WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

XXXI. POUTERIA

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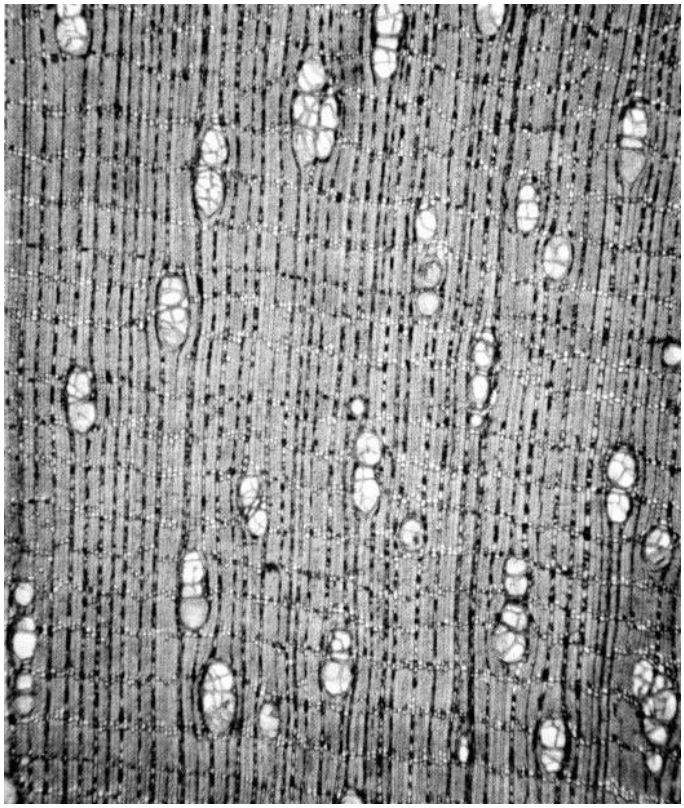

Abstract

As circumscribed by Baehni the genus Pouteria consists of a heterogeneous assemblage of over 300 species pantropical in distribution. The wood anatomy also reflects the tremendous heterogeneity and makes identification based on the wood all but impossible. This author has elected to follow Aubréville's system that reduces Pouteria to less than 50 species confined to the American tropics. As a result, the American species of Pouteria comprise a very homogenous anatomical group that is readily identifiable from its wood anatomy.

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 the 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 synonomy. 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 Pouteria is the thirty-first 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--Res. Pap. FPL 325
II. Mastichodendron--Res. Pap. FPL 326
III. Dipholis--Res. Pap. FPL 327
IV. Achrouteria--Res. Pap. FPL 328
V. Calocarpum--Res. Pap. FPL 329
VI. Chloroluma--Res. Pap. FPL 330
VII. Chrysophyllum--Res. Pap. FPL 331
VIII. Diploon--Res. Pap. FPL 349
IX. Pseudoxythece--Res. Pap. FPL 350
X. Micropholis--Res. Pap. FPL 351
XI. Prieurella--Res. Pap. FPL 352
XII. Neoxythece--Res. Pap. FPL 353
XIII. Podoluma--Res. Pap. FPL 354
XIV. Elaeoluma--Res. Pap. FPL 358
XV. Sandwithiodoxa--Res. Pap. FPL 359
XVI. Paralabatia--Res. Pap. FPL 360
XVII. Gambeya--Res. Pap. FPL 361
XVIII. Gomphiluma--Res. Pap. FPL 362
XIX. Chromolucuma--Res. Pap. FPL 363
XX. Manilkara--Res. Pap. FPL 371
XXI. Barylucuma--Res. Pap. FPL 372
XXII. Pradosia--Res. Pap. FPL 373
XXIII. Gayella--Res. Pap. FPL 374
XXIV. Ecclinusa--Res. Pap. FPL 395
XXV. Ragala--Res. Pap FPL 396
XXVI. Myrtiluma--Res. Pap. FPL 397
XXVII. Sarcaulus--Res. Pap. FPL 398
XXVIII. Labatia--Res. Pap. FPL 416
XXIX. Eglerodendron--Res. Pap. FPL 417
XXX. Pseudocladia--Res. Pap. FPL 418

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 comprehensive unit.

WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

XXXI. POUTERIA

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Introduction

The genus Pouteria was described by Aublet in 1775 and consisted of the single species known to him, Pouteria guianensis from French Guiana. Unfortunately, the fruit described by Aublet is known now to belong to Sloanea of the Elaeocarpaceae and, as a result of this error, the number of species within the genus remained very small. On the other hand, Lucuma described by Molina in 1782 developed into a rather large genus despite the fact that Molina's original diagnosis contained two species belonging to families other than the Sapotaceae. Lucuma is now regarded as a "nomen nudum" and the majority of its species have been reduced to synonyms of Pouteria.

The nomenclatural history of the Pouteria-Lucuma complex is rather interesting and, although it has been argued by every student of the family, the precise circumscription of Pouteria still remains controversial. Baehni (4)[3/] in his "Monograph of Pouteria" cites 318 species distributed among 15 sections that are pantropical in distribution. For the Neotropics he cites 178 species with an additional 23 varieties and forms. In his "Inventory of the Genera" (5) he cites for Pouteria 24 generic synonyms and an additional 23 probable synonyms. All in all, a vast and heterogenous assemblage of plants.

At the other extreme, Aubréille (1, 2) restricts Pouteria to a much smaller number of species that are confined to the American Tropics and are characterized by their 4-merous flowers, subulate staminodes, stamens with filaments inserted near the middle of the corolla tube, a four-chambered ovary, and leaves with a distinct network of veins apparent from both surfaces.

From the anatomical standpoint, Baehni's Pouteria is untenable, impractical, and consists of an extremely heterogeneous assemblage; an anatomical

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3/ Underlined numbers in parentheses refer to literature cited at the end of this report.

description would nearly encompass all of the American Sapotaceae. Aubréville's Pouteria forms a closely allied grouping of species characterized by banded parenchyma and the pores in diffuse arrangement and, further, can be separated into two groups on the size of the intervessel pitting.

