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Anatomical Characters and Identification of Tropical Woods I

Elaeocarpus and *Sloanea* (Elaeocarpaceae)

By

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Summary : Anatomical characters of woods of some species belonging to *Elaeocarpus* and *Sloanea* were examined with emphasis on identification of the genera.

The Elaeocarpaceae consist of about 12 genera and 350 species of trees and shrubs and are distributed in the tropical and subtropical regions. Taxonomically, the family is considered to be related to the Tiliaceae, Rhizophoraceae and Combretaceae[29], and included in the Tiliaceae by some botanists. The fruits of some species of *Elaeocarpus* are edible with sour, sweet taste and the stones are often used as beads for rosaries, necklaces, bracelets and other ornamental objects, and the leaves and the barks also are used as local medicine[5)7)]. The important genera of this family from the viewpoint of timber utilization are *Elaeocarpus* and *Sloanea*, since trees of the genera other than these usually do not attain timber size.

Elaeocarpus

There are more than 200 species in this genus which are distributed widely from Madagascar, Socotra and Mauritius westward, to Hawaii eastward, including the whole Southeast Asia regions, Himalaya to southern China, Formosa and southern Japan, Celebes, Moluccas, New Guinea, the eastern part of Australia, New Caledonia, New Zealand and other islands of the Pacific regions. The center of the distribution is New Guinea region with over 100 species[28]. The following vernacular names are used for trees or woods of the species of this genus. These may be applied to a certain species or as generic name.

Sengkurat, Sanga, Empedu (Sarawak); Surigam, Perius-perius, Kesap, Bungkurad, Perdoh (Brunei); Kungkurad, Sangkurad (Sabah); Mendong, Siampa (Malaya); Jenitri, Ganitri (Indonesia); Quandong (Australia); Hinau (New Zealand)

1. General properties of woods

Sapwood yellowish white to pale yellow or grayish yellow; heartwood yellowish white to pale brown or brown, sometimes with pink or orange tinge, and not differentiated from sapwood in some species. Growth rings distinct in some species as annual rings. Texture usually moderately fine to fine; grain not interlocked or only shallowly so. Planed surfaces more or less with lustrous sheen. Without ripple marks, colored streaks, characteristic odor, taste or

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special touch.

Woods moderately light to medium-heavy in most species*1. According to literatures, the following values of specific gravity in air-dry condition are given to individual species: (The figure shows mean (minimum-maximum) value.)

E. apiculatus[8]: 0.65; *E. braceanus*[7]: 0.59; *E. ferrugineus*[7]: 0.71; *E. floribundus*[4)7)8)]: 0.67 (0.49～0.82) (heartwood), 0.48 (0.47～0.49) (sapwood), 0.68, 0.72 (0.60～0.79); *E. foveolatus*[3)15)]: 0.41, 0.37; *E. ganitrus*[7)9)10)]: 0.42 (0.40～0.45), 0.39, 0.45; *E. glaber*[4]: 0.56; *E. grandis*[3)15)26)]: 0.49, 0.47, 0.49; *E. jackianus*[8]: 0.55; *E. japonicus*[16]: 0.53; *E. lacunosus*[7]: 0.53; *E. lanceaefolius*[7)10)]: 0.55 (0.53～0.57), 0.66; *E. largiflorens*[3)15)]: 0.46, 0.45; *E. leptomishus*[8]: 0.59 (0.57～0.61); *E. nitidus*[4]: 0.58; *E. obtusus*[8]: 0.50 (0.40～0.58); *E. oxypyrens*[27]: 0.43; *E. parvifolius*[8]: 0.48; *E. pedunculatus*[4]: 0.60; *E. petiolatus*[8]: 0.51 (0.47～0.55); *E. robustus*[7)8)10)]: 0.57 (0.53～0.62), 0.59 (0.55～0.63), 0.61; *E. rugosus*[7]: 0.55 (0.54～0.56); *E. serratus*[7)10)]: 0.49, 0.48; *E. stapfianus*[7]: 0.55; *E. stipularis*[4)8)]: 0.54 (0.44～0.69), 0.53 (0.48～0.57); *E. subglobosus*[8]: 0.52; *E. sylvestris* var. *ellipticus*[16]: 0.57; *E. tuberculatus*[7]: 0.48 (0.46～0.50); *E. varunua*[7)10)]: 0.42, 0.48; *E. wallichii*[7]: 0.66; *E. wrayi*[8]: 0.60

2. Anatomical characters

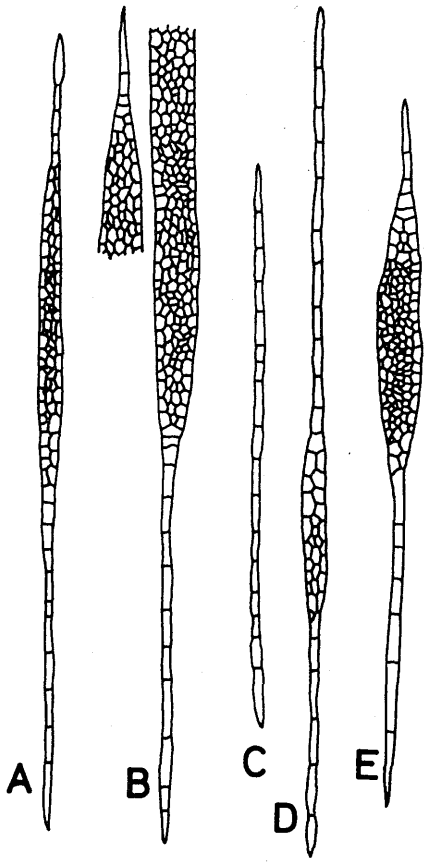
Vessels diffusely arranged often with a tendency of making radial series (Plate 1A); moderately small to medium-sized in diameter, visible to the naked eye or only so with a hand lens on transverse surface; about 700 (450～1,000) μm in length, often with farther 30～300 μm of tails; very variable in distribution number in different species, varying from moderately few to very numerous (Plate 1A & 1B); solitary and in radial multiples of 2～3 to 2～many (more than 8) cells (Plate 1A & 1B); solitary pore usually radially elongated oval, not angular or sometimes a little angular; perforation simple with horizontal to oblique plate; spiral thickenings present in some species*2; intervascular pitting typically large, 10～13 μm in diameter, round or angular, usually alternate, sometimes with a tendency of opposite arrangement (Plate 2A & 2B); not vestured; ray-vessel pitting distinctly and reticulately developed, especially in the part where vessels and upright cells of rays cross, irregularly round, usually 10～15 μm in diameter (Plate 2D); tyloses generally sparse but sometimes fairly developed.

