

AD-A080 869

FOREST PRODUCTS LAB MADISON WI
WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE. XII. NEOXYTHECE. (U)
1979 B F KUKACHKA

F/G 11/12

UNCLASSIFIED

FSRP-FPL-353

NL

[] of []

AD
3080603



END
DATE
FILMED
3-80
EDC



~~LEVEL~~ A

12

Wood Anatomy
of the
Neotropical Sapotaceae.

XII. Neoxythece.

Research Paper FPL 353

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

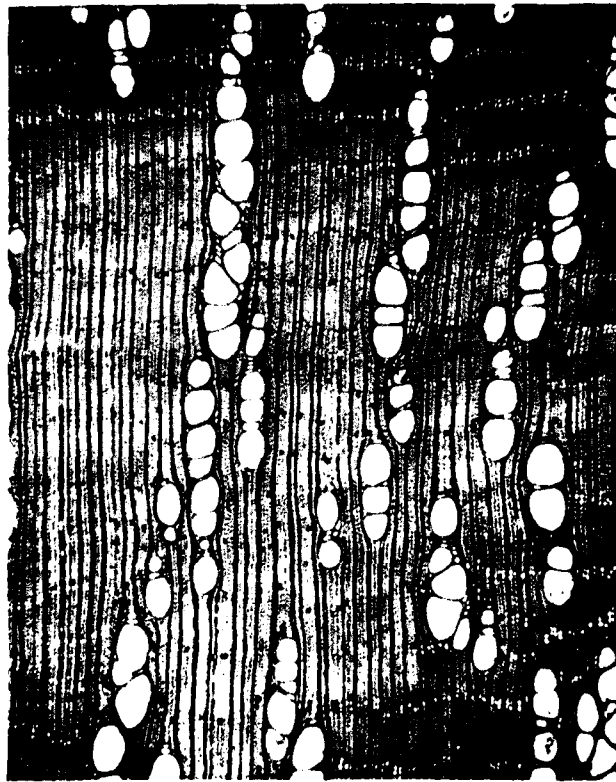
Research
1979
B. F. Kuk...

ADA 080869

DDC FILE COPY

FPL-353

1979



DTIC
ELECTE
FEB 21 1980
S
A

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

141707

Abstract

The genus Neoxythece consists of a small number of species concentrated in the Amazon and northern South America with a single species native to the West Indies. Anatomically and physically, the woods investigated here appear to be a very closely related group. The woods are light brown, very heavy, and characterized anatomically by their narrow banded parenchyma, pores in radial-echelon arrangement, abundant vascular tracheids, long vessel members, and the presence of silica in the wood rays. Woods of Caramuri could not be anatomically distinguished from Neoxythece and have been included in the latter. It seems likely that Pseudoxythece of Aubreville will also be reduced to synonymy.

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 percent 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. 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 Neoxythece is the twelfth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, 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
- IV. Achrouteria--Research Paper FPL 328
- V. Calocarpum--Research Paper FPL 329
- VI. Chloroluma--Research Paper 330
- VII. Chysophyllum--Research Paper 331
- VIII. Diploon--Research Paper 349
- IX. Pseudoxythece--Research Paper 350
- X. Micropolis--Research Paper 351
- XI. Prieurella--Research Paper 352

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

XII. NEOXYTHECE

By

B. F. Kukachka, Botanist^{1/}

Forest Products Laboratory,^{2/} Forest Service
U.S. Department of Agriculture

Introduction

Eyma (6) stated "The name *Oxythece* Miq. should be regarded as an orthographic variant of *Oxytheca* Nutt. (Polygonaceae). Consequently, *Oxytheca* Nutt. 1847, invalidates *Oxythece* Miq. (1863) as a generic name." On this premise, Aubreville (1) made the new combination *Neoxythece* which included most of the species of *Oxythece*, and some species of *Pouteria* and *Chrysophyllum*, based on the type species *Oxythece leptocarpa* Miq. Among others, Aubreville (1,2) made the combinations *Neoxythece cladantha* (Sandw.) Aubr. and *Neoxythece elegans* (A. DC.) Aubr.