Record (13) provided a very brief and generalized description of the Pouteria-Lucuma complex that was similar in many respects to the other genera he had described. His descriptions would not permit generic identification under any circumstance but it should be remembered that at the time his descriptions were being prepared, the Yale wood collection contained a relatively small number of nomenclaturally confused Sapotaceae. However, it is rather surprising that no mention was made of the presence of vascular tracheids and the occurrence of silica in the wood rays. In fact, silica is not mentioned in any of his descriptions and this is no doubt due to the "then standard procedure" of soaking sectioning blocks in hydrofluoric acid which was quite effective in removing silica and crystalline contents.

Kribs (10) described two species of Pouteria and, as Record, made no mention of the presence of vascular tracheids and silica. His description of Pouteria carabobensis is now known to be for a species of Pradosia, and Pouteria guianensis is described as having intervessel pitting 4-5 µm in diameter when actually it is 8-10 µm in diameter. It is evident that the Pouteria guianensis described by Kribs belongs in another genus.

Description

Up to this point, many species of Pouteria (sensu Baehni) have been referred to other genera that have been described in preceeding monographs of this series. The remaining species, notably those which Aubréville (1,2) declared as belonging to the true Pouteria and a few new species that had been subsequently described by him, comprise a group of closely related species having in common the anatomical characteristics of the generic type Pouteria guianensis. To this basic group have been added species of Pouteria that on the basis of their anatomical and physical characteristics belong here. Pouteria is herein described on the basis of 29 named species represented by 111 wood specimens and 21 unassigned specimens. Refer to table 1 for pertinent data relative to each specimen. The last portion of table 1 lists specimens of named species of Pouteria that have been excluded for various reasons (see Notes for details).

General: Sapwood light brown to brown; heartwood apparently late in formation and, when present, is usually dark brown or reddish brown and sharply demarcated from the lighter colored sapwood. Wood hard and heavy, with a specific gravity range of 0.60 (branchwood) to 1.30 (heartwood); the overall average for all specimens was 0.91 and the majority of these were sapwood or in-part heartwood. The value for all heartwood specimens always exceeds the 1.00 level. Growth rings usually indistinct or absent except in the southernmost species (fig. 3) where they are fairly distinct. Wood straight-grained; with little or no luster. Froth test negative.

Anatomical:

Pores in diffuse arrangement; occurring as solitary pores and in radial multiples of 2-5 pores or infrequently longer with an observed maximum of 9 pores in salicifolia (figs. 1,3). Maximum tangential pore diameter of individual specimens ranges from 79 µm in salicifolia to 244 µm in an unassigned specimen; overall average is 157 µm.

Vessel member length averages range from 340 µm in salicifolia to 920 µm in belizensis with an overall average of 660 µm. Intervessel pitting 6 µm in diameter in the southern species (fragrans, gardnerana, and salicifolia) and commonly 6-8 µm or 8-10 µm in the other species. Perforation plates simple. Tyloses thin-walled, thick-walled, and commonly sclerotic in the dense heartwood.

Axial parenchyma typically banded (fig. 1); the individual bands irregularly 1-3 seriate to infrequently in-part 4-5 seriate. The bands (fig. 3) are not distinct because of the magnification and abundance of pores but are quite distinct when observed with a hand lens of 15X. Parenchyma cells frequently with brown deposits in which a small particle of silica may be embedded. Rhombic and microcrystals lacking.

Wood rays heterocellular; commonly 1-2 seriate and occasionally 3-seriate in some species; multiseriate portion very variable in height but generally not exceeding 500 µm in height (figs. 2,4). Ray cells tabular, square, the marginals usually erect as viewed from radial sections. Brown deposits common although some cells may appear to be devoid of any contents. Vessel-ray pitting irregular in shape and size but commonly obovoid to linear. Pitting on lateral walls of square and erect cells abundant and distinct. Rhombic crystals and microcrystals lacking but silica particles are common to very abundant. Silica particles spheroidal, attaining diameters of 20 µm to 30 µm and confined to those cells with brown contents. Silica most abundant in the tabular and square cells; when it occurs in the erect marginals it is usually in those cells adjacent to the axial parenchyma.

Wood fibers thick-walled; fiber length averages for all specimens ranging from 0.69 mm to 1.75 mm with an overall average of 1.30 mm. Vascular tracheids common.

Silica content determined by chemical analysis ranged from 0.03 percent (ovata) to 3.10 percent (neglecta) with an overall average of 0.78 percent for the 95 specimens analyzed. Silica analyses were performed by Martin F. Wesolowski, Chemist, FPL.

Diagnostic features: Wood light brown, dark brown, or red brown and mostly heavy to very heavy (heartwood specimens always sink in water). Parenchyma banded. Pores in diffuse arrangement; wood rays commonly 1-2(3) seriate; uniseriate rays frequently abundant; the multiseriate body generally less than

500 µm high. Inter-vessel pitting 6-8 µm or 8-10 µm in diameter. Tyloses (in heartwood) commonly thick-walled or sclerotic. Silica particles common in the wood rays and generally confined to the tabular and square cells. Not readily confused with other genera with diffuse parenchyma and silica in the wood rays because in these instances the pores are in radial-echelon arrangement or the vessel pitting is 3-4 µm or 4-6 µm in diameter. Eglerodendron might be confused with those Pouteria with red-brown heartwood but in the former the wood rays are mostly 2-4 seriate and the multiseriate body portion is 0.6 mm to 1.0 mm in height.

