

**OCCURRENCE OF PERFORATED RAY CELLS IN THE WOOD OF
DRYPETES ROXBURGHII (WALL.) HURUSAWA***

by

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Summary

Anatomical features of the wood of *Drypetes roxburghii* (Wall.) Hurusawa, Euphorbiaceae are described in detail. Occurrence of ray cells with scalariform perforations is reported for the first time in this taxon. This study supports the inclusion of *Drypetes* in the *Aporosa* type of the Phyllanthoideae, i.e., in accordance with the classification of the genera of Euphorbiaceae on anatomical grounds by Metcalfe and Chalk (1950). Inclusion of this species by Hurusawa (1954) and Webster (1967) in *Drypetes*, is also supported.

Introduction

Euphorbiaceae constitute one of the interesting and intriguing families in view of their diverse anatomical structure (Metcalfe & Chalk, 1950; Stern, 1967; Hayden, 1977). The family, represented by 300 genera and 7000 species (Webster, 1967; Hans, 1973), is cosmopolitan in its distribution and includes herbs, shrubs and trees. Largely due to extreme variations in their exomorphic features, classification of Euphorbiaceae into the lower taxonomic hierarchies has received considerable attention by those approaching the family in different botanical pursuits. Relevant literature on the wood anatomy of this family (Solereeder, 1908; Metcalfe & Chalk, 1950; Stern, 1967; Hayden, 1977) shows the range of structural complexity varying from very primitive to highly evolved. In the present study a detailed account of anatomical features of *Drypetes roxburghii* is given, emphasising some characters hitherto not reported. The systematic position of this genus is also discussed in the light of the above.

Material and Methods

Material of *Drypetes roxburghii* (Wall.) Hurusawa was collected from the botanical garden of Andhra University, Waltair. Permanent stain-

ed micropreparations of transverse, radial longitudinal and tangential longitudinal sections of 20 μm were prepared from the wood according to conventional methods. Measurements of cell lengths were carried out from macerated material (Schultze's method) with the help of a calibrated ocular micrometer. Mean value of fifty measurements for each quantitative character along with the most frequent range (mfr) is given. Diagnostic characters and terminologies employed in describing the wood are in accordance with Chalk and Chattaway (1933, 1934), Kribs (1935, 1937), Tippe (1945), Metcalfe and Chalk (1950) and the IAWA Committee on Nomenclature (1964).

Observations

Wood diffuse-porous with fairly distinct growth rings.

Vessels per mm^2 moderately numerous to numerous (mean 23, mfr 14–33), mostly in radial multiples of 2–8, some forming pore chains, rarely in aggregates and a few solitary (Fig. 1). Pores oval to circular and with small mean tangential diameter (47 μm , mfr 39–55 μm); walls of the vessels thick (mean 7 μm); perforations scalariform, with bars ranging from 5–20; intervacular pits small, abundant, alternate, angular with oval to elongate pit apertures (Fig. 2); some of the pit apertures show coalescence; vessel–ray pitting similar to that of intervacular pitting; vessel elements medium in length (mean 0.832 mm, mfr 0.616–1.056 mm), eligulate and empty.

Axial parenchyma both apotracheal and paratracheal; the former diffuse, diffuse-in-aggregates (tangentially 2–3 or sometimes more cells wide); the latter scanty-vasicentric to vasicentric with a single layer of cells surrounding the vessels; strands of 4–20 cells with starch.

