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WOOD ANATOMY OF NEOTROPICAL SAPOTACEAE. III. DIPHOLIS.(U)
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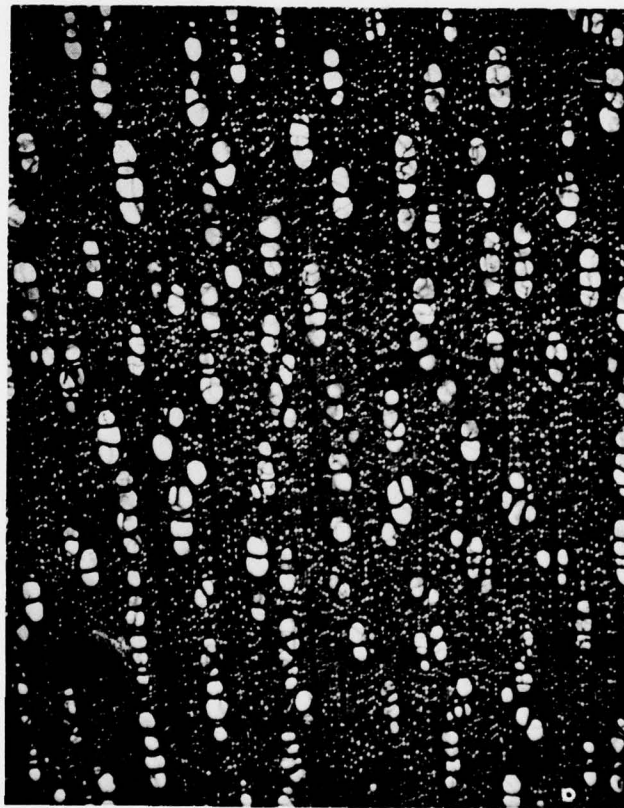
**WOOD ANATOMY
OF THE
NEOTROPICAL SAPOTACEAE
III. DIPHOLIS**

RESEARCH PAPER FPL 327

FOREST PRODUCTS LABORATORY
FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
MADISON, WIS.

1978

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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 Dipholis is the third in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The others, listed more completely in the literature cited, are:

- I. Bumelia--Research Paper FPL 325
- II. Mastichodendron--Research Paper FPL 326

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.

⑥ WOOD ANATOMY OF NEOTROPICAL SAPOTACEAE
III. DIPHOLIS

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⑩ By
B. F. Kukachka, Botanist^{1/}

⑪ 2978

Forest Products Laboratory, Forest Service
U.S. Department of Agriculture

⑨ Forest Service research papers

Abstract ⑭ FSRP-FPL-327

The wood anatomy of Dipholis described here is based primarily on the type species D. salicifolia. Three species attributed to Dipholis have very strong affinities with Mastichodendron and perhaps belong in that taxon. Dipholis jubilla, of uncertain taxonomic status, is characterized by banded parenchyma and very long vessel members.

Introduction

According to Cronquist (3) the genus Dipholis consists of 14 species confined to Central America, the West Indies, and southern Florida. The genus reaches its greatest development in the West Indies, where 10 of the 14 known species occur. The plants are generally shrubs or small trees but stevensonii and minutiflora of Central America may attain heights of 25 to 30 meters.

Cronquist (3) states that "Dipholis is closely related to and evidently derived from Mastichodendron from which it differs in the presence of lateral lobes on the corolla-lobes."

A portion of Cronquist's key (4) is reproduced here for illustration:

- 6. Corolla-lobes without lateral lobes; endosperm present
 Mastichodendron

^{1/} Pioneer Research Unit, FPL. The Laboratory is maintained at Madison, Wis., in cooperation with the University of Wisconsin, Madison.

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- 6. Corolla-lobes with lateral lobes,
except in a few species of Bumelia
- 7. Endosperm present; ovary nearly always glabrous; unarmed
..... Dipholis
- 7. Endosperm wanting; ovary usually hairy; usually more or
less spiny. Bumelia

Aubréville (1) makes a similar separation but places Bumelia and Dipholis in his Group 1 Bumeliees and Mastichodendron in Group 2 Sideroxylees, where it is the sole American genus.