Notes

1. Lucuma amygdalina Standley (14) was described in 1935 on the basis of leaves and seeds collected by Durland (s.n.) in El Peten, Guatemala. In 1942 Baehni (4) transferred this species making the new combination Pouteria amygdalina (Standley) Baehni and added an incomplete floral description that stated in-part "sepals 5, corolla unknown." Apparently the floral description was derived from Lundell LP 14 collected in Belize that Standley had described as Bumelia laurifolia but Baehni had reduced to a synonym of Pouteria amygdalina. In 1946 Cronquist (7) amplified the description by the addition of eleven collections from Belize and Guatemala and in his floral description stated, in-part "sepals commonly 4, sometimes 5."

Three wood specimens were available for this study of which Stevenson 2 was cited by Cronquist (7), Aguilar 11 was determined at the Field Museum, and Lundell 5 was cited by Cronquist as Pouteria unilocularis. Standley had referred Lundell 5 to his new species Sideroxylon meyeri and this species, in turn, was transferred to Pouteria lundellii by Louis Williams. Our other wood specimens of Pouteria unilocularis are very different from Lundell 5 and seemingly belong to Franchetella.

2. Lucuma belizensis Standley (14) was described from Kluge 41 collected in Belize and based on sterile, leafy twigs. Baehni (4) excluded this specimen from his Pouteria and referred it to Sideroxylon sp. Cronquist (7) made the transfer to Pouteria belizensis (Standley) Cronquist and added a floral description based on Sideroxylon lundellii Standley that he had reduced to synonomy. However, he qualified his description with the statement "The type (Kluge 41) is completely sterile, and there is some possibility that this is not the same species as the flowering material to which Standley gave the name Sideroxylon lundellii."

The wood specimen from the type tree (Kluge 41) and an associated specimen Kluge s.n. differ from the other two specimens that have an appreciably higher silica content and the wood rays are 1-3 seriate. Anatomically, all four specimens are acceptable as Pouteria but may represent two species.

3. The Peruvian wood specimens of Pouteria caimito have a specific gravity range of 0.60 to 0.78, averaging 0.70; the other specimens average 0.95. Williams 4802, originally received as Lucuma huallagae Standley, has a specific

gravity of 0.94 and was cited in "Flora of Peru" (6) as a synonym of P. caimito. The wood specimens of A. C. Smith 2848 and 3245 have a silica content of 1.81 percent and 2.33 percent, respectively, which seem rather high for this species. The same may be said for Williams 171 and 472 from Peru.

4. Pouteria calistophylla Standley (15) was described from Cooper 481 which consisted of sterile leafy twigs and is known only from the type locality, Province of Bocas del Toro, Panama. Standley qualified his species by the following statement "Because of the absence of flowers and fruits, the generic position of this tree is, of course, uncertain. It seems desirable to give it a name, because it is clearly distinct in foliage characters from all the Sapotaceae hitherto reported from Central America. The tree is well marked by the broad coriaceous leaves. densely brown-sericeous beneath." In 1942 Baehni (4) transferred this species to Pouteria calistophylla (Standley) Baehni but placed it in his "species of uncertain status." This species has been retained by Cronquist (7) and Pilz (12) but is excluded here on the basis of its very small intervessel pitting (3-4 µm) and tentatively placed in Labatia.

5. Lucuma chiricana Standley (15) was described on the basis of leaves and seeds from the Panama collections of Cooper & Slater 254 (type) and 230. Baehni (4) cited both of these numbers and made the combination Pouteria chiricana (Standley) Baehni but placed this species in his "species of uncertain status." Cronquist (7) cited the Cooper & Slater number and added Cooper numbers 445 and 457, also from Panama. His floral description was apparently based on Cooper 457. A fifth specimen, also from Panama, Forgeson 69A, is not cited in the literature but the sheet was annotated by Cronquist as belonging here. Very adequate wood specimens with accompanying herbarium specimens are in the Madison collections. The wood anatomy of Cooper & Slater 230, 254, and Forgeson 69A are very similar but their place in Pouteria appears doubtful. Furthermore, Cooper 445 and 457 are very different from each other and from the preceeding three specimens; they do not belong in Pouteria and their proper generic disposition has not yet been determined. It thus appears that the floral description provided by Cronquist is not applicable. The wood of Cooper 457 is very distinctive because the small pores are in clustered-echelon arrangement; the intervessel pitting is 6-8 µm in diameter and the wood has a very high silica content, 3.45 percent; definitely not a Pouteria. Cooper 445 also has small pores but in diffuse arrangement and the intervessel pitting is 3-4 µm in diameter; specific gravity is 0.57; not a Pouteria.

6. Pouteria cooperi Cronquist (7) was described from Cooper 499 and is known only from the type locality in Panama. This specimen was originally identified by Standley as Calocarpum viride Pittier but Cronquist did maintain his new species in the "Calocarpum group" under Pouteria. Cronquist stated "This species is distinguished from others of the 'Calocarpum group"' but its relatively coarse and irregular venation, fleshy glabrous sepals, and woody fruit. Lundell (11) make the new combination Calocarpum cooperi (Cronquist) Lundell. Anatomically, the wood from the type tree is very different from Calocarpum mammosum which is characterized by reticulate parenchyma and the radial arrangement of the pores; in typical Pouteria and in this specimen the parenchyma is banded and the pores are in diffuse arrangement. It would be rather difficult to reconcile this specimen with Calocarpum.

7. Pouteria cuatrecasasii Aubréville (3) was described from Pacific Colombia on the basis of leaves and fruits of Cuatrecasas 16396 (holotype) and an additional specimen, Cuatrecasas 15749. Both numbers were collected with wood specimens and their anatomy is typically Pouteria.

8. Pouteria dasystyla Rizzini appears to be a doubtful Pouteria on the basis of its small pores which are arranged in radial files. The only specimen available for this study was Filho & Rizzini 557 collected in the Rio de Janeiro area and is represented by wood specimen 6062 of the Jardim Botanico (Rio) and corresponding herbarium sheet 155277.