Later, Baehni (4) made *Oxythece leptocarpa* Miq. the type of his monotypic genus *Ichthyophora*; *Pouteria cladantha* Sandw. was placed in *Richardella* and *Neoxythece elegans* (A. DC.) Aubr. was placed in the pan-tropical genus *Planchonella*. Needless to say, a bit confusing.

The species of *Neoxythece* as circumscribed by Aubreville comprise a group of closely related species as indicated by the wood anatomy; for this reason the name *Neoxythece* has been adopted.

It should be mentioned here that *Oxythece ferreiri* Cronquist (5) properly belongs in *Elaeoluma glabrescens* (Mart. & Eichl.) Aubr. The literature refers to the affinities of these two genera, but from the standpoint of wood anatomy they are very different (figs. 7-8). One of the most outstanding physical differences is the specific gravity; the available specimens of *Elaeoluma* average 0.55 while those of *Neoxythece* average 1.05.

1/ Pioneer Research Unit, Forest Products Laboratory.

2/ Maintained at Madison, Wis., in cooperation with the University of Wisconsin, Madison.

It was originally intended to describe Caramuri (1) as a separate genus but it became evident that the available specimens could not be separated from Neoxythece with any degree of reliability and are here considered as belonging to the latter genus. It appears that the monotypic Pseudoxythece ambelaniifolia (Sandw.) Aubr. based on Sandwith 372 from Guyana also belongs here.

Description

Based on 31 named specimens of amazonica, cladantha, crassifolia, dura, elegans, gabrielensis, guianensis, robusta, schulzii, and 19 specimens which were assigned to this genus on the basis of wood anatomy (table 1).

General: Wood light brown, drab, without luster. No distinction in color between heartwood and sapwood with the exception of Forest Dep. 3229 which has a very dark brown heartwood. Growth rings indistinct or lacking. Wood heavy to very heavy, the specific gravity of individual specimens ranging from 0.85 to 1.33 with a generic average of 1.05.

Anatomical:

Pores in radial-echelon arrangement (figs. 1,3,5). Solitary pores present but most commonly are in radial multiples of 2-5 and very occasionally in multiples of 5-7. The long chains frequently observed with a hand lens will be found, upon microscopic examination, to consist of multiples separated by a single layer of fiber or tracheids or both. Maximum tangential pore diameter of individual specimens ranges from 87 μm in cladantha to 236 μm in an unassigned specimen (Krukoff 6841). Pores attaining maximum diameters of more than 200 μm were found in specimens of amazonica and dura. Average maximum diameter of all specimens examined was 158 μm .

Vessel member length averages 900 μm for all species; shortest average 800 μm in cladantha and longest in named specimens of robusta and dura. The longest average of 1.14 mm was from an unassigned specimen (Krukoff 1065). Tyloses commonly sclerotic and usually very abundant in the densest woods. Intervessel pit-pairs up to 6 μm in diameter in cladantha, elegans, guianensis, and caramuri; to 8 μm in the other species. Perforations simple.

Axial parenchyma banded, the individual bands varying from 1-3 seriate; occasionally the bands may be somewhat meandering and discontinuous (figs. 1-6). The individual cells frequently with brown contents. Silica occasionally present and then confined to the cells with brown contents. Rhombic and microcrystals not observed. Cell walls of normal thickness even though the density of some specimens was very high.

Wood rays uniseriate in *cladantha* and several unassigned specimens; 1-2(3) seriate in the other specimen examined; heterocellular. Vertical fusions common. The maximum body height of the 2-3 seriate portions ranges from 79 μ m to 552 μ m; very inconsistent within and between species and of no diagnostic value. Vessel-ray pitting irregular in shape and size. Silica common in the wood rays and confined to cells containing brown, organic contents. The silica particles are commonly spheroidal and range in size from 10 μ m to 30 μ m in individual specimens. Silica content of the wood of individual specimens ranges from 0.05 to 1.56 percent of the oven-dry weight of the wood (table 2). Crystals were not observed in the rays.

