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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE. IV. ACHROUTERIA. (U)  
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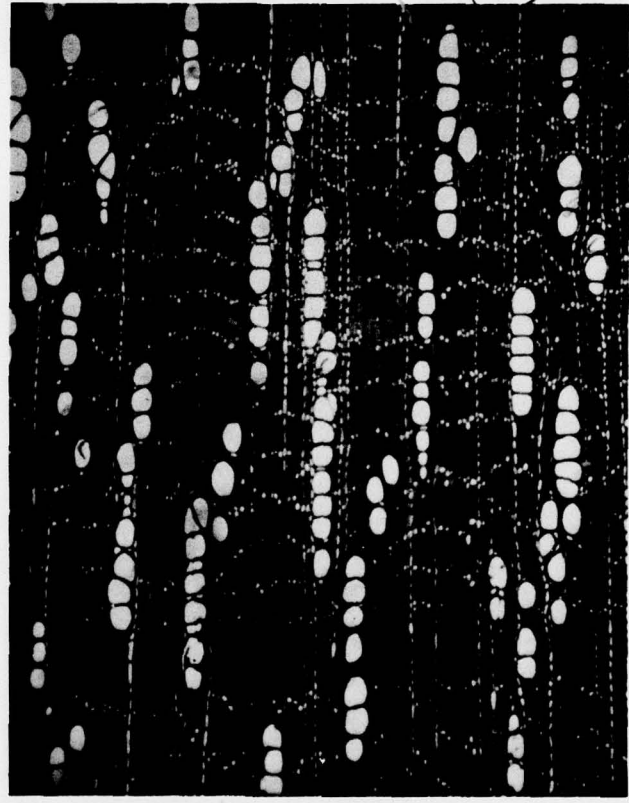
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B. F. Kukachka

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## Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25% of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy.

Baehni and Bernardi state the situation with respect to Peru but this would hold equally well for all of the neotropics: "For instance, of the 39 species and one variety described hereunder, 13 are known only from the Peruvian type; and 23 taxa here presented have no fruit or seed. It is universally admitted that the taxonomy of this family is almost impossible without--for the same species--leaves, flowers, fruits, and seeds."

Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Achrouteria is the fourth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The others, all by the same author, and under the same general heading, include:

- I. Bumelia--Research Paper FPL 325
- II. Mastichodendron--Research Paper FPL 326
- III. Dipholis--Research Paper FPL 327

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a single comprehensive unit.

WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

IV. ACHROUTERIA

By

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Abstract

Achrouteria pomifera Eyma, the sole representative of the genus for almost 40 years, is distinguished from the world Sapotaceae by the very large silica particles which occur in the wood rays. Anatomically, two groups (species) may be distinguished on the basis of vessel member length and parenchyma seriation. A second species, A. durifructa described in 1974, differs significantly in several respects and may have been doubtfully placed in this genus.

Introduction

Although a relative newcomer to the Sapotaceae, the genus Achrouteria has already undergone several nomenclatural changes. It was first described by Eyma (2) in 1936 and was based on a number of specimens from Guyana and Surinam. A single species, Achrouteria pomifera Eyma, was described.

In 1942, Baehni (1) transferred this monotypic genus to his "all-inclusive" genus Pouteria and it then became Pouteria pomifera (Eyma) Baehni.

In 1957, van Royen (4) transferred this species to the Old World genus Planchonella but, because the name pomifera was already occupied, it became Planchonella guianensis van Royen.

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<sup>1/</sup> Pioneer Research Unit, FPL. The Laboratory is maintained at Madison, Wis. in cooperation with the University of Wisconsin, Madison.

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A second species, Achrouteria durifructa, was described by William Rodrigues (3) in 1974 from the Manaus area of the Brazilian Amazon.

The range of Achrouteria now includes French Guiana, Surinam, Guyana, and the Brazilian Amazon. The reported occurrence of this genus in the area of Rio de Janeiro and Santos appears to be doubtful. The trees are large, attaining heights of 30 meters and diameters of 50 cm.