Rays visible or barely visible to the naked eye on transverse surface, and whitish or sometimes brownish on radial surface; up to 2～6 cells wide (Fig. 1); of two distinct sizes, mostly consisting only of uniseriate rays and multiseriate rays of maximum width; heterogeneous (Kribs' Type I)[17]; uniseriate rays very numerous, usually more than 10 up to 15 or more per mm on transverse surface, and typically composed entirely of upright cells, and the uniseriate wing of multiseriate rays often very high and similar to uniseriate rays; up to 800～4,300 μm in height (Plate 1C & 1D).

Axial parenchyma sparse and not conspicuous, usually limited to a few cells around the vessels; apotracheal parenchyma not observed in the specimens examined here, but reported to occur rather sporadically as tangential narrow bands[22)23)].

*1 The wood of *E. bancroftii* F. v. M. et Bail from Australia, known as "ebony heart of Cairns", is said to be very hard and heavy somewhat resembling "lignum-vitae"[7].

*2 According to Kanehira[14], spiral thickenings on vessels are present in temperate species of *Elaeocarpus*, while absent in tropical species of the genus. This is recognized as well in the species examined here (Table 1). The same thing is said to occur also in the other genera of different families such as *Michelia, Melia, Ilex, Byronia, Euonymus, Rhus* and *Gleditsia*[2)14)21)].



A : *E. ganitrus* (TWTw 4428)
B : *E. novoguineensis* (TWTw 10434)
C, D : *E. dentatus* (TWTw 11006)
E : *E. calomala* (TOFOw 2369)

Fig. 1 Rays of *Elaeocarpus* (80 ×)

Fibers radially regularly arranged between rays (Plate 1A & 1B); with bordered pits which are more numerous in the radial than in the tangential walls; about 25～35 μm in diameter and 1,400 (1,100～1,700) μm in length; septate fibers present, but usually not very numerous and sometimes rather rare.

Crystals present in rays in most species; often abundant and usually contained in upright cells which are, in most species, subdivided vertically into 2～4 or more chambers (Plate 2E); crystals also present in chains in axial chambered parenchyma strands in some species.

Silica absent in most species, but reported to occur in rays in some species (*E. arnhemicus*[1], *E. bancroftii*[1], *E. obovatus*[1], *E. floribundus*[20]).

Vertical traumatic canals in tangential series reported to occur[8].

3. Characteristics of the genus for identification

Wood not very dark, not very heavy and not very hard in most species; intervascular pitting large, alternate sometimes with a tendency of opposite arrangement; ray-vessel pits distinctly, reticulately developed; with spiral thickenings on vessels in temperate species; rays heterogeneous (typically of Kribs' Type I), of two distinct sizes; uniseriate rays very numerous; axial parenchyma sparse, paratracheal scanty and sporadically as narrow tangential layers; fibers radially, regularly arranged on transverse surface; septate fibers present, but usually

Table 1. A summary of certain macroscopic and microscopic features

Scientific name (TWTw no.)	Origin of the samples	Color (S : sapwood, H : heartwood)	Specific gravity in air dry	Vessel	
				Multiples of	Tangential diameter (μm)
E. bifidus Hook. et Arn. (2548)	Hawaii	H : yellowish brown	0.62	2～3	～40～100～
E. bifidus (TOFOw 6634)	do.	H : yellowish brown	—	2～4, smt. more	～70～140～
E. calomala Merr. (TOFOw 2369)	Philippines	H : yellowish brown	—	2～3	～50～ 80～
E. carolinensis Koidz. (TOFOw 13672)	Caroline Is.	S : grayish yellow	—	2～4	～100～170～
E. dentatus Vahl (11006)	New Zealand	S, H : yellowish white	0.37	2～many	～40～ 80～
E. dentatus (TOFOw 8340)	do.	S, H : grayish yellow	—	2～many	～40～ 80～
E. ganitrus Roxb. (4428)	Indonesia	S, H : yellowish white	0.40	2～4, smt. more	～70～130～
E. ganitrus (8284)	do.	S, H : yellowish white	—	2～3, smt. more	～80～130～
E. grandis F. Muell. (1817)	Australia	S, H : yellowish white	0.40	2～4, smt. more	～100～180～
E. grandis (6916)	do.	S, H : yellowish white	0.55	2～4, smt. more	～140～220～
E. hookerianus Raoul (TOFOw 6706)	New Zealand	S, H : yellowish white	—	2～many	～40～ 80～
E. hookerianus (TOFOw 8306)	do.	S, H : yellowish white	—	2～many	～40～ 90～
E. japonicus Sieb. et Zucc. (1036)	Japan	S : yellowish white H : pale brown	0.50	2～many	～30～ 50～
E. kerstingianus Schlechter (TOFOw 13673)	Caroline Is.	H : pale brown with pink tinge	—	2～5	～100～170～
E. kusanoi Koidz. (TOFOw 13674)	do.	S : yellowish white	—	2～4, smt. more	～70～130～
E. lanceaefolius Roxb. (3249)	India (Himalaya)	H : pale brown with pink tinge	0.52	2～6, smt. more	～30～ 80～
E. multiflorus Villar (6558)	Philippines	S : pale yellow H : dull pale brown	0.68	2～5, smt. more	～70～140～
E. novoguineensis Warb. (10434)	New Guinea	S, H : yellowish white	0.31	2～5, smt. more	～100～200～
E. pedunculatus Wall. (5197)	Sabah	S : pale yellow H : pale brown	0.67	2～3, smt. more	～50～100～
E. photiniaefolius Hook. et Arn. (TOFOw 7728)	Bonin Is. (S. Japan)	H : dull yellow	—	2～7, smt. more	～40～ 80～
E. sylvestris Poir. var. *ellipticus* Hara (958)	Japan	S, H : white with pink tinge	0.57	2～5, smt. more	～30～ 70～