9. Pouteria dentata (Pierre) Gilly is represented by Froes specimens 96, 207, 213, and 279. The wood specimens exhibit considerable variation and may represent two or perhaps three species of Pouteria.

10. Lucuma izabalensis Standley (14) was described on the basis of a sterile collection from Guatemala made by Whitford & Stadtmiller No. 35. Standley remarked, "The leaves of this tree are strikingly similar to those of Lucuma sclerocarpa." Baehni (4) made the transfer to Pouteria izabalensis (Standley) Baehni citing the type specimen (Whitford & Stadtmiller 35) and J. Record 8841. The S. J. Record herbarium number is actually G-10 and the accompanying Yale wood collection number is 8841. The Record collection apparently provided material for Baehni's floral description. Cronquist (7) identified some additional collections with this species and included Englesing 46, Record G-10, and the type, all of which have accompanying wood specimens. Cronquist's descriptions of izabalensis and sclerocarpa are very similar as is also the wood anatomy of the wood specimens available for study. Anatomically, the wood specimens are not Pouteria or Calocarpum but most like Urbanella (see also Note 15).

11. Pouteria krukovii (A. C. Smith) Baehni (4) was originally described as Lucuma krukovii A. C. Smith based on Krukoff 5700 collected in Acre Territory, Brazil. The small intervessel pitting, 4-5 µm, excludes this species from Pouteria. Froes 262 received as P. krukovii has very small intervessel pitting, 3-4 µm, and undoubtedly represents another species but not a Pouteria.

12. Pouteria laurifolia (Gomes) Baehni, according to the literature is limited to southeastern Brazil. All of our specimens are Amazonian and hence may represent some other species of Pouteria. The wood specimens represented by Lucival 229 has very small intervessel pitting, 3-4 µm, and has been tentatively referred to Labatia.

13. Pouteria melanopoda Eyma (9) was described in-part "5 sepals and 5 petals; the leaves with petioles 1-1/2 to 4 cm long; and the fruit unknown." The petiole length given in centimeters (cm) is a typographical error and should read as millimeters (mm). This error may have been responsible for the rather odd assemblage which has accumulated under this name. The first four wood specimens which became available for this study had been identified from sterile herbarium material and anatomically belonged to four different genera. The specimens listed in table 1 may or may not belong to this species but appear to be typical Pouteria.

14. Pouteria neglecta Cronquist (7) is represented here by a single specimen collected by Cooper s.n. (Oct. 1926) in Costa Rica and accompanied by wood specimen SJR 9712. Cronquist indicated that sterile specimens could be confused with Calocarpum but the banded parenchyma and other features make this number a typical Pouteria. The silica content of this specimen is 3.10 percent and is the highest value obtained for any species of Pouteria.

15. Pouteria salicifolia (Spreng.) Radlk. is one of the most distinctive of the genus, being characterized as a small tree with Salix-like leaves native to the temperate zone of South America. Anatomically it is also very distinct and readily separable by its abundant pores in diffuse arrangement which attain a maximum diameter of 87 µm (fig. 3); the vessels and pores are the shortest encountered in Pouteria; wood rays 1-3 seriate; intervessell pitting 6 µm in diameter; and with low specific gravity, averaging 0.63. Baehni (5) placed this species in his conglomerate genus Richardella.

16. Pouteria sclerocarpa (Pittier) Cronquist (7) was originally described by Pittier as Lucuma sclerocarpa. This species is known definitely only from the type collection, Pittier 4357 from Panama, and is accompanied by a wood specimen. Cronquist made the transfer to Pouteria and retained this species in his "Calocarpum group." In 1976 Lundell transferred this species to Calocarpum sclërocarpum (Pittier) Lundell (11). The wood anatomy is neither Pouteria or Calocarpum but is very similar to Urbanella.

17. Pouteria torta (Mart.) Radlk. is said to be very variable in size from "a little shrub to a tree 25 meters high" and according to "Flora of Peru" (6) includes Lucuma dolichophylla Standley represented by Ll. Williams 886. The five specimens available for this study exhibit enough anatomical variation to suggest that two or three species of Pouteria may have been included here.

18. Pouteria trilocularis Cronquist (8) was described on the basis of Adams 2070 (accompanied by wood specimen W-11) from Acre Territory, Brazil. Also cited were Krukoff 5283, 5338, and 5531 also from Acre Territory which had previously been distributed as Sideroxylon bolivianum Rusby. To the above collections, the author has added Capucho 371, Froes 164, Krukoff 5435, 8109, and M. G. Silva 3242 and 3362. Anatomically this species is briefly described as follows: wood light brown; largest pores averaging 214 µm in diameter and in radial-echelon arrangement; intervessel pitting 6-8 µm in diameter; vessel member length averages 765 µm; wood rays essentially uniseriate; pitting of lateral walls of the erect marginals prominent; silica particles occur in the tabular, square, and erect marginals; and wood with a high silica content, average of all specimens 2.08 percent. Anatomically this species is not a Pouteria and superficially with hand lens examination approaches Ragala and Sarcaulus. The correct placement of this species remains to be determined.

19. Pouteria vestita Baehni (4) was described from Krukoff 4743 (type) and Krukoff 5013 from the state of Amazonas, Brazil. Anatomically, this species could be regarded as a smaller-pored version of P. trilocularis. The silica content of these two specimens averaged an exceptionally high 4.07 percent. P. vestita and trilocularis could be the basis for a new genus.