Up until 1974 the wood of Achrouteria was unique among the Sapotaceae and all known silica-accumulating woods in that it could be instantly recognized by the large silica particles in the wood rays. Achrouteria durifructa, the second species of the genus, lacks the unique silica particles and differs from typical Achrouteria in several other details. From the standpoint of wood anatomy this author would be inclined to exclude A. durifructa from this genus. The final disposition of A. durifructa will have to await the findings of a detailed study by some future taxonomic monographer.

#### Description

Nine wood specimens were available for this study and pomifera was represented by eight specimens from the range of the genus; durifructa is represented by a single mature wood specimen from the holotype collected in the Manaus area.

The specimens of pomifera are similar in most respects but anatomically fall into two distinct anatomical groups; here they are designated Achrouteria A and Achrouteria B for comparison (table 1). Group A is regarded as typical Achrouteria because it contains one of the collection numbers cited by Eyma (2) in his original description. Group B may possibly represent an undescribed genus. The differences between the two groups are quantitative from the anatomical standpoint and perhaps will prompt a detailed taxonomic study of the genus. The single specimen of durifructa differs from Groups A and B in several significant details and is described separately.

#### Groups A and B

General: Wood pale yellowish-brown with no distinction between heartwood and sapwood. Growth rings not apparent. Wood heavy, fine-textured, and without luster. Specific gravity ranges from 0.75 to 0.89.

Anatomical:

Pores commonly in radial multiples of 2-6 (sometimes appearing longer under a hand lens) and occasional tangential clusters which are in radial or echelon arrangement (figs. 1-3). In BAFOG 343M (fig. 4) the pores are closely spaced so that the arrangement is more typically diffuse. Maximum pore diameters for the eight specimens range from 118 to 173  $\mu\text{m}$ .

Vessel members with simple perforations; tyloses, when present, thin-walled. Inter-vessel pitting 4-6  $\mu\text{m}$  in diameter. Vessel member length (individual specimen averages) range from 670 to 1090  $\mu\text{m}$ .

Axial parenchyma is irregularly and closely banded; 1(2) seriate (fig. 5) or 2(3) seriate (fig. 6). The cells are free of dark-colored contents. Wood rays (1)2-3(4) seriate; heterocellular. Vertical fusions common. The maximum body height of the 2-4 seriate portion ranges from 323 to 512  $\mu\text{m}$  among the different specimens. The cells are without dark-colored contents.

Silica (figs. 7-8) occurs in some of the larger tabular and upright cells of the ray margins and occasionally in the smaller tabular cells of the ray body. The silica particles are generally ovoid and very large, attaining a length of 100  $\mu\text{m}$ . Frequently the silica body will completely fill the cell. The silica-containing cells vary from few to abundant in a given radial section. Because of their large size, many of the particles are lost during the sectioning process.

Silica particles of this type are unique to Achroteria groups A and B, making these woods distinctive among the Sapotaceae and, for that matter, from all other woods known to accumulate silica. A silica analysis conducted on For. Dept. 913 gave a value of 0.24% based on the oven-dry weight of the wood.

Wood fibers thick-walled; the fiber length averages for the different specimens range from 1.37 to 1.94 mm. Vascular tracheids common.

The major differences between Groups A and B are with respect to vessel member length and seriation of the axial parenchyma. In Group A the vessel member length averages range from 950 to 1090  $\mu\text{m}$  with an overall average of 1000  $\mu\text{m}$ . The seriation of the parenchyma in Group A is mostly uniseriate and occasional in-part biseriate. In Group B the vessel member length averages range from 670 to 780  $\mu\text{m}$  with an overall average of 730  $\mu\text{m}$ . The seriation of the parenchyma in Group B is mostly biseriate and occasionally in-part triseriate. Although these features are quantitative,

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their magnitude strongly suggests that another species besides pomifera may be found here.

Achrouteria durifructa

General: Wood gray, without luster. Wood moderately heavy and fine-textured. No apparent distinction between heartwood and sapwood. Growth rings apparently lacking. Average specific gravity 0.75.