of the timbers of some species of *Elaeocarpus* and *Sloanea* examined

Average no./mm²	Spiral thickening	Ray: Height of multiseriate ray (μm)	Ray: Width (cells)	Banded parenchyma	Crystals in: Ray	Crystals in: Chambered parenchyma	Septate fiber
9	Absent	400～2,600	1～3	—	+ (undiv.)	—	rather rare
21	Absent	500～1,500 (～2,500)	1～4	—	+ (undiv.)	—	rather rare
9	Absent	400～1,200 (～1,900)	1～7	—	+++ (div.)	—	not rare
19	Absent	300～ 900 (～1,200)	1～4 (～5)	—	+++ (div.)	+	not rare
76	Present	500～1,500 (～2,000)	1～3	—	+ (div.)	(+)	rather rare
122	Present	400～1,600	1～4	—	+ (div.)	(+)	rather rare
9	Absent	600～1,500 (～1,800)	1～5	—	+++ (div.)	—	rather rare
18	Absent	500～ 800 (～1,500)	1～4 (～5)	—	++ (div.)	++	rather rare
10	Absent	1,000～2,000 (～3,000)	1～5 (～6)	—	+++ (div.)	+	not rare
10	Absent	1,100～2,500 (～3,800)	1～5	—	+++ (div.)	(+)	not rare
98	Present	500～2,300 (～3,400)	1～4	—	+ (div.)	—	rather rare
50	Present	400～1,300 (～1,700)	1～5 (～6)	—	+ (div.)	—	rather rare
92	Present	500～1,500	1～2	—	—	—	rather rare
10	Absent	1,200～4,300	1～5	—	++ (div.)	—	rather rare
15	Absent	300～1,600 (～2,600)	1～5	—	+++ (div.)	—	rather rare
36	Present	300～1,000	1～3	—	+ (div.)	—	rather rare
7	Absent	700～1,500 (～2,000)	1～4	—	(+) (div.)	—	rather rare
8	Absent	500～1,800	1～5 (～6)	—	+++ (div.)	+	not rare
13	Absent	600～1,300	1～4	—	+ (div.)	—	not rare
56	Absent	600～3,600	1～4 (～5)	—	++ (div.)	—	rather rare
72	Present	300～ 800 (～1,100)	1～2	—	—	(+)	rather rare

Table 1. (Continued)

Scientific name (TWTw no.)	Origin of the samples	Color (S : sapwood, H : heartwood)	Specific gravity in air dry	Vessel	
				multiples of	Tangential diameter (μm)
E. sylvestris var. *ellipticus* (TOFOw 1161)	do.	S, H : grayish yellow	—	2～many	～40～ 70～
E. sylvestris var. *ellipticus* (TOFOw 7466)	do.	S, H : yellowish white	—	2～many	～50～ 90～
E. tuberculatus Roxb. (11147)	India	S : dull yellow H : dull pale brown	0.51	2～6	～100～180～
S. formosana Li (1053)	Taiwan	H : yellowish brown	0.60	2～3, smt. more	～40～ 80～
S. laurifolia Benth. (7137)	Peru	H : dull brown	0.96	2, smt. 3	～150～230～
S. woollsii F. Muell. (6957)	Australia	H : orange brown	0.57	2～3, smt. more	～70～150～
Sloanea sp. (TOFOw 8238)	Australia	H : pinkish brown	—	2～3, smt. more	～70～130～
Sloanea sp. (TOFOw 13554)	Brazil	H : brown	—	2	～120～200～
Sloanea sp. (TOFOw 13560)	do.	S : grayish yellow	—	2～3	～110～180～

Average number per mm^2 of vessels : In the case of pore multiple, each member of the constituents
— : not observed ; (+) : extremely few ; + : few to moderately few ; ++moderately abundant ;

not very numerous, sometimes rather rare; crystals present in upright ray cells in most species, which are usually subdivided into 2～4 or more chambers.

4. Importance and uses

Many species of *Elaeocarpus*, especially in Southeast Asia regions, are rather small trees not reaching to timber size, but some in New Guinea and Australia regions are large enough, attaining 30～40 m tall and 100 cm in diameter. Woods of light colors are suitable for drawer sides, boxes, match box and splints, interior finish, mouldings, lower class furniture and veneer.

