestured. Hexagonal pits multiseriate. Bars of sanio present. Field pits 2-6 circular to oval and cupressoid.

Holotype - NDR/11/98 Department of Botany, Shivaji University Kolhapur.

Locality - Nandori, Chandrapur District, Maharashtra, India.

Horizon & Age - Kamthi Formation; Late Permian - Lower Triassic.

DISCUSSION

Kamthioxylon is a genus of fossil conifer and is widely distributed in the Kamthi Formation. Mahabale and Vagyani (1980) instituted the genus for a transitional conifer showing characters of Araucariaceae and Cupressaceae. The genus probably represents a characteristic center of Kamthi formation.

Plate 1

1-11. *Kamthioxylon biradarii*

1. T.S. showing secondary xylem differentiated into spring wood (SP) and autumn wood (AU) x 100.
2. T.L.S. showing uniseriate and biseriate xylem rays x 100.
3. T.L.S. showing uniseriate, circular, tangential pits (TP) x 200.
4. T.L.S. showing uniseriate xylem rays and xylem parenchyma (XP) x 200.
5. R.L.S. showing uniseriate, circular, separate and vestured pits (VP) x 600.
6. R.L.S. showing biseriate pits occasionally becoming uniseriate

7. R.L.S. showing biseriate, circular, alternate and vestured pits (VP) x 600.
8. R.L.S. showing multiseriate, hexagonal alternate pits x 480.
9. R.L.S. showing bars of Sanio (BS) present between successive pit pairs x 800.
10. R.L.S. showing bars of Sanio (BS) present between successive pit pairs x 400.
11. R.L.S. showing 2-6 circular to oval cross-field pits (CFP) x 400.

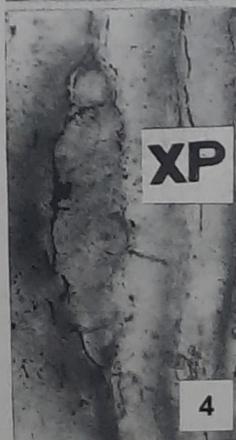
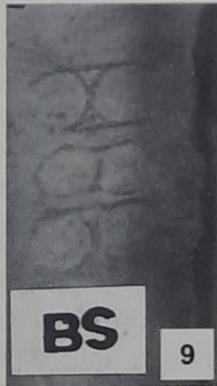
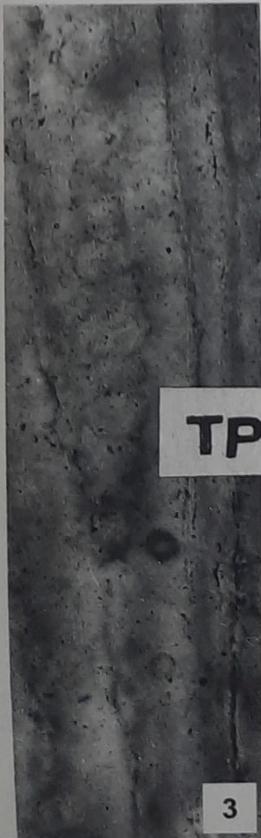


PLATE I

Table 1: Comparative anatomical characters of species of *Kamthioxylon*.

Name of the species	Growth rings	Xylem rays	Tangential pits	Bordered pitting on radial walls	Cross-field pits	Locality and geological age
<i>Kamthioxylon adhariense</i> Mahabale & Vagyani	Distinct	1-2 seriate, mostly uniseriate, 1-17 cells high, resin plugs present, average height 7 cells	Present	Uniseriate to multiseriate radial pits, when biseriate, radial pits are in opposite pairs, vested, bars of sanio horizontal situated between 2 rows of successive pits	3-9, simple or bordered mostly in horizontal rows	Adhari, Chandrapur District, Maharashtra, India; Late Permian
<i>K. chandrapurensis</i> Agashe & Prasad	Distinct	Mostly uniseriate (98%) rarely partly biseriate, 1-19 cells high, average height 5 cells, xylem parenchyma marked by horizontal septa	Present	1-4 seriate, free or contiguous, when biseriate they are opposite to subopposite, alternate bars of sanio horizontal, present between 2 rows of successive radial pits, compact, rarely vested type	1-11 (1-9 clear) with somewhat thick border, field pits are mostly found in groups and contiguous	Wejgaon, Chandrapur District, Maharashtra, India; Permian
<i>K. mahabalei</i> Agashe & Prasad	Distinct	Mostly uniseriate (99%), 1-5 cells high, average height 6 cells, xylem parenchyma marked by horizontal septa	Present	1-4 seriate, when biseriate they are opposite, alternate vested, bars of Sanio present between 2 rows of successive radial pits (usually biseriate and triseriate free, radial pits opposite)	1-8, bordered present mostly in horizontal rows, commonly 1-4 field pits per field	Wejgaon, Chandrapur District, Maharashtra, India; Permian
<i>K. biradarii</i> sp. nov.	Distinct	Mostly uniseriate rarely biseriate, 2-19 cells high, average height 8 cells. xylem parenchyma marked by horizontal septa	Present	Uniseriate to multiseriate radial pits, vested pits uniseriate to biseriate, multiseriate pits hexagonal and alternate, bars of sanio between successive pits pairs	2-6, simple and circular to oval	Nandori, Chandrapur District, Maharashtra, India; Late Permian

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