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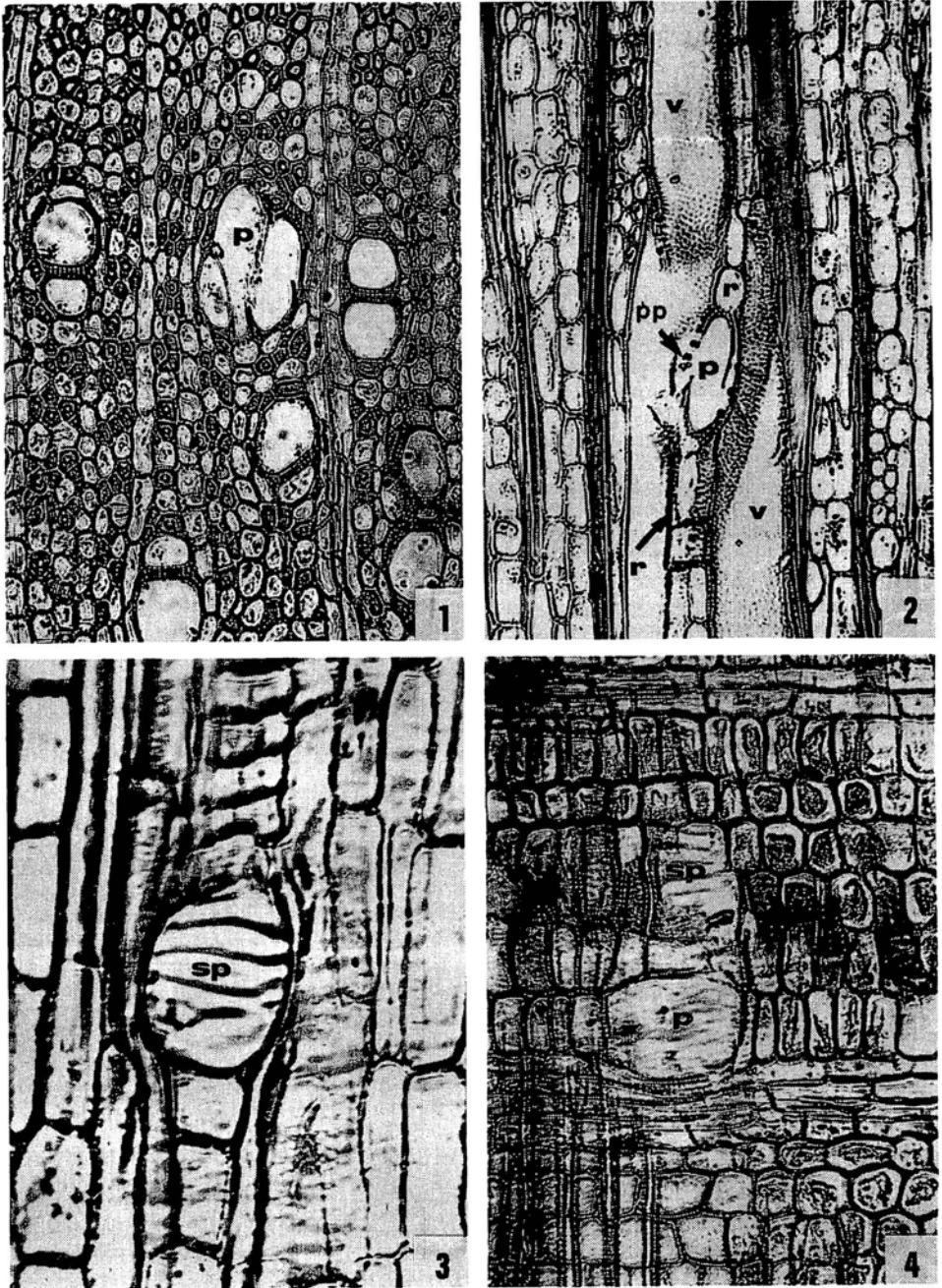


Fig. 1–4. *Drypetes roxburghii* (Wall.) Hurusawa. — 1: Transverse section, x 190. — 2: Tangential section, x 230. — 3: Tangential section, x 570, showing perforated ray cell. — 4: Radial section, x 230. — p: perforated ray cell, pp: perforations in the ray cell, v: vessel element, r: ray, sp: scalariform perforation.

Rays predominantly bi- or tri-seriate with a few uniseriate (Fig. 2); very numerous per mm (mean 15, range 9–21); heterogeneous I and II A; very high, the multiseriate part relatively short, composed of distinctly small procumbent cells. Height of uniseriate and multiseriate rays ranges from 0.491–0.982 mm and 0.549–1.025 mm respectively (Figs. 1, 2 & 3).

One of the important features, in the anatomical structure of the wood of *D. roxburghii*, is the presence of perforated ray cells (Figs. 1–4). The perforations are scalariform. That these are perforated rays is corroborated by their occurrence in between two vessel elements (Figs. 1–3). Occurrence of such rays is reported for the first time in this genus. Rays contain starch and occasionally rhomboidal crystals.

Fibres represented by fibre-tracheids with fairly large number of bordered pits and libriform fibres (1:3 approximately) the latter non-septate, medium in their length (mean 1.842 mm, mfr 1.561–2.094 mm).

Discussion

Vessels of medium size often with scalariform plates, moderately numerous to numerous per mm², small pore diameter, small abundant intervascular pits, abundant parenchyma in strands of 4–20 cells and heterogeneous nature of the rays, the occurrence of perforated ray cells and also the presence of fibre-tracheids justify the inclusion of *D. roxburghii* in the *Aporosa* type (Metcalf & Chalk, 1950).

Presence of perforated ray cells is recorded for the first time in this genus although Chalk and Chattaway (1933), Stern (1967) and McLean and Richardson (1973), reported this feature in other genera of Euphorbiaceae.

Presence of angular, narrow vessels with scalariform perforations, highly dissected, tall, heterogeneous rays, non-septate libriform fibres and fibre-tracheids with a fairly large number of bordered pits suggests the primitive nature of the taxon and hence its placement at the beginning of the family by Metcalf and Chalk (1950) is supported. The anatomical characters presented in this study support the reduction of *Putranjiva* to *Drypetes* by Hurusawa (1954).

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