Sloanea

The genus *Sloanea* consists of about 100 species which are distributed in Southeast Asia to the Pacific regions (including New Guinea, the eastern part of Australia, and New Caledonia), and tropical America (to the southern part of Mexico northward). There are some representatives from Himalaya, the southern part of China and Formosa. The genus in a wide sense, as treated here, is sometimes divided into four genera: *Sloanea*, *Echinocarpus*, *Anoniodes* and *Antholoma*.

The species relatively known from the viewpoint of timber utilization may be the following: Blush alder (*S. australis*), Grey carabeen (*S. macbrydei*) and Yellow carabeen (*S. woollsii*) from Australia, Motillo (*S. berteriana*) from Puerto Rico, Mameicillo colorado (*S. megaphylla*) from Panama, and Sloane's green-heart or Break axe (*Sloanea* spp.) from West Indies.

Average no./mm²	Spiral thickening	Ray: Height of multiseriate ray (μm)	Ray: Width (cells)	Banded parenchyma	Crystals in: Ray	Crystals in: Chambered parenchyma	Septate fiber
100	Present	300～1,600	1～4	—	+ (div.)	—	not rare
80	Present	300～2,500	1～2 (～3)	—	—	—	rather rare
9	Absent	700～2,600	1～3 (～4)	—	+++ (div.)	—	rather rare
100	Present	300～1,000 (～1,300)	1～5	—	++ (undiv.)	—	not rare
4	Absent	400～1,300 (～2,200)	1～5 (～6)	Present	+++ (undiv.)	—	not rare
22	Absent	600～1,600 (～2,100)	1～6	—	++ (undiv.)	—	not rare
33	Absent	600～2,000	1～4	—	+ (undiv.)	—	not rare
8	Absent	1,000～2,500	1～12	Present	—	—	rather rare
16	Absent	800～3,500 (～6,000)	1～12	Present	++ (undiv.)	—	not rare

was counted.
+++ : abundant ; (div.) : in divided cells ; (undiv.) : in undivided cells ; smt. : sometimes

1. General properties of woods

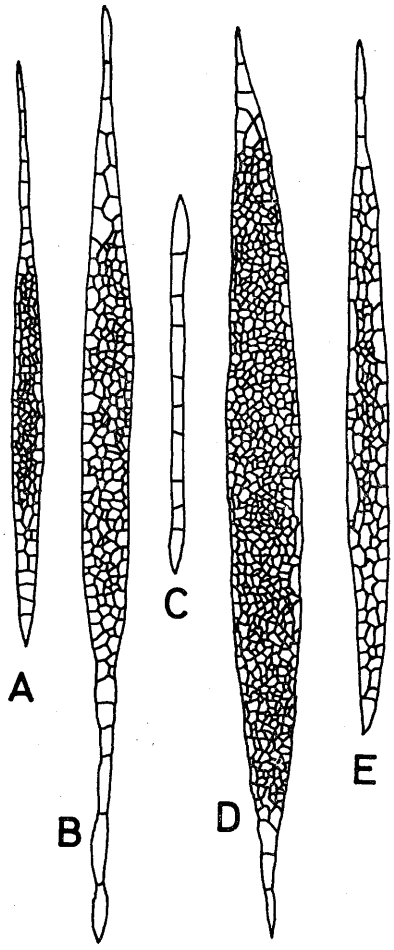
Sapwood grayish yellow to yellowish brown; heartwood various in color, not differentiated from sapwood in some species (e.g. *S. dasycarpa*[23], *S. formosana*[13]), but usually darker than sapwood, yellow brown to dark brown, often with a pinkish or reddish tinge and also with some dark stripes. Growth rings present as annual rings in some species. Texture moderately fine to moderately coarse; grain usually not interlocked. Without ripple marks, characteristic odor, taste or touch.

Woods moderately light to moderately heavy usually, but very heavy in some species from tropical America[25]. The following values of specific gravity in air dry condition were obtained from literature: (The figure shows mean (minimum-maximum) value.)

S. australis[15]: 0.57; *S. assamicus*[7]: 0.36 (0.32～0.43); *S. berteriana*[19]: 0.80; *S. dasycarpa*[7)10)]: 0.49 (0.45～0.51), 0.51; *S. forbesii*[9]: 0.56; *S. javanica*[8]: 0.73; *S. macbrydei*[3)15)]: 0.58, 0.52; *S. sigun*[7)8)]: 0.51, 0.56 (0.50～0.59); *S. woollsii*[15]: 0.62

2. Anatomical characteristics of the genus

Woods of *Sloanea* are very similar to those of *Elaeocarpus* in the anatomical structure in many points, that is, approximate size range and arrangement of vessels, simple perforation of vessels, patterns of intervascular and ray-vessel pitting, heterogeneous type (KRIBS' Type I) and two distinct sizes of rays, numerousness of uniseriate rays, general sparsity of axial parenchyma, radial and regular arrangement of fibers, presence of septate fibers, etc, as summarized



A : *S. dasycarpa* (TWTw 1053)
B, C : *S. woollsii* (TWTw 6957)
D : *Sloanea* sp. (TOFOw 13554)
E : *Sloanea* sp. (TOFOw 8238)

Fig. 2　Rays of *Sloanea* (80 ×)

in Table 1.

Judging from limited numbers of the specimens examined here and from descriptions of some literatures[7)8)13)22)], the following may be mentioned as the characteristics of the genus more or less distinguishable from *Elaeocarpus*:

Intervascular pitting rather distinctly opposite (Plate 2C), sometimes transitional to alternate; rays often broader, up to 12 cells wide (Fig. 2, Plate 3C), and the uniseriate wing of multiseriate rays often not very elongated; uniseriate rays apparently a little fewer, usually up to 10 per mm on transverse surface; bordered pits of fibers, distinct in the radial wall, more developed in the size and number; crystalliferous ray cells not chambered, usually with 1, sometimes 2 or 3 crystals in a cell.

