FURTHER CONTRIBUTION TO OUR KNOWLEDGE OF *DICOTYLIRHIZOS SAHNII* RAO

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ABSTRACT

The paper gives additional information about the root anatomy of *Dicotylirhizos sahnii* Rao based on a study of three petrified specimens collected from Mohgaonkalan beds of the Deccan Intertrappean series of India. The secondary wood is described in detail from transverse, radial and tangential sections.

INTRODUCTION

THE present paper deals with three well petrified fossil dicotyledonous roots collected by one of the authors (M. T. Sheikh) in May 1968 from the Deccan Intertrappean cherts of Mohgaonkalan. The roots measure 2·5 mm., 4 mm., and 6 mm. respectively in length. All these three roots resemble each other in anatomy and also resemble the one described by Rao (1957) under the name *Dicotylirhizos sahnii*. His account was based on only one transverse section of one millimetre width obtained from a thin slide. A study of these new specimens has added to the knowledge of the anatomy of this root.

TECHNIQUE

The material, being well preserved, was etched with hydrofluoric acid and cellulose acetate solution was evenly spread on the ground surface. Peel sections were thus taken along transverse, radial, and tangential planes of the root.

DESCRIPTION

Transverse section of the root — The small pith consists of thin walled parenchymatous cells (TEXT-FIG. 7) and is surrounded by five exarch xylem bundles (TEXT-FIG. 5; PL. 1, FIG. 4). Each xylem group consists of one to two protoxylem elements and two to four metaxylem elements. In longitudinal sections annular thickenings of protoxylem (TEXT-FIG. 2) and spiral thickenings of metaxylem elements are seen. Surrounding primary xylem occurs well developed secondary wood (PL. 1, FIG. 4). In transverse section, vessels in the secondary xylem are diffuse, generally solitary, sometimes in radials of 2 to 4 and also in oblique pairs at some places (TEXT-FIG. 3; PL. 1, FIGS. 3, 4, AND 5). Vessels are quite large, tangential diameter of each varying from 40 to 80 μ. They also show variation in length from 266 to 566 μ each, as observed in tangential and radial sections. Each vessel member is 80 to 400 μ in length respectively. The simple perforation plate (TEXT-FIG. 6; PL. 1, FIG. 1) is very clear and is obliquely placed. Intervessel pitting is bordered, alternate, and contiguous (PL. 1, FIG. 6). Some of the vessels show some black as well as brown contents as reported by Rao. Others show presence of tyloses. Paratracheal wood parenchyma is present as a single layer of vasicentric one (TEXT-FIG. 3; PL. 1, FIG. 4). Metatracheal parenchyma is also present but diffuse, cells of which vary in their diameter from 12 to 24μ each. Fibres are sparse and nonseptate with tangential diameter 10 to 15 μ each (TEXT-FIG. 4; PL. 1, FIG. 1). The primary medullary rays are 2-3 seriate, homocellular with errect cells, length being 10 to 50 cells (TEXT-FIG. 3; PL. 1, FIGS. 1 & 4). In tangential sections the secondary medullary rays are 5 to 7 cells in height and 2 to 9 cells in width (TEXT-FIGS. 4 & 9; PL. 1, FIGS. 1 & 2). Out side the wide zone of secondary xylem occurs a narrow region of parenchymatous cells of phloem (TEXT-FIG. 8; PL. 1, FIG. 5). This is succeeded by a broader zone of thin walled parenchymatous cells with groups of sclerenchymatous cells. This may be the pericycle (TEXT-FIG. 8; PL. 1, FIG. 5). It is followed by an indistinct layer of endodermis. A narrow cortex of thin walled parenchymatous cells is seen rather indistinctly. Epidermis is not seen.

In view of the additional characters found in the new specimens the diagnosis of *Dicotylirhizos sahnii* Rao is emended as follows:

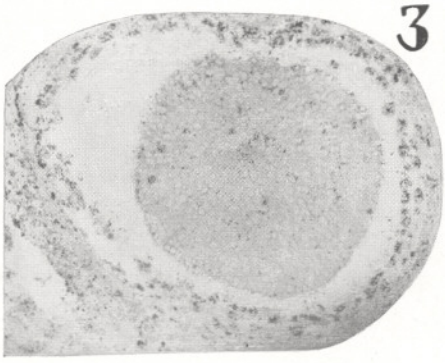
DICOTYLIRHIZOS SAHNII RAO EMENDED

Silicified dicotyledonous roots, with five exarch primary xylem groups; Pith very small, of parenchymatous cells; Diameter of root 1 to 6 mm., secondary xylem of vessels and parenchyma, fibres sparse; Vessels