Anatomical:

Pores in radial multiples of 2-5, occasionally longer; the pore groups usually in echelon arrangement (fig. 9). Largest pores with a maximum tangential diameter of 205  $\mu\text{m}$ .

Vessel members with simple perforations; tyloses, when present, thin-walled. Intervessel pitting 6-8  $\mu\text{m}$  in diameter. Vessel member length averages 920  $\mu\text{m}$ .

Axial parenchyma irregularly and closely banded, merging into reticulate-diffuse; bands 1(2) seriate (fig. 10). Cell contents pale and inconspicuous.

Wood rays (1)2-3(4) seriate; heterocellular. Organic contents pale and inconspicuous. Vertical fusions common. Maximum body height, 552  $\mu\text{m}$ . Crystals and silica lacking.

Wood fibers thick-walled with an average length of 1.87 mm. Vascular tracheids common.

Diagnostic features: Wood gray. Pores in radial-echelon arrangement. Parenchyma reticulate-diffuse to irregularly banded. Without silica.

Literature Cited

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2. Eyma, P. J.  
1936. Notes on Guiana Sapotaceae. Rec. Trav. Bot. Neerl.  
33:192-195.
3. Rodrigues, William A.  
1974. Subsídios para o estudo das Sapotaceas da Amazonia.  
Acta Amazonica 4:3:9-18.
4. Van Royen, P.  
1957. Revision of the Sapotaceae of the Malaysian area in a  
wider sense. VII. Planchonella. Blumea 8:2:395.

Table 1.--Wood specimens of Achrouteria examined

Species	Collector and number	Origin	Numbers in wood collection	
			INPA*	SJRw**
-----				
<u>GROUP A</u>				
pomifera Eyma	For. Dept.	913	Guyana	43560
	For. Dept.	sn	Guyana	32843
	E. Oliveria	2844	Amazon	
	INPA	21142	Amazon	X-3849
<u>GROUP B</u>				
pomifera Eyma	Froes	193	Amazon	27394(H)
	BAFOG	343 M	French Guiana	50956
	INPA	15786	Amazon	X-3243
	N.A. Rosa	1324	Amazon	
-----				
durifructa W. Rodr.	INPA (Holotype)	27947	Amazon	X-4104

\* INPA (Instituto Nacional de Pesquisas da Amazonia).  
\*\* (H) wood specimen from Harvard Wood Collection.

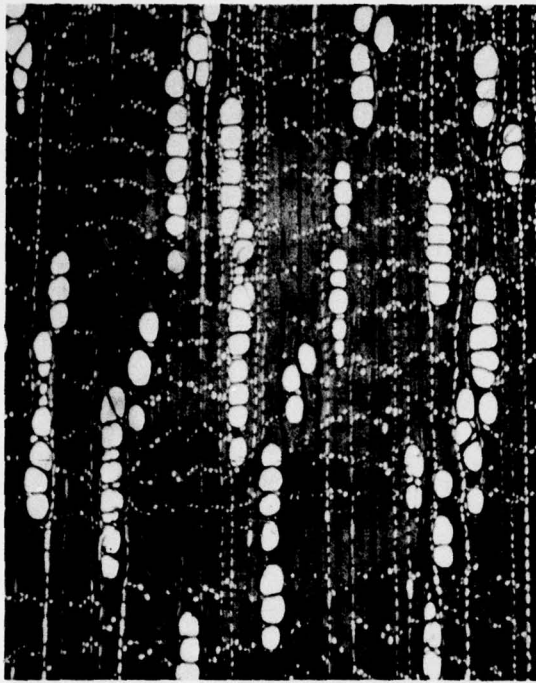


Figure 1.--A. pomifera (A) with distinctive radial alignment of pore multiples and thin irregular banding of parenchyma (For. Dept. 913) X 30.