Other characteristics: spiral thickenings on vessels present in *S. formosana**; narrow tan-

* *S. formosana*[18)], which is found in mountains of Taiwan, about 2,500 m alt., was formerly referred to *S. dasycarpa* (Benth.) Hemsl., a species growing in high mountains of southern China to Himaraya. The presence of spiral thickenings on vessels is reported also in *S. dasycarpa*[23)] as well as *S. formosana*[18)]. From these facts, it may be said that spiral thickenings occur in temperate species also in the genus *Sloanea* in the same way as *Elaeocarpus* (see footnote of p. 64).

gential bands of axial parenchyma commonly present in *S. laurifolia* and two samples of *Sloanea* sp., at the intervals of 2～5 mm in the former and 0.1～1.5 mm in the latter two (Plate 3A); vertical traumatic canals observed in *S. laurifolia* and *Sloanea* sp. (TOFOw 13560) in tangential series, which are considerably larger than vessels and filled with gum-like deposits; silica absent.

Appendix

The following standards are used for describing dicotyledonous woods:

Size of pores[12]

	Tangential diameter
Extremely small	up to 25 μm
Very small	25～50
Moderately small	50～100
Medium-sized	100～200
Moderately large	200～300
Very large	300～400
Extremely large	over 400

Distribution of pores[6]

	No./mm²
Very few	up to 2
Few	2～5
Moderately few	5～10
Moderately numerous	10～20
Numerous	20～40
Very numerous	over 40

Length of vessel members[11]

	Length
Extremely short	less than 175 μm
Very short	175～250
Moderately short	250～350
Medium-sized	350～800
Moderately long	800～1,100
Very long	1,100～1,900
Extremely long	over 1,900

Diameter of intervascular pits[24]

	Diameter
Very small	up to 4 μm
Small	4～7
Medium-sized	7～10
Large	10～15
Very large	over 15

Length of fibers[11]

	Length
Extremely short	less than 500 μm

Very short	500～700
Moderately short	700～900
Medium-sized	900～1,600
Moderately long	1,600～2,200
Very long	2,200～3,000
Extremely long	over 3,000

Distribution of rays[6]

	No./mm in the transverse section
Very few	up to 2
Few	2～4
Moderately numerous	4～7
Numerous	7～10
Very numerous	over 10

Weight of wood (arbitrarily selected)

	sp. gr. in air dry
Extremely light	up to 0.20
Very light	0.20～0.35
Moderately light	0.35～0.55
Medium-heavy	0.55～0.75
Moderately heavy	0.75～0.90
Very heavy	0.90～1.05
Extremely heavy	over 1.05

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熱帯材の解剖学的性質と識別（第1報）

Elaeocarpus 属および *Sloanea* 属（ホルトノキ科）

緒　方　　健(1)

摘　要

ホルトノキ科（Elaeocarpaceae）は，約12属350種からなり，主に世界の熱帯，亜熱帯地域に分布する。すべて木本性であるが，木材として利用できる大きさに達するのは，ほとんど *Elaeocarpus*（ホルトノキ属）および *Sloanea* 両属の樹種に限られる。近年，わが国にもニューギニアやボルネオなどから，ふつう M. L. H.（Mixed Light Hardwoods：雑軽軟広葉樹材）としてこれらの木材が輸入されることがある。*Elaeocarpus* 属は分布の北限として，わが国に3種，ホルトノキ *E. sylvestris* var. *ellipticus*（房総以南，中国大陸南部まで），コバンモチ *E. japonicus*（南畿以南，中国大陸南部まで），シマホルトノキ *E. photiniaefolius*（小笠原）がある。

調べた樹種の主な特徴を Table 1 にまとめた。標本が乏しく，限られた樹種しか調べられなかったが，他の樹種について調べた文献をも参照した結果，この両属の木材の識別的特徴として，下記の点をあげることができる。

***Elaeocarpus* 属の木材の識別的特徴**

1. 木材は一般に淡色で，重硬ではない。

2. 道管相互壁孔は大きく（径10～13 μm），交互配列をするが，ときにはやや対列型の傾向を示す（Plate 2 A, 2 B）。

3. 道管放射組織間壁孔は網目状に発達する（Plate 2 D）。

4. 温帯地方の樹種には，道管にらせん肥厚がある。

5. 放射組織は異性（Kribs[17]の異性I型）。二型的特徴*が顕著で，かつ単列放射組織がひじょうに多い（Plate 1 C, 1 D）。

6. 軸方向柔組織は少なく，ふつう道管の周辺にわずかに存在するのみであるが，やや偶発的に細い帯状柔組織が現われることがある。

7. せんいは，木口面でみたとき，放射方向に規則的に配列する（Plate 1 A, 1 B）。

8. 隔壁木せんいが存在するが，一般に多くはなく，しばしばややまれである。

9. 多くの樹種では，放射組織（とくに直立細胞）に結晶が存在し，結晶を含む細胞は，ふつう軸方向に2～数室に仕切られている（Plate 2 E）。また一部の樹種には，多室結晶柔細胞がある。

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* 放射組織の二型的特徴：放射組織の大，小が明りょうに区別され，中間の大きさを欠く場合を意味する。典型的な例は，ミズナラ属（*Quercus*）の単列放射組織と広放射組織である。*Elaeocarpus* の場合，たとえば1～5列の放射組織をもつ樹種では，中間の2～4列はほとんどない。英語では，一般に "Rays of two distinct sizes" と表現されているが，これまでに使われた適当な日本語の表現を知らないので，ここでは "二型的特徴" ということにしたい。