Wood fibers very thick walled; the fiber length averages for the different specimens range from 1.34 mm to 2.32 mm with an overall average of 1.79 mm. Vascular tracheids common.

Diagnostic features: Wood drab, light brown; very heavy, most wood collection specimens sink in water. Pores in radial-echelon arrangement; parenchyma banded. Silica present and usually distinct in the wood rays. Vascular tracheids common.

Literature Cited

1. Aubreville, A.
1961. Notes sur des Chrysophyllees Americaines. Adansonia 1(1):13-17.
2. Aubreville, A.
1961. Notes sur des Pouteriees Americaines. Adansonia 1(2):182-183.
3. Aubreville, A.
1964. Sapotacees. Adansonia Memoire No. 1:1-147.
4. Baehni, Charles.
1965. Memoires sur les Sapotacees. III. Inventaire des genres.
Boissiera II.:27-28; 66-68; 97.
5. Cronquist, Arthur.
1946. Studies in the Sapotaceae. VI. Miscellaneous Notes.
Bull. Torrey Bot. Club 73(5):465-471.
6. Eyma, P. J.
1936. Notes on Guiana Sapotaceae. Rec. Trav. Bot. Neerl. 33:165-166;
186-189.

U.S. Forest Products Laboratory.

Wood anatomy of neotropical Sapotaceae:
XII. Neoxythece, by B. F. Kukachka. Res. Pap.
FPL 353, FPL, For. Serv., USDA. 9 p.
Madison, Wis.

The genus Neoxythece consists of a small number of species concentrated in the Amazon and northern South America. Anatomically and physically the woods investigated here appear to be a very closely related group. Woods of Caramuri could not be antatomically distinguished from Neoxythece and have been included in the latter.

U.S. Forest Products Laboratory.

Wood anatomy of neotropical Sapotaceae:
XII. Neoxythece, by B. F. Kukachka. Res. Pap.
FPL 353, FPL, For. Serv., USDA. 9 p.
Madison, Wis.

The genus Neoxythece consists of a small number of species concentrated in the Amazon and northern South America. Anatomically and physically the woods investigated here appear to be a very closely related group. Woods of Caramuri could not be antatomically distinguished from Neoxythece and have been included in the latter.

U.S. Forest Products Laboratory.

Wood anatomy of neotropical Sapotaceae:
XII. Neoxythece, by B. F. Kukachka. Res. Pap.
FPL 353, FPL, For. Serv., USDA. 9 p.
Madison, Wis.

The genus Neoxythece consists of a small number of species concentrated in the Amazon and northern South America. Anatomically and physically the woods investigated here appear to be a very closely related group. Woods of Caramuri could not be antatomically distinguished from Neoxythece and have been included in the latter.

U.S. Forest Products Laboratory.

Wood anatomy of neotropical Sapotaceae:
XII. Neoxythece, by B. F. Kukachka. Res. Pap.
FPL 353, FPL, For. Serv., USDA. 9 p.
Madison, Wis.

The genus Neoxythece consists of a small number of species concentrated in the Amazon and northern South America. Anatomically and physically the woods investigated here appear to be a very closely related group. Woods of Caramuri could not be antatomically distinguished from Neoxythece and have been included in the latter.

Table 1.--Wood specimens of Neoxythece examined in this study

Species	Collector and number	Source	Wood collection numbers
<u>amazonica</u> (Krause) _____ *	Froes 83 Froes 214 Froes 224	Brazil Brazil Brazil	A 27364 A 27405 A 27408
<u>cladantha</u> (Sandw.) Aubr.	Forest Dep. 3229 Schulz 7437 Stahel 134 A	Guyana Surinam Surinam	SJR 43722 MAD 32947 SJR 42448
<u>aff. cladantha</u>	Froes 1065 Froes 1072	Bahia, Brazil Bahia, Brazil	A 28009 A 28016
<u>crassifolia</u> (Miq.) _____ *	Froes 95 Froes 151 Froes 832	Brazil Brazil Brazil	A 27369 A 27377 A 27534
<u>dura</u> (Eyma) Aubr. & Pellegr.	Forest Dep. 3556 Froes 184 Froes 289 Froes 312 LLB-Maas 10802 Maguire et al. 41782	Guyana Brazil Brazil Brazil Surinam Venezuela	SJR 43816 A 27388 A 27442 A 27455 MAD 32972 SJR 52391
<u>elegans</u> (A. DC.) Aubr.	Wurdack-Adderley 43203 Froes 263 Wurdack-Monachino 39661	Venezuela Brazil Venezuela	SJR 54203 A 27429 SJR 50036