Baehni (2) placed the species of Dipholis under Bumelia but his treatment gained little or no favor in the taxonomic world. The wood anatomy of Bumelia, described by the author (5), has nothing in common with Dipholis and the union of these taxa is not justified on anatomical grounds.

Record (7) provided a very brief and rather uninformative description of the wood anatomy of Dipholis; he did mention the deviation of D. jubilla with respect to the parenchyma, which was closely banded but reticulate in the other species he had examined.

Wood Description

Dipholis (Typical) based on 28 specimens of salicifolia, four specimens of montana, and single specimen of cubensis. D. salicifolia is the type species of the genus.

General: Wood brown to dark brown, rather drab in appearance and without luster. Sapwood and heartwood not differentiated. Growth rings indistinct or may be demarcated by fibrous zones which are relatively free of parenchyma. Wood fine-textured; hard and heavy. Specific gravity ranges from 0.72 to 1.01 with an overall average of 0.91.

Anatomical:

Wood diffuse-porous, the pores commonly in radial multiples of 2-4 and occasionally to 6-7 (fig. 1). Maximum tangential pore diameters for individual specimens range from 79 to 158 μm , the most common range being 102 to 142 μm .

Vessel member length averages range from 480 to 820 μm with most of the specimens near the average of 680 μm . Inter-vessel pits 6-8 μm in diameter. Tyloses, when present, thin-walled.

Axial parenchyma typically diffuse or reticulate (figs. 1-2); dark brown organic deposits common. Rhombic crystals and silica lacking.

Wood rays (1)2-3(4) seriate; heterocellular. Maximum ray height (unfused rays) up to 470 μm . Maximum height of 2-4 seriate portions of the rays up to 300 μm . Vessel-ray pit-pairs large and variable in size and shape. Rhombic crystals and silica lacking.

Wood fibers thick-walled with an average length of 1.53 mm. Tracheids common.

Dipholis montana differs from cubensis and salicifolia in that some of the cells of the axial parenchyma contain microcrystals and these also occur to a lesser extent in the marginal ray cells.

Diagnostic features: Wood brown; diffuse-porous; parenchyma reticulate; rhombic crystals and silica lacking but microcrystals present in montana.

Dipholis (Atypical) based on one specimen each of minutiflora, nigra, and stevensonii. These specimens have herbarium vouchers which were cited by Cronquist (3) but anatomically the woods could be placed in Mastichodendron. The wood of these specimens differs from Mastichodendron only in the greater abundance of brown organic deposits in the parenchyma and wood rays. The wood of Mastichodendron is described in reference (6). Herbarium vouchers for these three species at Madison are sterile so that some doubt is cast on the accuracy of these determinations.

When Standley (8) described D. stevensonii he added this qualifying statement, "It is unfortunate that flowers are not available so that the true generic disposition of the tree might be determined. I am not certain that it belongs properly to Dipholis but have referred it there because of the close resemblance of the fruit to that of the Costa Rican D. minutiflora Pittier. Dipholis stevensonii, whatever its final generic disposition may be, is evidently distinct from any of the Sapotaceae now known from Central America, and may be recognized at once by its rust-like tomentum of the leaves."

It is of interest to note that Standley mentioned D. minutiflora because the anatomy of this wood as noted from the sole specimen available for study (Austin Smith 4184 from Costa Rica) is practically identical with that of D. stevensonii.

Dipolis jubilla was earlier noted by Record (7) as differing from the other species he examined by its distinctive banded parenchyma (figs. 3-4). The only specimen available to Record and this author is Bucher 173, accompanied by sterile herbarium material. The wood specimen is 3.8 cm in diameter and obviously derived from a branch. Besides the banded

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parenchyma, the long vessel members (which average 1010 μm) make this specimen rather unique.

Cronquist indicated that mature flowers and fruits are unknown for this species so proper disposition of this plant is still in doubt.

U.S. Forest Products Laboratory.

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III. Dipholis, by B. F. Kukachka. Res. Pap.
FPL 327, For. Serv., U.S. Dep. Agr.
Madison, Wis. 9 p.