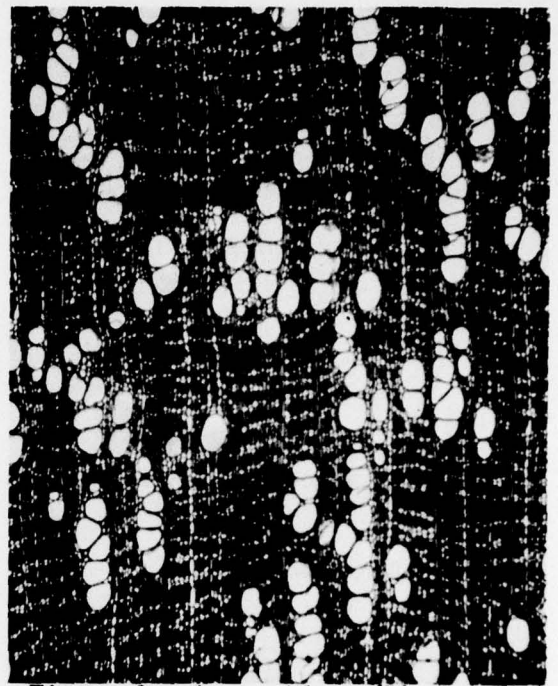


Figure 2.--A. pomifera (B) showing echelon arrangement of pore multiples and more conspicuous banding of parenchyma (X-3243). X 30.

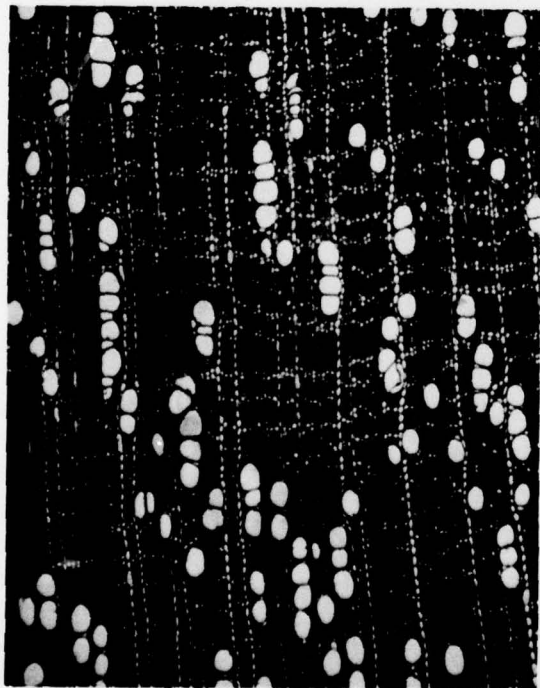


Figure 3.--A. pomifera (A) showing loose-echelon arrangement of pores (Oliveira 2844) X 30.

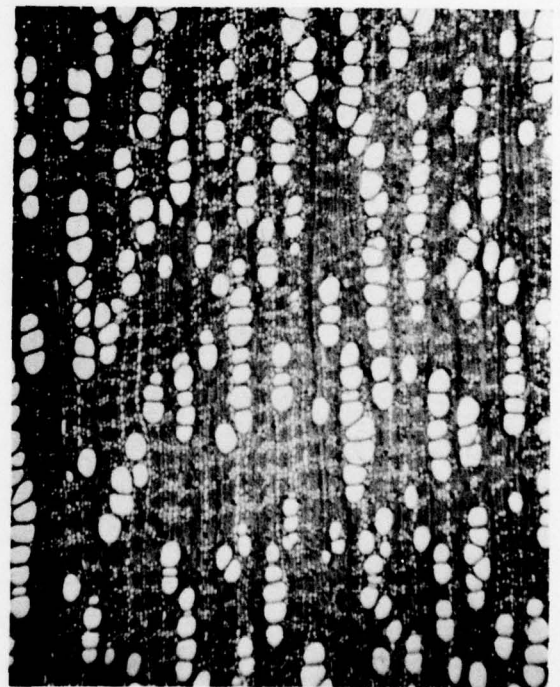


Figure 4.--A. pomifera (B) pore arrangement typically diffuse (BAFOG 343M) X 30.