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Table 1.--Pouteria: Selected parameters of specimens examined[1/]
(specimens marked (T) are from type tree)

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
INTERVESSEL PIT DIAMETER 6 µm											
carabobensis Pittier	Williams, Ll. 11011	0.86	0.87	D	126	740	1.54	2	095	6	Venezuela
fragrans (Pierre) Dubard	Noverras 39	.62	.51	D	118	570	1.22	3	355	6	Argentina
gardnerana (A.DC.) Radlk.	Curran 321	.62	1.04	D	95	600	1.22	2	355	6	Argentina
salicifolia (Spreng.) Radlk.	Service Forestal s.n.	.61	.09	D	87	430	.88	3	394	6	Uruguay
	Lindeman & de Haas 3494	.61	.32	D	79	420	.80	3	236	6	Brazil
	Patterson 8135	.66	.34	D	87	340	.69	3	213	6	Argentina
INTERVESSEL PIT DIAMETER 6-8 µm											
amygdalina (Standley) Baehni	Augilar 11	.93	1.90	D	134	640	1.30	2	236	6-8	Guatemala
	Lundell 5	.93	.54	D	102	600	1.29	2	158	6-8	Belize
	Stevenson 2	.89	1.01	D	134	580	1.25	3	568	6-8	Belize
belizensis (Standley) Cronq.	Cons. Forests 49	.93	1.58	D	126	730	1.46	3	276	6-8	Belize
	Kluge s.n.	.96	.13	D	118	770	1.56	2	339	6-8	Belize
	Kluge 41(T)	1.03	.12	D	126	920	1.75	2	291	6-8	Belize
	Stevenson 185	.95	.86	D	126	610	1.33	3	315	6-8	Belize
benoistii Aubr.	Melinon 108	1.00		D	118	790	1.37	2	079	6-8	Fr. Guiana

Table 1.--Pouteria: Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
			INTERVESSEL PIT DIAMETER 6-8 pm--con.								
caimito (R. & P.) Radlk.	For. Dep. (Guyana) 919	0.91	0.18	D	158	680	1.30	2	079	6-8	Guyana
	For. Dep. (Guyana) 3652	.95	.68	D	142	650	1.14	2	134	6-8	Guyana
	Krukoff 6377	1.00	.59	D	142	660	1.26	2	134	6-8	Brazil
	Lanjeuw & Lindeman 1576	.88	.85	D	118	730	1.27	2	063	6-8	Suriname
	Maguire et al. 51696	.96	.55	D	95	630	1.32	2	042	6-8	Brazil
	Silva & Jangoux 332	1.00	.68	D	118	550	1.05	2	158	6-8	Brazil
	Smith, A. C. 2848	.92	1.81	D	158	670	1.26	2	315	6-8	Guyana
	Smith, A. C. 3245	.97	2.33	D	110	660	1.20	2	158	6-8	Guyana
	Williams, Ll. 171	.78	1.64	D	142	700	1.27	2	158	6-8	Peru
	Williams, Ll. 472	.70	1.21	D	142	480	0.94	2	095	6-8	Peru
	Williams, Ll. 1789	.68		D	165	530	1.23	2	276	6-8	Peru
	Williams, Ll. 1792	.70	.18	D	142	590	1.09	2	197	6-8	Peru
	Williams, Ll. 1983	.60		D	134	460	1.14	2	315	6-8	Peru
	Williams, Ll. 2683	.64		D	150	560	1.09	2	165	6-8	Peru
	Williams, Ll. 3990	.77	.40	D	165	730	1.44	2	315	6-8	Peru
	Williams, Ll. 4717	.72	.58	D	142	450	1.03	2	276	6-8	Peru
	Williams, Ll. 4802	.94	.72	D	158	610	1.25	2	126	6-8	Peru
hispida Eyma	Capucho 512	1.01	.45	D	134	670	1.30	2	394	6-8	Brazil
	LBB 10835	1.05	.33	D	126	800	1.55	3	512	6-8	Suriname
	Oldenberger & Norde 434	1.02	1.04	D	102	700	1.40	2	158	6-8	Suriname
	Silva, N. T. 3947	.90		D	134	500	.93	3	347	6-8	Brazil
jenmanii (Pittier) Sandw.	For. Dep. (Guyana) 3112	1.09	.51	D	158	840	1.60	2	118	6-8	Guyana

Table 1.--*Pouteria:* Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
INTERVESSEL PIT DIAMETER 6-8 pm--con.											
laurifolia (Gomes) Baehni	Froes 185	0.92	0.21	D	181	800	1.31	2	394	6-8	Brazil
	Maguire et al. 51767	.99	.55	D	126	630	1.19	2	158	6-8	Brazil
	Oliveira 2966			D	126	720	1.28	2	095	6-8	Brazil
	Oliveira 4172			D	118	640	1.14	2	236	6-8	
ovata A. C. Smith	Krukoff 1841 (T)	.78	.03	D	134	610	1.38	3	433	6-8	Brazil
schrophylla (Auth.?)	Williams, Ll. 1892	.67		D	158	500	.93	2	197	6-8	Peru
trichopoda Baehni	Krukoff 6344 (T)	.93	.27	D	150	720	1.57	2	331	6-8	Brazil
INTERVESSEL PIT DIAMETER 8-10 µm											
cooperi Cronquist	Cooper 499 (T)	.95	.24	D	158	750	1.53	2	063	8-10	Panama
cuatrecasasii Aubr.	Cuatrecasas 15749	1.04	.24	D	142	660	1.32	2	197	8-10	Colombia
	Cuatrecasas 16396	1.02	.30	D	181	680	1.42	3	473	8-10	Colombia
demerarae Sandw.	For. Dep. (Guyana) s.n.	.94	.14	D	197	530	1.07	2	315	8-10	Guyana
dentata (Pierre) Gilly	Froes 96	.85	.96	D	142	650	1.34	2	189	8-10	Brazil
	Froes 207	.84	.92	D	205	890	1.60	2	079	8-10	Brazil
	Froes 213	.71	1.37	D	158	700	1.47	2	189	8-10	Brazil
	Froes 279	1.12	.80	D	110	660	1.28	2	079	8-10	Brazil
echinocarpa W. Rodrigues	Rodrigues 8779	1.30	1.20	D	181	710	1.23	2	434	8-10	Brazil