TEXT-FIGS. 1-9


1


2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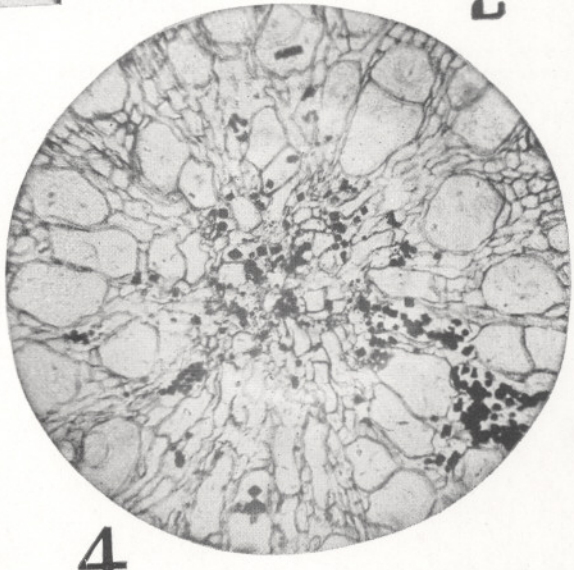
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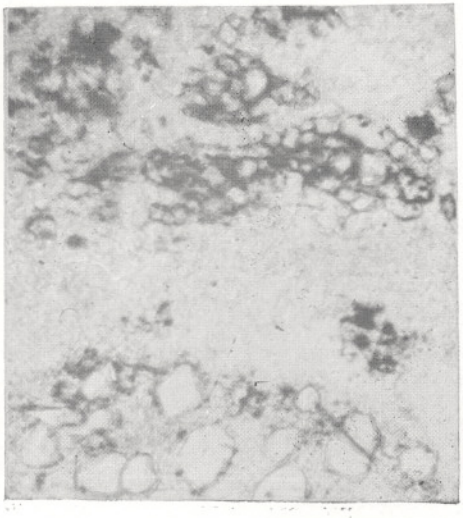
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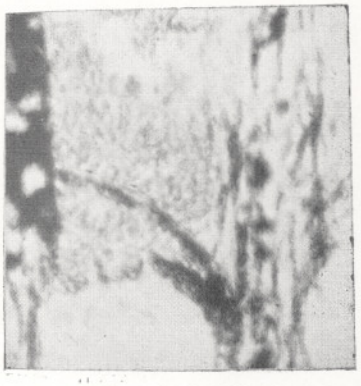
6

solitary and radial multiples of 2 to 4, sometimes obliquely paired; vessel segment size 80-400 μ. Perforation plate simple with oblique pore. Intervessel pitting bordered, alternate, contiguous. Parenchyma paratracheal vasicentric and metatracheal diffuse. Fibres sparse, nonseptate. Primary rays multiseriate, homocellular with erect cells; secondary rays, uniseriate homocellular of errect cells. Phloem of thin walled parenchymatous cells. Pericycle of hard and soft bast. Endodermis single layered; cortex narrow, of thin walled parenchymatous cells. No secretory cells seen.

Isotypes — 1, 2, 3, Sh/Dn. at Institute of Science, Nagpur.

Locality — Mohagaonkalan.

Age. — ? Palaeocene.

Horizon — Deccan Intertrappean series.

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REFERENCES

Rao, A. R. (1957). Contribution to our knowledge of the Deccan Intertrappean flora. *Palaeobotanist.* **6**: 19-21.

EXPLANATION OF PLATE 1

1. T.L.S. root — Vessels, perforation plates, parenchyma, fibers and medullary rays. × 150.
2. R.L.S. root — Vessels and medullary rays. × 150.
3. T.S. root — Root complete. × 10.
4. T.S. root — Pith, pentarch primary xylem and secondary vessels with vasicentric parenchyma. × 120.
5. T.S. root — Secondary xylem, phloem and pericycle. × 80.
6. L.S. root — Vessels with bordered pits. × 450.

←—

Text-figs. 1-9 — 1. T.S. root — Diagrammatic showing small pith, primary xylem, secondary xylem, pericycle, endodermis and broken cortex. × 10. 2. T.L.S. root — Protoxylem with annular thickening. × 220. 3. T.S. root — Secondary vessels, vasicentric parenchyma, metatracheal parenchyma and medullary rays. × 220. 4. T.L.S. root — Vessels, parenchyma, fibers and uniserite medullary rays. × 220. 5. T.S. root — Pith, pentarch primary xylem, secondary xylem. × 220. 6. T.L.S. root — Vessels with oblique perforation plate. × 220. 7. T.S. root — Parenchymatous cells of pith. × 220. 8. T.S. root — Phloem, hard and soft tissue of pericycle and endodermis. × 85. 9. R.L.S. root — Vessels and medullary rays. × 85.