1975年3月13日受理

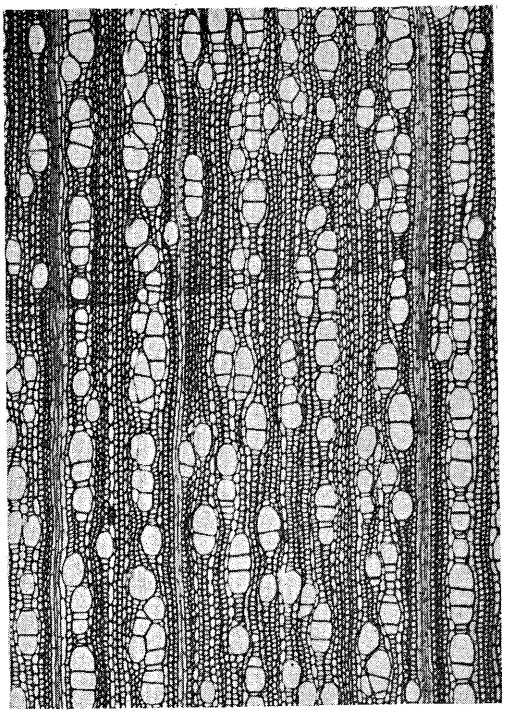
(1) 林業試験場木材部

10. 軸方向傷害樹脂道が現われることがある。若干の樹種は放射組織にシリカを含む。

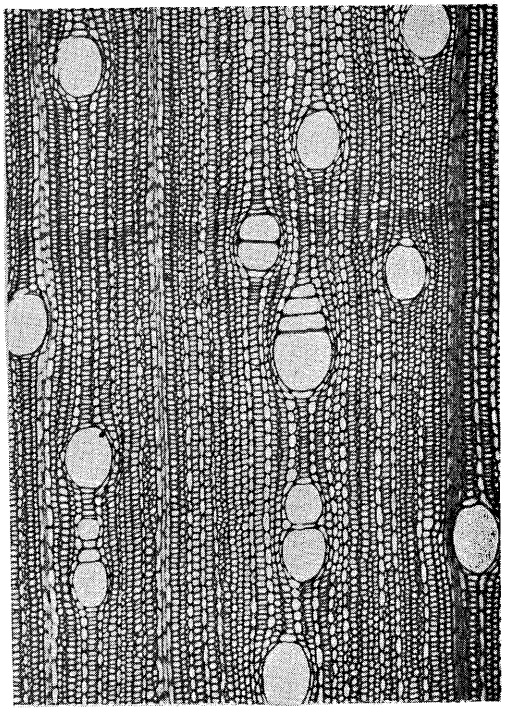
***Sloanea* 属の木材の特徴**

調べた樹種がさらに少なく，断定的なことはいえないが，*Sloanea* 属の木材は *Elaeocarpus* 属と基本的に共通点が多い。識別上の違いとしては，次の点があげられる。

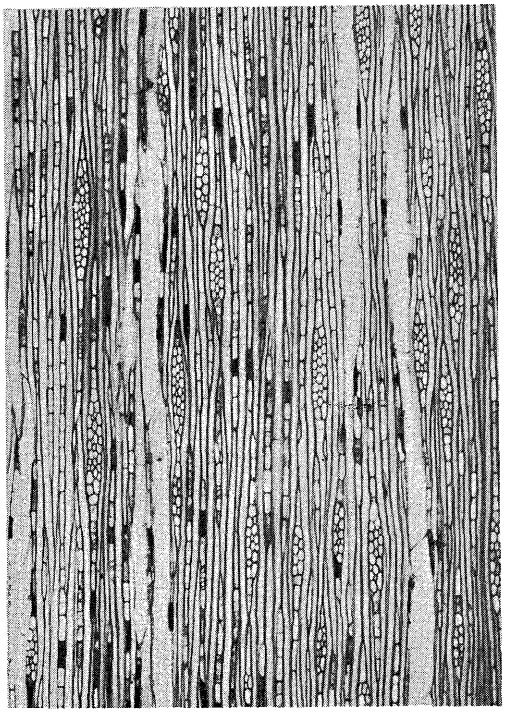
1. 心材はより濃色のことが多く（黄褐色～暗褐色），しばしば桃～赤色の色合いを帯び，暗色の縞をもつことがある。
2. 道管相互壁孔は対列型の傾向が強い（Plate 2 C）。
3. 多列放射組織の幅はより広い場合が多い（Fig. 2, Plate 3 C）。またその単列部は，一般にあまり長く伸長しない。
4. 単列放射組織は多いが，*Elaeocarpus* ほどではない。
5. せんいの壁孔はより大きく，より多い。
6. 結晶を含む放射組織の細胞は，多室に分かれない。



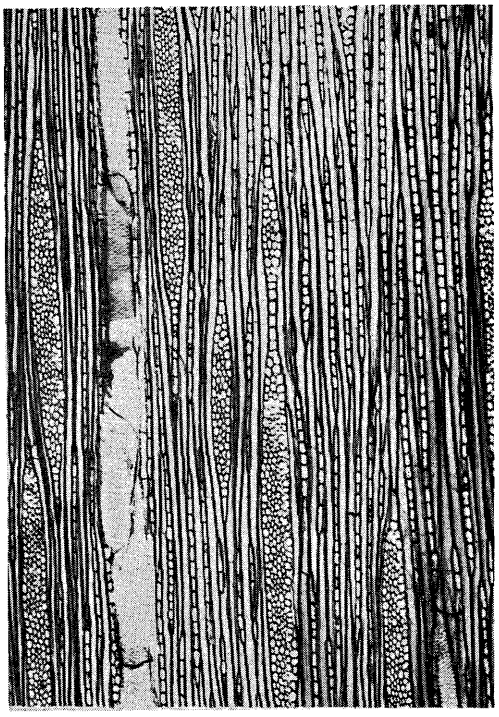
A：*Elaeocarpus dentatus*
(TOFOw 8340) (50 ×)