Table 1.--Wood specimens of Neoxythece examined in this study--continued

Species	Collector and number	Source	Wood collection numbers
<u>gabrielensis</u> Aubr.	Froes 397 Maguire et al. 41874	Brazil Venezuela	A 27493 SJR 52427
<u>guianensis</u> (Miq.) *	Froes 354	Brazil	A 27485
<u>robusta</u> (Mart. & Eichl.) Aubr. & Pellegr.	BAFOG 1287 Froes 208 Froes 387 Maguire-Politi 28630 Schulz 7425 Stabel 30 Stabel 307	French Guiana Brazil Brazil Venezuela Surinam Surinam Surinam	MAU 32967 A 27402 A 27491 SJR 52256 MAU 32946 MAU 19558 SJR MAU 43303
<u>schulzii</u> Aubr.	Schulz 7327	Surinam	MAU 32944

Wood specimens assigned to Neoxythece on basis of wood anatomy

Kretzler 5105	Venezuela	SJR 55707
Cabrera 7	Colombia	MAU 37896
Cabrera 8	Colombia	MAU 37897
Cabrera 9	Colombia	MAU 37898
Guatrecasas 15791	Colombia	SJR 42951
Guatrecasas 17482	Colombia	SJR 43225

Table 1.--Wood specimens of *Neoxythece* examined in this study--continued

Species	Collector and number	Source	Wood collection numbers
<i>Neoxythece</i> assigned to <i>Neoxythece</i> on basis of wood anatomy			
	Froes 27	Brazil	A 27367
	Froes 581	Brazil	A 27531
	Krukoff 6841	Brazil	SJR 36916
	Krukoff 7049	Brazil	MAD 12797
	Krukoff 7191	Brazil	SJR 37129
	Maguire et al. 55362	Surinam	MAD 22844
	Perzaud 21	Guyana	SJR 9438
	Perzaud 105	Guyana	SJR 9495
	Rosa 1612	Brazil	IAN 1612
<p><i>Oxythece rigidopsis</i> Monachino was excluded from consideration here because of its very small pores (max. 62 μm) in diffuse arrangement. Its status is unknown at present.</p> <p>Specimens previously assigned to <i>Caramuri</i> but which apparently belong here are:</p>			
	Coelho 5116	Brazil	ISPA 560
	Krukoff 6717	Brazil	SJR 36843
	Krukoff 6725	Brazil	SJR 36871
	Pires et al. 51796	Brazil	MAD 21489

It is not known at this time whether these new combinations have been made.