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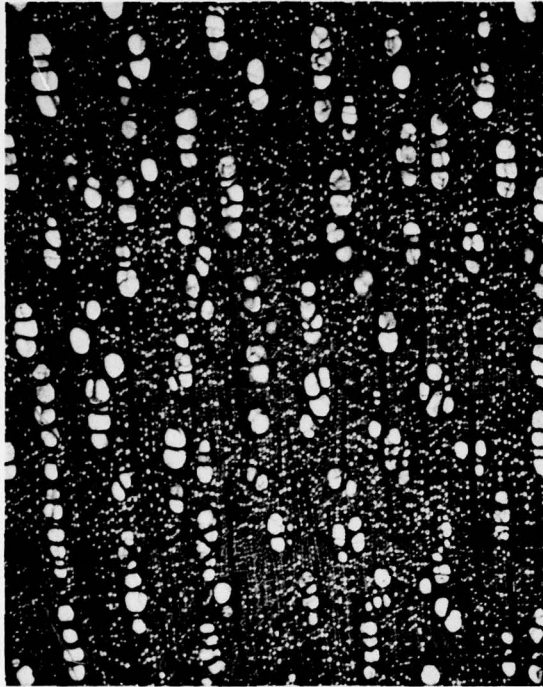


Figure 1.--*Dipholis salicifolia* Typical arrangement of pores and parenchyma. (Caldwell 8786) X 30.

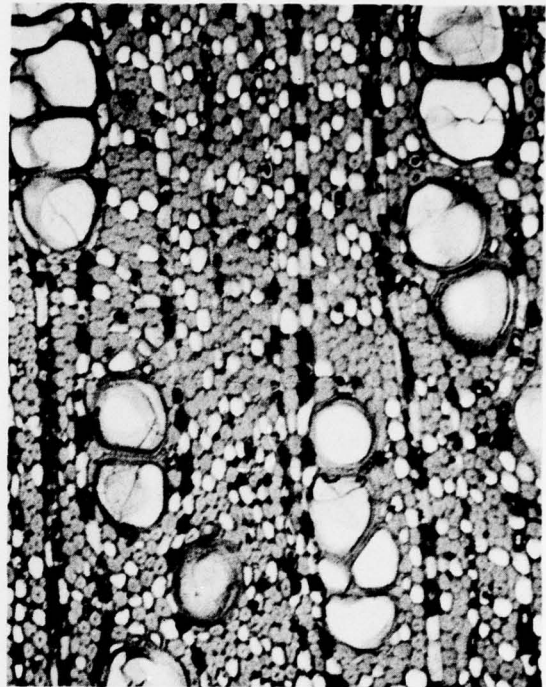


Figure 2.--*Dipholis salicifolia* parenchyma detail (Caldwell 8786) X 110.

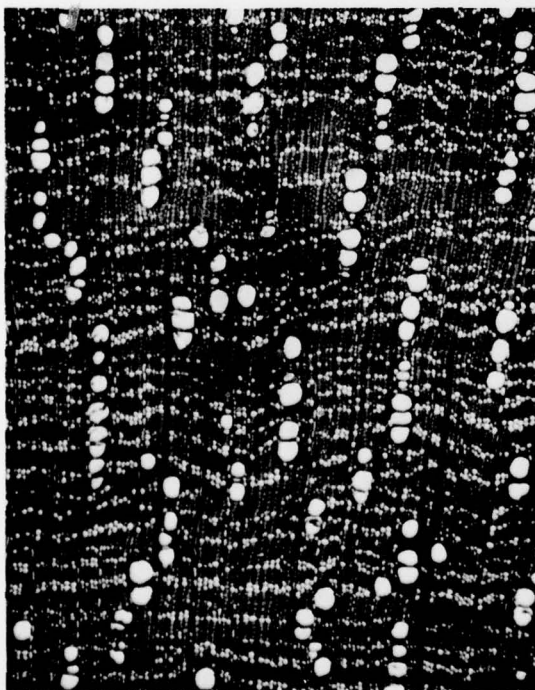


Figure 3.--*Dipholis jubilla* banded parenchyma and definite trend toward radial alinement of the pores (Bucher 173) X 30.