Table 1.--Pouteria: Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
			INTERVESSEL PIT DIAMETER 8-10 pm--con.								
guianensis Aubl.	BAFOG 1293	1.07		D	173	670	1.13	2	315	8-10	Fr. Guiana
	BBS 1068	1.21	1.03	D	165	650	1.44	2	276	8-10	Suriname
	BW 27	1.08		D	165	710	1.32	2	394	8-10	Suriname
	Capucho 394	1.03	.92	D	165	700	1.35	2	339	8-10	Brazil
	Capucho 505	1.03	.67	D	165	540	1.10	2	394	8-10	Brazil
	Capucho 576	1.06	1.06	D	181	670	1.25	2	443	8-10	Brazil
	For. Dep. (Guyana) 3346	1.10	.38	D	158	720	1.68	2	173	8-10	Guyana
	Froes 152	1.05	.88	D	236	740	1.25	2	236	8-10	Brazil
	Kools 1067	1.24	.50	D	189	800	1.52	2	355	8-10	Suriname
	Maguire et al. 51831	1.13	.67	D	142	690	1.37	2	173	8-10	Brazil
	Oliveira 2959	1.00		D	197	710	1.31	2	315	8-10	Brazil
	Oliveira 2998	.90		D	102	780	1.44	2	550	[2/]6-8	Brazil
	Plowman & Rosa 9420	1.00	.92	D	220	570	1.20	2	197	8-10	Brazil
	Rosa, N. A. 1122	.95		D	189	660	1.30	2	394	8-10	Brazil
	Stahel 9	1.10	.23	D	213	690	1.34	2	315	8-10	Suriname
	Stahel 272	1.08	.51	D	142	790	1.49	2	473	8-10	Suriname
gutta (Ducke) Baehni	Black 47-1092	1.07	1.25	D	181	720	1.47	2	394	8-10	Brazil
	Monteiro da Costa 283	1.07	.59	D	158	520	1.32	2	433	8-10	Brazil
	Krukoff 1322	.96	.71	D	213	700	1.30	2	079	8-10	Brazil
lasiocarpa (Mart.) Radlk.	Capucho 564	.91	1.62	D	197	590	1.17	3	394	8	Brazil
malanopoda Emya	Froes 192	.97	.81	D	181	670	1.24	2	260	[3/]6-8	Brazil
	Froes 314	.95	.93	D	150	710	1.31	2	197	8-10	Brazil

Table 1.--*Pouteria:* Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
			INTERVESSEL PIT DIAMETER 8-10 µm--con.								
malanopoda Eyma--continued											
	Froes 322	0.91	0.67	D	181	680	1.30	2	213	8-10	Brazil
	Froes 408	1.06	.27	D	173	740	1.31	2	197	8-10	Brazil
	Froes 1071 (Bahia)	.96	.45	D	142	700	1.47	2	213	8-10	Brazil
	Rosa, N. A.	1.00		D	134	630	1.22	2	158	[3/]6-8	Brazil
neglecta Cronq.	Cooper s.n.	.96	3.10	D	189	630	1.28	2	433	8-10	Costa Rica
obidensis Huber	Froes 576	.99	.36	D	165	610	1.26	2	055	8-10	Brazil
solimoesensis Aubr. & Pellegr.	Krukoff 8618	.98	.30	D	142	640	1.33	2	197	8-10	Brazil
	Krukoff 8649 (T)	.96	.71	D	126	880	1.65	2	079	8-10	Brazil
temare (H.B.K.) Aubr.	Williams, Ll. 14300	.73	.26	D	158	570	1.14	2	244	8-10	Venezuela
torta (Mart.) Radlk.	Krukoff 1201	.96	1.50	D	181	580	1.24	2	355	8-10	Brazil
	Krukoff 6415	.89	2.72	D	189	690	1.48	2	189	8-10	Brazil
	Krukoff 6636	.94	1.13	D	150	680	1.37	2	173	[4/]6-8	Brazil
	Williams, Ll. 886	.75	.31	D	197	720	1.25	2	118	[4/]6-8	Peru
	Williams, Ll. 4951	.71	1.14	D	165	560	1.29	2	158	[4/]6-8	Peru
wurdackii Aubr.	Schunke 4626	.75		D	173	580	1.15	2	102	8-10	Peru
	Williams, Ll. 899	1.07	.29	D	165	670	1.25	2	244	8-10	Peru

Table 1.--Pouteria: Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
			UNASSIGNED SPECIMENS								
	BW 47	1.00		D	165	860	1.60	2	158	6	Suriname
	Curran 95	1.02	0.34	D	158	740	1.41	2	315	8-10	Brazil
	Curran 342	.97	.83	D	165	730	1.38	2	260	8-10	Brazil
	Curran 450	1.02	.38	D	158	800	1.53	2	260	8-10	Brazil
	Froes 37	.96	1.31	D	181	640	1.49	2	079	6-8	Brazil
	Froes 45	1.03	1.06	D	213	510	.96	2	276	8-10	Brazil
	Froes 75	.92	.70	D	158	690	1.35	3	552	8-10	Brazil
	Froes 160	.93	.70	D	220	640	1.42	2	039	8-10	Brazil
	Froes 297	1.02	.33	D	173	580	1.08	2	173	8-10	Brazil
	Froes 309	1.20	.20	D	189	730	1.39	2	236	8-10	Brazil
	Froes 412	.97	.63	D	173	590	1.16	2	236	8-10	Brazil
	IICA 205	.82	.65	D	244	690	1.55	2	394	8-10	Panama
	Krukoff 10811	.95	1.16	D	173	610	1.23	2	236	8-10	Bolivia
	Krukoff 10924	1.01	.82	D	158	590	1.16	2	095	8-10	Bolivia
	Lisboa 1695	.92	.92	D	189	620	1.28	2	236	8-10	Brazil
	Lisboa 1722	1.02	.65	D	173	660	1.41	2	394	8-10	Brazil
	Monteath TS 14	.76	1.70	D	165	650	1.38	2	095	6-8	Peru
	Pittier 41	.84	1.25	D	197	620	1.21	2	276	8-10	Venezuela
	Rosa, N. A. 572			D	181	560	1.13	2	079	8-10	Brazil
	Silva, N. T. 5114	1.00	.18	D	165	810	1.48	3	710	8-10	Brazil
	TS (SJRw 5534)	.95		D	181	730	1.42	2	394	8-10	Brazil
			Named species of Pouteria excluded from description.								
calistophylla (Standley) Baehni	Cooper 481 (T)	.93	.93	D	118	730	1.72	2	276	3-4	Panama