Table 2.--Silica content

Species	Collector and number	Origin	Wood specimen	Percent silica
<i>amazonica</i>	Froes 83	Brazil	A 27364	0.67
<i>cladantha</i>	Forest Dep. 3229	Guyana	SJR 43722	.16
	Schulz 7437	Surinam	MAD 32947	.15
	Schulz 7528	Surinam	MAD 32951	.96
	Stahel 134 A	Surinam	SJR 42448	.24
<i>crassifolia</i>	Froes 832	Brazil	A 27534	.84
<i>dura</i>	Forest Dep. 3556	Guyana	SJR 43816	.73
	Froes 289	Brazil	A 27442	.20
	Maguire et al. 41782	Venezuela	SJR 52301	.35
<i>elegans</i>	Froes 263	Brazil	A 27429	.49
<i>gabrielensis</i>	Froes 397	Brazil	A 27493	.18
	Maguire et al. 41874	Venezuela	SJR 52427	.39
<i>guianensis</i>	Froes 354	Brazil	A 27485	.84
<i>robusta</i>	BAFOG 1287	French Guiana	MAD 32967	.34
	Schulz 7425	Surinam	MAD 32946	.59
	Stahel 307	Surinam	MAD 19819	.10
<i>schulzii</i>	Schulz 7327	Surinam	MAD 32944	.94
sp.	Cabrera 7	Colombia	MAD 37896	.59
sp.	Cuatrecasas 17482	Colombia	SJR 43225	.05
sp.	Froes 1065	Brazil	A 28009	.10
sp.	Froes 1072	Brazil	A 28016	.31
sp.	Krukoff 6841	Brazil	MAD 12686	.60
sp.	Krukoff 7049	Brazil	MAD 12797	1.56
sp.	Krukoff 7191	Brazil	MAD 12859	.21
<i>Caramuri</i>	Coelho 5118	Brazil	INPA 560	.45
	Krukoff 6717	Brazil	SJR 36843	.70
	Krukoff 6785	Brazil	SJR 36871	.46
	Pires et al. 51796	Brazil	MAD 21489	.45

The author is indebted to Martin F. Wesolowski, Chemist, Forest Products Laboratory, for the silica analysis.

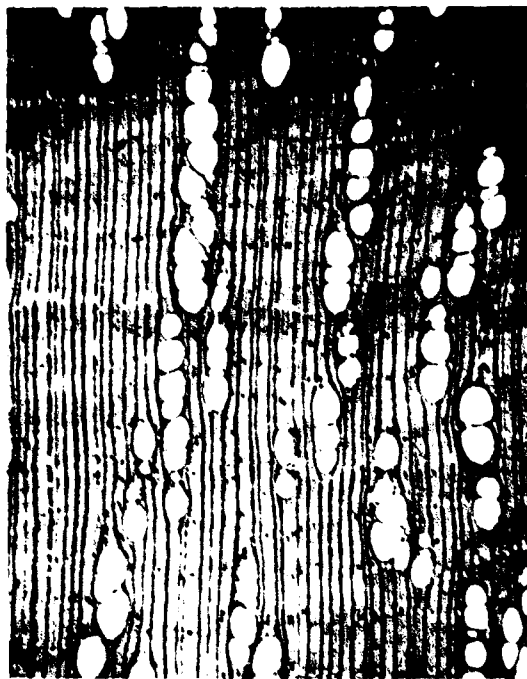


Figure 1.--*Nooxythece dura*
(For. Dep. Guyana 3556),
pore and parenchyma
arrangement X30.



Figure 2.--Same showing
parenchyma detail X110.

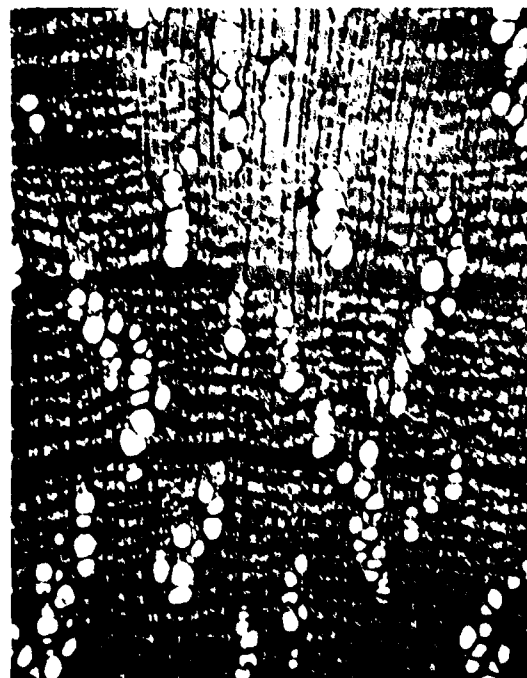


Figure 3.--*N. elegans*
(Wurdack-Adderley 43203),
pore and parenchyma
arrangement X30.