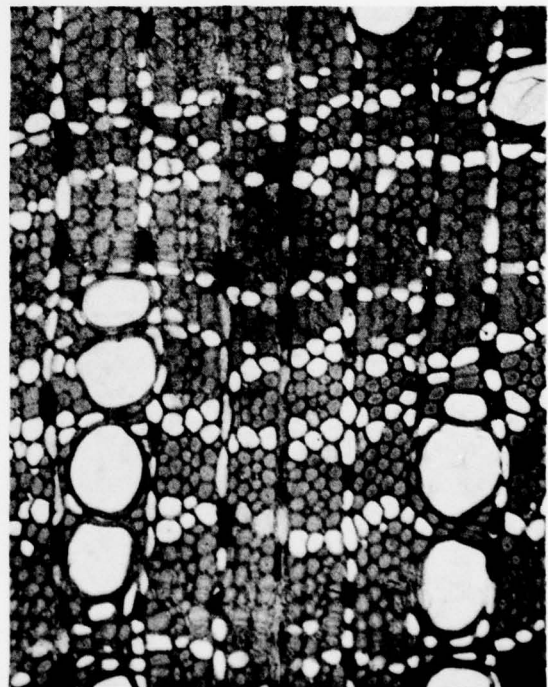


Figure 4.--*Dipholis jubilla* parenchyma detail (Bucher 173) X 110.

Table 1.--Wood specimens of *Dipholis* examined

| Species | Collector and number | | Origin | Numbers in wood collection | |
|----------------------------------|----------------------|---------|-------------|----------------------------|-------------------|
| | | | | MADw | SJRw |
| <i>cubensis</i> (Griseb.) Pierre | Bucher | 175 | Cuba | | 19300 |
| <i>jubilla</i> Ekman ex Urban | Bucher | 173 | Cuba | | 19298 |
| <i>minutiflora</i> Pittier | Austin Smith | 4184 | Costa Rica | | 38398 |
| <i>montana</i> (Sw.) Griseb. | Miller | 1267 | Jamaica | 20711 | |
| | Miller | 1297 | Jamaica | 20734 | |
| | Field Mus. | 14960 | Jamaica | | 10861 |
| | Commercial | | Jamaica | | 40788 |
| <i>nigra</i> (Sw.) Griseb. | Miller | 1389 | Jamaica | 20779 | 53971 |
| <i>salicifolia</i> (L.) A. DC. | Abbott | 1295 | Dom. Rep. | 19504 | 7092 and 53975 |
| | Barbour | 44 | Haiti | 11069 | 9003 |
| | Caldwell | 8786 | Florida | 4155 | 49313 |
| | Cowels | 2565 | Puerto Rico | | 47837 |
| | Curtiss | sn | Florida | | 5186 |
| | Durland | 17 | Dom. Rep. | | 5036 |
| | Eggers | 4106 | Bahamas | 9708 | |
| | Fors | 17 | Cuba | 13737 | 15858 |
| | Gill-Whitford | 4 | Cuba | | 9022 |
| | Gill-Whitford | 111 | Cuba | 9122 | 11100 |
| | Jack | 5675 | Cuba | | 16651 |
| | Lundell | 6 | Belize | | 19829 |
| | MacDonald | 11 | Florida | | 32527 |
| | Miller | 1363 | Jamaica | 20764 | 53928 |
| | Miller | 1413 | Jamaica | 20797 | |
| | Scarff | 2A | Dom. Rep. | | 35305 |
| | St. Louis Expo | 10 | Cuba | | 804 |
| | Stern | 32 | Florida | 16860 | 49391 |
| | Stern-Brizicky | 290 | Florida | | 51120 |
| | Stern-Brizicky | 339 | Florida | | 51159 |
| | Stern-Brizicky | 394 | Florida | | 51198 |
| | Stern-Brizicky | 460 | Florida | | 51243 |
| | Wilson | 40 | Florida | 15983 | |
| | Woodworth | 254 | Virgin Is | | 40180 |
| | 10th Census | 137 | Florida | 20443 | |
| | Commercial | | Cuba | | 5000 |
| | Commercial | | Florida | | 6710 |
| Commercial | | Jamaica | 19407 | 53920 | |
| <i>stevensonii</i> Standl. | Duncan Stevenson | sn | Belize | | 10314 |