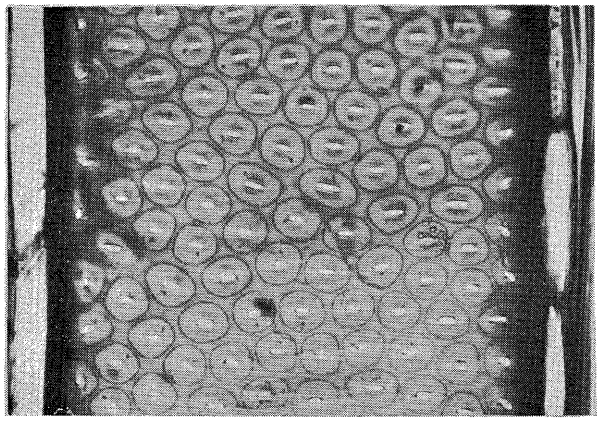
B：*Elaeocarpus multiflorus*
(TWTw 6558) (50 ×)



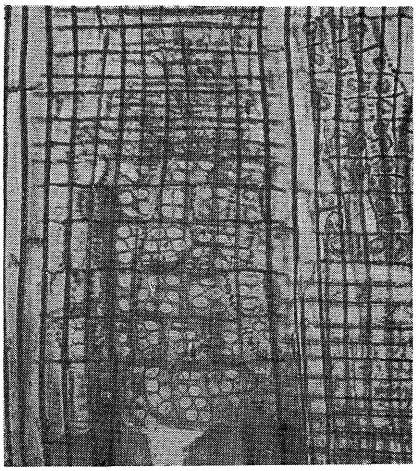
C：*Elaeocarpus lanceaefolius*
(TWTw 3249) (50 ×)



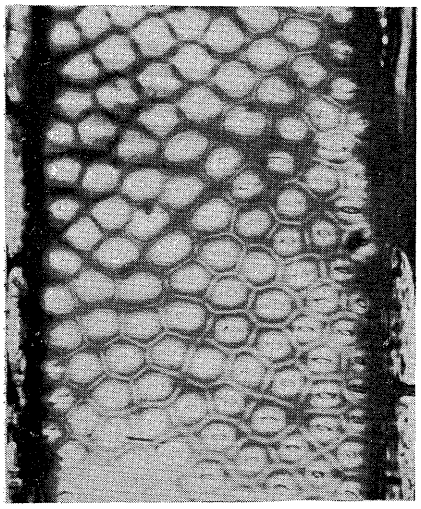
D：*Elaeocarpus novoguineensis*
(TWTw 10434) (50 ×)



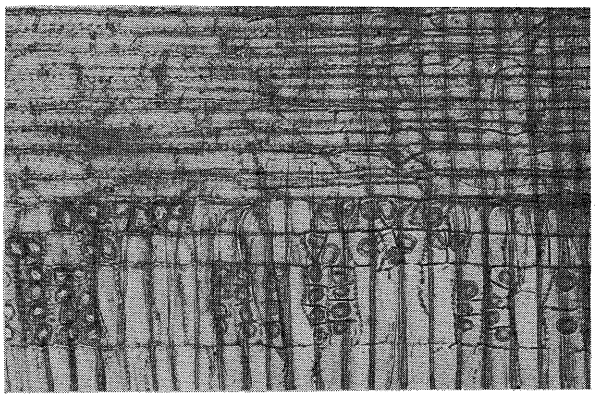
A：*Elaeocarpus ganitrus*
(TWTw 4428) (500 ×)



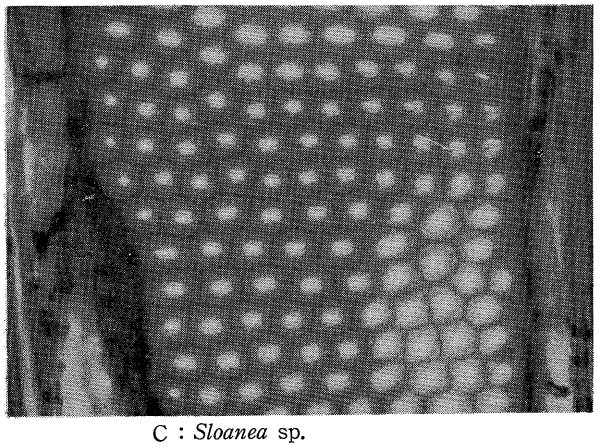
D：*Elaeocarpus ganitrus*
(TWTw 4428) (150 ×)



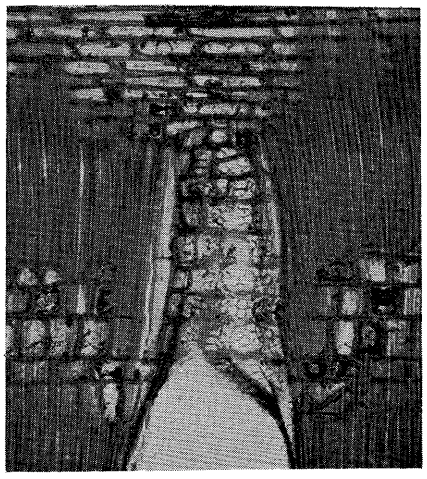
B：*Elaeocarpus novoguineensis*
(TWTw 10434) (500 ×)