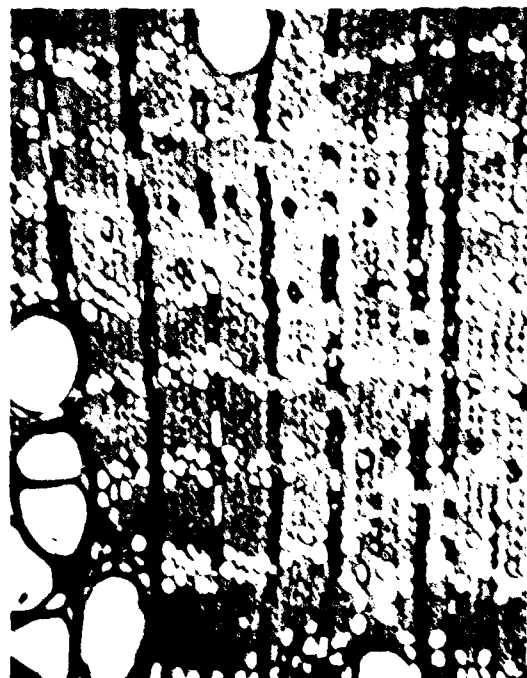


Figure 4.--Same showing
parenchyma detail X110.

691 61 8 08



Figure 5.--*N. cladantha*
(For. Dep. Guyana 3229),
pore and parenchyma
arrangement X 30.



Figure 6.--Same as figure 5
showing parenchyma detail
and sclerotic tyloses X110.

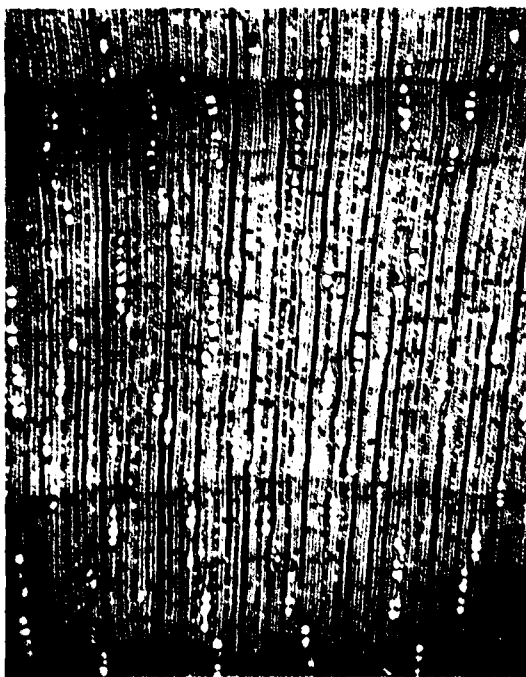


Figure 7.--*Elaeoluma glabrescens*
(Rodrigues-Coelho 2476)
reticulate parenchyma, small
pores, and growth rings X30.

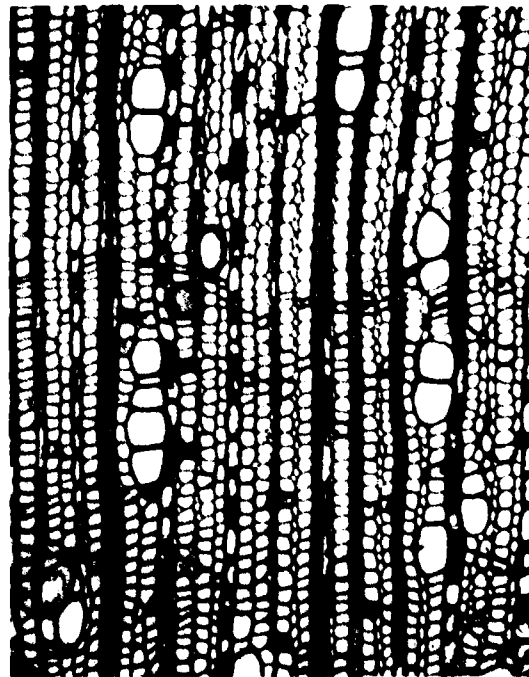


Figure 8.--Same showing
parenchyma detail and thin-
walled fibers X 110.