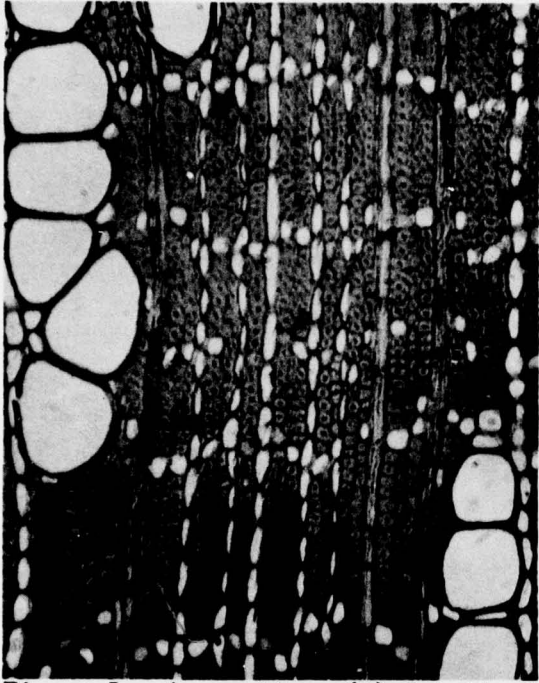


Figure 5.--A. pomifera (A) Detail of narrow parenchyma banding (For. Dept. 913) X 110.

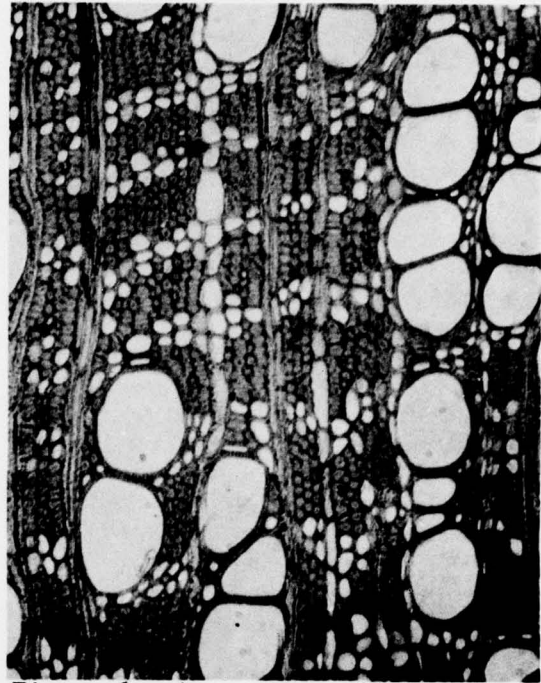


Figure 6.--A. pomifera (B) Detail of wider parenchyma banding (BAFOG 343M) X 110.

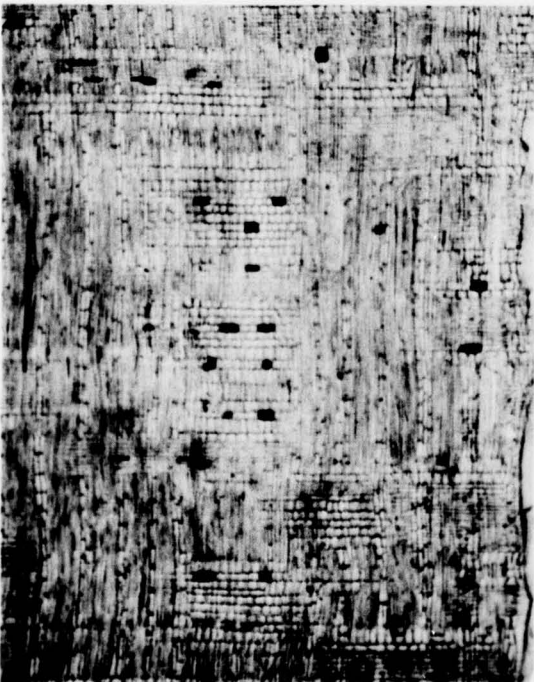


Figure 7.--A. pomifera Showing dispersion of silica-containing cells (dark) (N.A. Rosa 1324) X 30.