Table 1.--Pouteria: Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
Named species of Pouteria excluded from description--con.											
chiricana (Standley) Baehni	Cooper 230	0.81	1.20	D	158	710	1.35	2	158	5-6	Panama
	Cooper 254 (T)	.76	3.80	D	134	660	1.55	3	291	5-6	Panama
	Cooper 445	.57	1.78	D	95	590	1.24	3	355	3-4	Panama
	Cooper 457	.73	3.45	R	95	550	1.22	2	158	6-8	Panama
	Forgeson 69A	.96	1.61	D	158	700	1.52	2	118	5-6	Panama
crassinervia Engler	Froes 163	.98	1.39	D	134	630	1.12	2	276	4-5	Brazil
dasystyla Rizzini	Filho & Rizzini 557		.36	R	87	690	1.33	2	236	6-8	Brazil
izabalensis (Standley) Baehni	Englesing 46	.81	1.54	D	134	710	1.54	3	355	4-6	Nicaragua
	Record G-10	.82	2.10	D	158	820	1.58	3	315	4-6	Guatemala
	Whitford & Stadtmiller 35(T)	.88	1.99	D	134	710	1.52	3	473	4-6	Guatemala
krukovii (A. C. Smith) Baehni	Froes 216	.85	.43	R	110	670	1.35	2	079	4-6	Brazil
	Froes 262	.85	.87	R	126	770	1.38	2	276	3-4	Brazil
	Krukoff 5700 (T)	.85	.30	D	102	680	1.39	2	110	4-6	Brazil
laurifolia (Gomes) Baehni	Lucival 229	.90	.65	D	134	620	1.25	2	260	3-4	Brazil
melanopoda Eyma	Schulz 7453	.79	.19	R	165	900	2.10	2	095	8-10	Suriname
sclerocarpa (Pittier) Cronq.	Pittier 4357 (T)	.77	1.72	D	142	620	1.18	2	134	4-5	Panama

Table 1.--Pouteria: Selected parameters of specimens examined[1/] (specimens marked (T) are from type tree)--con.

Species	Collector and number	Sp. gr.	Si	P	MPD	VML	FL	R	MBH	IV	Source
			%		µm	µm	mm		µm	µm	
Named species of Pouteria excluded from description--con.											
trilocularis Cronquist	Adams 2070/W-11 (T)	0.81	1.68	R	220	740	1.43	2	079	6-8	Brazil
	Capucho 371	.72	2.57	R	189	680	1.39	2	118	6-8	Brazil
	Froes 164	.69	.75	R	244	820	1.56	2	079	8-10	Brazil
	Krukoff 5283	.77	2.25	R	220	670	1.49	2	134	6-8	Brazil
	Krukoff 5338	.81	1.53	R	205	790	1.47	2	055	6-8	Brazil
	Krukoff 5435	.74	2.86	R	220	630	1.37	2	126	6-8	Brazil
	Krukoff 5531	.75	3.01	R	236	810	1.32	2	158	6-8	Brazil
	Krukoff 8109	.81	1.96	R	205	870	1.58	2	134	6-8	Brazil
	Silva, M. G. 3242			R	228	790	1.29	2	079	6-8	Brazil
	Silva, M. G. 3362			R	173	850	1.49	2	095	6-8	Brazil
vestita Baehni	Krukoff 4743 (T)	.71	3.08	R	118	840	1.29	1	000	6-8	Brazil
	Krukoff 5013	.68	5.20	R	150	730	1.15	2	079	6-8	Brazil

1/ Sp. gr. = specific gravity; Si = silica content; p = pore arrangement, D = diffuse, R--radial; MPD = maximum pore diameter; VML = vessel member length; FL = fiber length; R = maximum ray seriation; IV = inter vessel pit diameter.

2/ See note_.

3/ See note 13.

4/ See note 17.

Errata, Table 1: 'Suriname' should be spelled 'Surinam.
Also, footnote 2 should apply to the entire specimen Oliviera 2998, and should read, 'This is dubious.

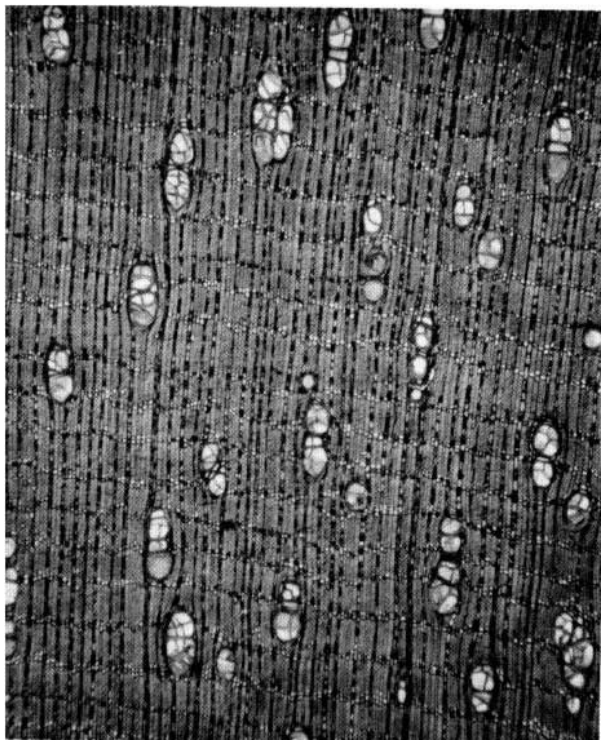

Figure 1.--Pouteria guianensis, transverse section showing large pores and multiples in diffuse arrangement parenchyma narrow banded X 30 (Maguire et al. 51831).