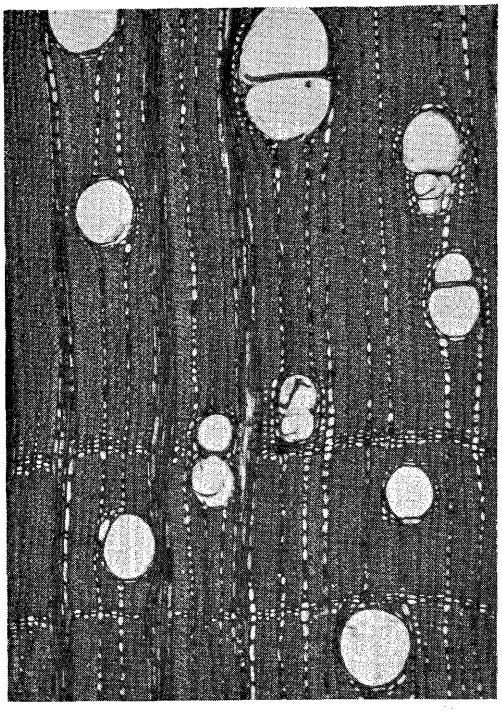
E：*Elaeocarpus ganitrus*
(TWTw 4428) (150 ×)



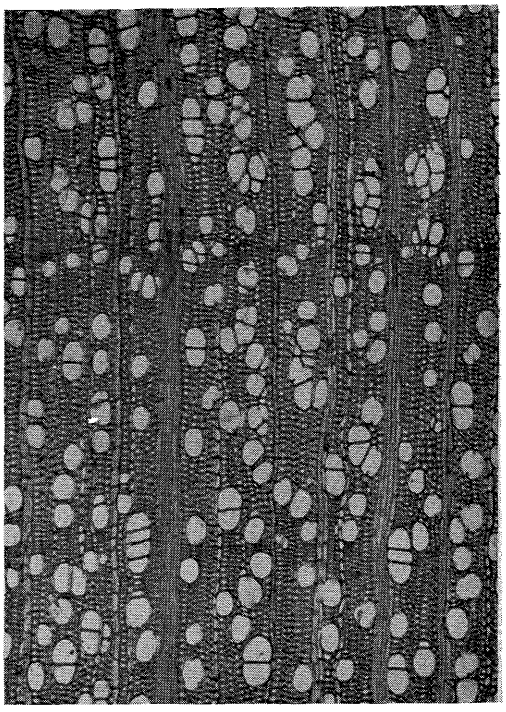
C：*Sloanea* sp.
(TOFOw 13554) (500 ×)



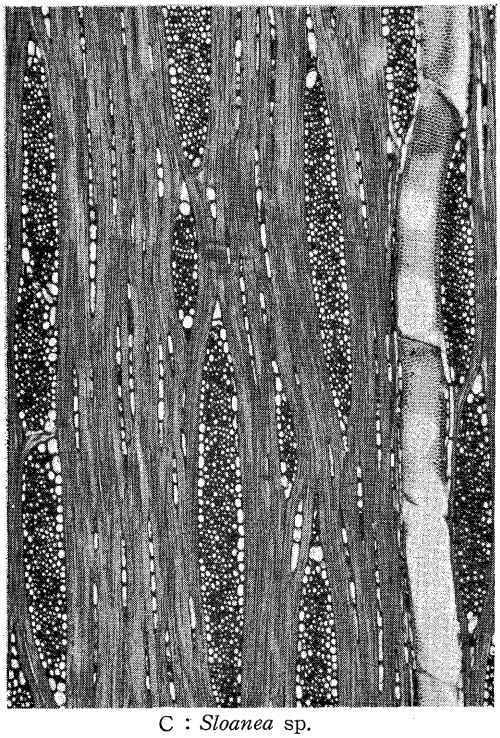
F：*Sloanea* sp.
(TOFOw 13554) (100 ×)



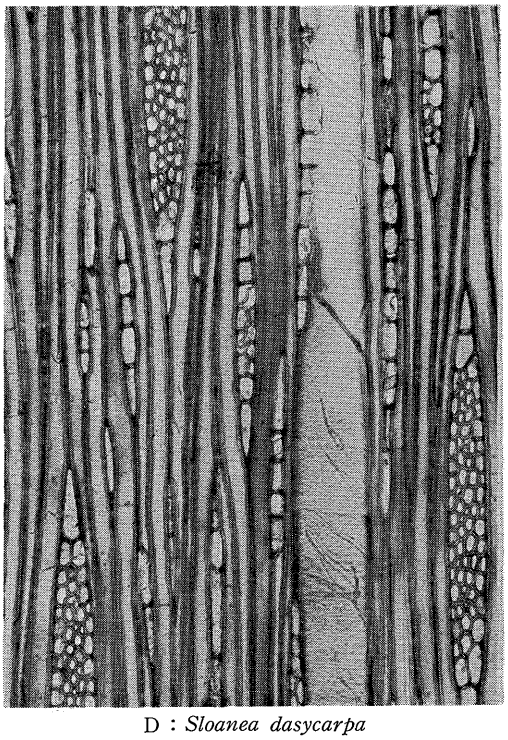
A : *Sloanea* sp.
(TOFOw 13554) (50 ×)



B : *Sloanea dasycarpa*
(TWTw 1053) (50 ×)



C : *Sloanea* sp.
(TOFOw 13554) (50 ×)



D : *Sloanea dasycarpa*
(TWTw 1053) (50 ×)