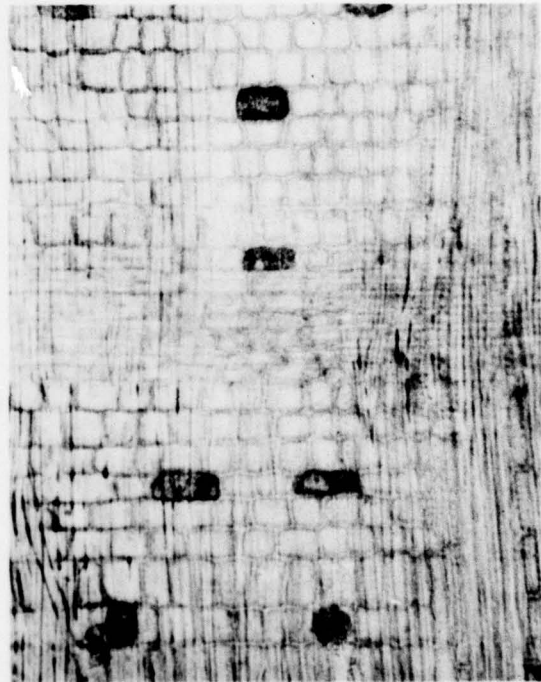


Figure 8.--A. pomifera Silica-containing cells (dark) completely occupied by silica. Note silica cells are larger than the adjacent cells. (N.A. Rosa 1324) X 110.

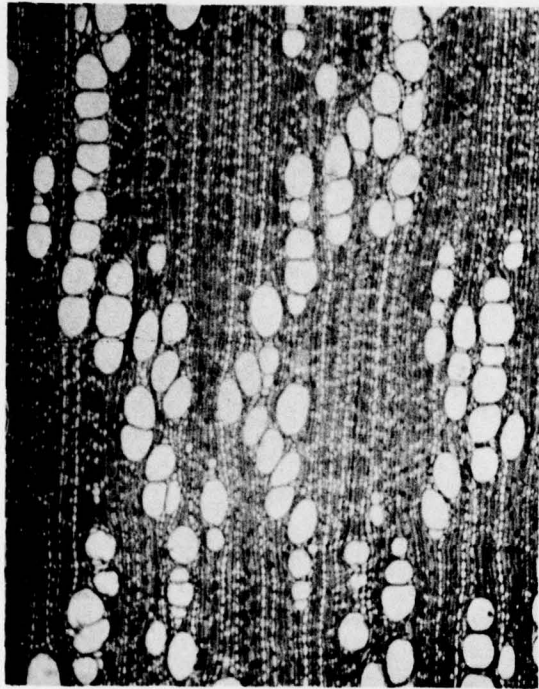


Figure 9.--A. durifructa showing arrangement of pores and parenchyma (X-4104) X 30.

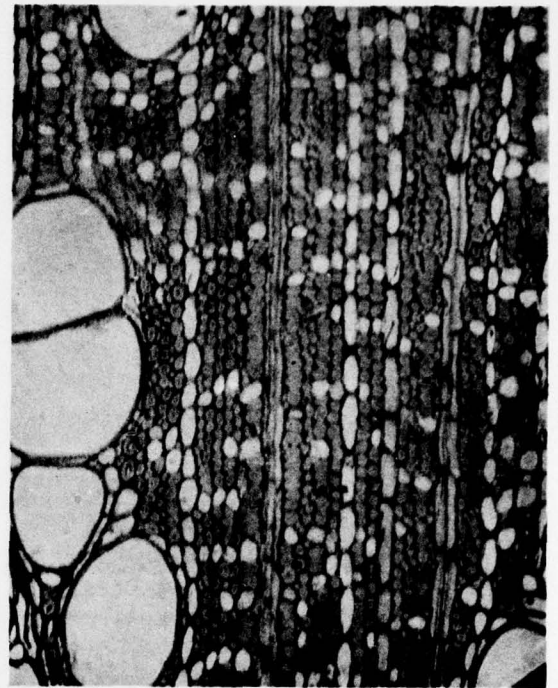


Figure 10.--A. durifructa showing parenchyma detail (X-4104) X 110.

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