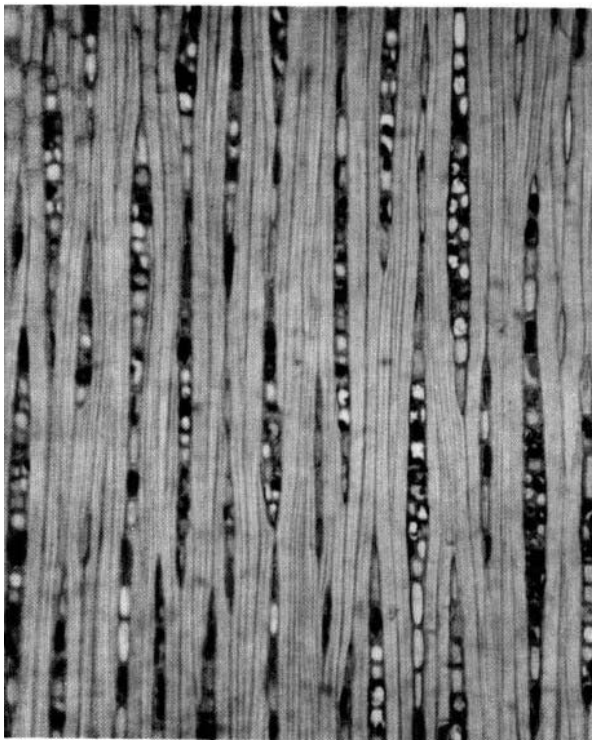

Figure 2.--Same as figure 1, tangential section showing character of 1 and 2 seriate rays X 110.

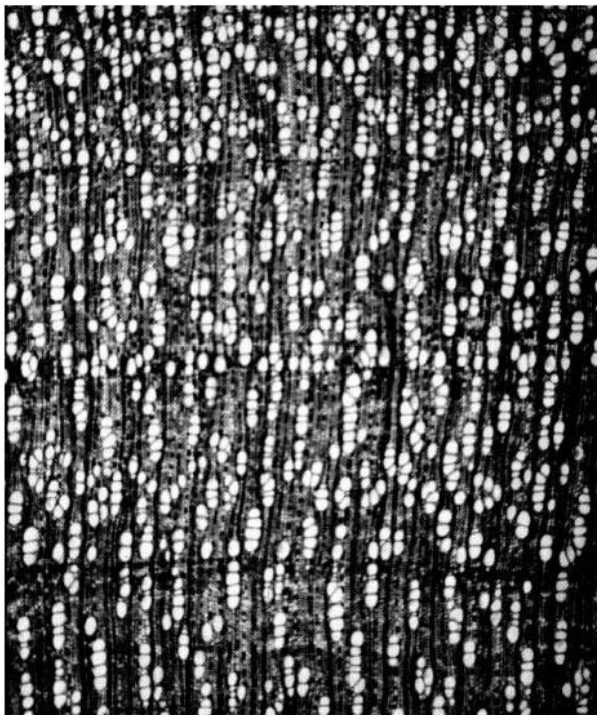

Figure 3.--Pouteria salicifolia, transverse section showing abundance of pores of small diameter in diffuse arrangement; growth rings present X 30 (Lindeman & de Haas 3494).

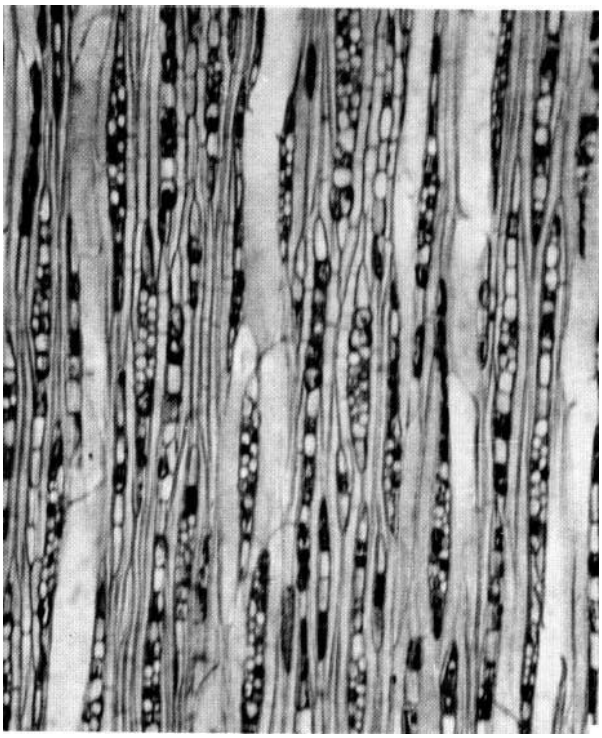

Figure 4.--Same as figure 3, tangential section showing rays mostly 2-3 seriate X 110.

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Wood anatomy of the neotropical Sapotaceae: XXXI. Pouteria. by B. F. Kukachka. FPL.
18 p: (USDA For. Serv. Res. Pap. FPL 419).

As circumscribed by Baehni the genus Pouteria consists of a heterogeneous assemblage of over 300 species pantropical in distribution. The wood anatomy also reflects the tremendous heterogeneity and makes identification based on the wood all but impossible. This author has elected to follow Aubréville's system that reduces Pouteria to less than 50 species confined to the American tropics. As a result, the American species of Pouteria comprise a very homogenous anatomical group that is readily identifiable from its wood anatomy.