

Araucamyelon pakurensis gen. et sp. nov. from the
Jurassic of Rajmahal Hills, India

By

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Introduction

Though the Jurassic rocks of Rajmahal Hills have been known for the collection of gymnosperms since 1863 (OLDHAM & MORRIS, 1863) and almost all plant parts are found well preserved so much so, that even nuclei and chromosomes (MITTRE, 1969) have been seen, yet the isolated roots remained unknown till 1975, when SHARMA (1975) and SHARMA & Bohra (1975) reported for the first time the occurrence of araucarian roots from the fossiliferous locality of Pakur. These roots are found embedded in the chert and preserve all anatomical details. Since 1975, a large number of specimens have been collected and on the basis of their study, the material has been described as *Araucamyelon pakurensis* gen. et sp. nov. in the present paper.

The material was collected from Sonajori near Pakur and slides were prepared by the usual method of cutting, grinding & polishing processes. They were mounted in canada balsam.

Description of Species

Araucamyelon pakurensis gen. et sp. nov.

Plate 1, figs. 1-7; Fig. 1.

Type Slide No.: 449/Raj. Pak. (NSM-PP7524).

Locality: Sanajori-Pakur

Horizon: Jurassic of Rajmahal Hills, India.

Collection: Dr. B. D. SHARMA's collection, Department of Botany, University of Jodhpur, Jodhpur, India.

Diagnosis: Root cylindrical, 0.3 to 4.2 cm in diameter; cortex parenchymatous; resin canals rare; cork layer well developed, cells narrow; stele diarch with two exarch protoxylem points, secondary wood compact, well developed, fan shaped; radial walls of tracheids with uniseriate to triseriate contiguous bordered pits, wood rays uniseriate 1-6 cells high.

There are present a large number of specimens as well as slides which possess this species. Transverse, oblique and longitudinal sections are in the collection and so all anatomical details are known. The roots are ranging 0.3 to 4.2 cm in thickness.

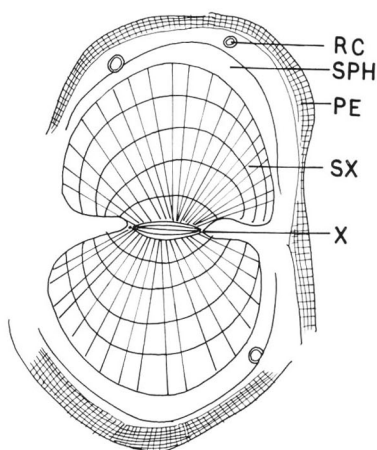


Fig. 1. *Arauamyelon pakurensis* gen. et sp. nov. C. S. Root with fan shaped secondary xylem. Primary xylem diarch, wood and periderm well developed. $\times 9$. Slide No. 50/Raj. Pak. (NSM-PP 7526).

Abbreviations used: RC-Resin canal, SPH-Secondary phloem, PE-Periderm, SX-Secondary xylem, X-Primary xylem.

In young roots the cortex is generally well preserved (Plate 1, fig. 1), and 0.6 to 0.8 mm thick. It is made up of parenchyma with scattered dark staining cells. Resin canals are present (Fig. 1). Epiblema is distinct from the cortical cells. Primary xylem is found better preserved in the younger roots (Plate 1, figs. 1, 2) in comparison to the older ones (Plate 1, figs. 3, 5). In the latter types it is crushed due to extensive secondary growth. The primary xylem is diarch with two exarch protoxylem points. It is made up of thickly walled, hexangular cells. Metaxylem cells are $26 \times 32 \mu$ in cross sections while protoxylem elements are narrower, $10 \times 12 \mu$ in size. The cambium and primary phloem are present on the radial sides of xylem. Secondary xylem started to make formation at an early stage of development, so much so, that a root with a diameter of 3.0 mm, the secondary xylem is 1.2 mm thick. In older roots the secondary xylem is very well developed and much wider in comparison to the cortex (Fig. 1). In the cortex, there also develops 200 to 600μ thick periderm layer which is made up of narrow, $48 \times 8 \mu$ sized, laterally extended cells (Plate. 1, fig. 4). They are placed in tangential rows.

Tangential section through secondary xylem shows, uniseriate, homogeneous, 1-6 cells high wood rays (Plate. 1, fig. 6). The tangential walls of tracheids are smooth while radial walls possess uniseriate to multiseriate contiguous bordered pits (Plate. 1, fig. 7). The pits are hexangular with circular pit pores. Pits in cross field are not clearly visible, they are small, circular and 6-8 in number.

Comparison: In majority of gymnosperms, the roots are diarch (COULTER & CHAMBERLEIN, 1917; CHAMBERLEIN, 1935; SPORNE, 1965) with secondary growth; except the corolloid roots which do not show cambial activity, and the xylem is poly-

(PANT & MEHRA, 1962). Thus in normal roots the study of cross-sections do not help much in identifications (HALKET, 1930, p. 867). However, characters like presence or absence of resin canals, nature of wood rays and kinds of pittings found on the radial walls of the tracheids are considered to be helpful in taxonomic separation.

Araucamyelon pakurensis shows resemblances with cupressoid roots (*Protojuniperoxyylon arcticum*) described by SELLING (1944) from the Jurassic of Arctic, in the nature of pittings and compactness of the secondary wood. But the latter differs in the structure of primary xylem (3–4 arch), periderm layer and the wood rays which are quite long and 1–3 seriate. The radial walls of tracheids are provided with both uniseriate contiguous as well as multiseriate separate bordered pits i.e. they are not true araucarian whereas, in the present material bordered pits are arranged contiguously.

Sections of roots of some of the living Araucarias e.g. *A. bidwilli*, *A. coccii*, and *A. cunninghumii* were cut and compared with the fossil material and found them almost identical. However, specific correlations could not be made out. The lack of a monographic study of roots anatomy in the coniferales, thus forms an impossible barrier to further comparisons and taxonomic separations.

References

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Explanation of Plate 1

Arauamyelon pakurense gen. et sp. nov.

Type Slide No: 449/Raj. Pak. (NSM-PP7524)

Locality : Sanajori-Pakur, Rajmahal Hills, India.

Horizon : Jurassic of Rajmahal Hills.

Collection : Dr. B. D. SHARMA's collections, Department of Botany, University of Jodhpur, Jodhpur. India.

Fig. 1. C. S. Young root with well developed cortex. $\times 18$. Slide No. 4/Raj. Pak (NSM-PP 7520).

Fig. 2. Same Stelar portion enlarged. $\times 60$.

Fig. 3. Fan shaped, well developed secondary xylem. $\times 18$. Slide No. 93/Raj. Pak. (NSM-PP 7521).

Fig. 4. C. S. Radially arranged, narrow cells of periderm. $\times 300$. Slide No. 453/Raj. Pak. (NSM-PP 7522).

Fig. 5. A portion of secondary xylem enlarged. Primary xylem is crushed. $\times 36$. Slide No. 449/Raj. Pak. (NSM-PP 7523).

Fig. 6. T. L. S. Uniseriate, small wood rays and tracheids. $\times 48$.

Fig. 7. L. S. Tracheids provided with contiguous bordered pits on their radial walls. $\times 120$. Slide No. 14/Raj. Pak. (NSM-PP 7525).

