1. スラウェシー産材の組織・同定
Anatomy of Sulawesi Woods

1・1 同　　定

木方洋二，石黒泰久，金川　靖

Wood Identification

Yoji KIKATA, Yasuhisa ISHIGURO and Yasushi KANAGAWA

1・1・1 はじめに

試験に供したトギアン産材はインドネシア国，スラウェシー州，トギアン地区の材で，トギアン諸島の主要な樹種に相当するものである。現地生産者の松下電工K.K.の御厚意により入手したものであり，一部はひき板サンプル（1船），丸太端切れ（2船）を混じたが残りは連続してとった厚板或は丸太状態で入手し，物理的，機械的諸性質の試験，加工適性試験に供したものである。

1・1・2 結果の検討

供試原木は解剖学的に次の表1の属の材であると判断された。

24科，36属，74個体の材よりなる。

組織構造の特徴の他に産地での分布が一属一種であることが知られているもの等では樹種名まで推定されるものもあったが，逆に Myristicaceae のように該当する属名が多く，科名の判定に止まってしまったものもある。

表中 1) を附したものはインドネシアの現地担当官による現地名ー学名対応表によったものであり，2) を附したものは Green Book と称されるインドネシア林業総局による調査報告にトギアン産樹種として記載されているもののうち，その属中一種のみ記載のあったものである。

以上同定された各属の材の三断面の顕微鏡写真を示す。

1・1・3 謝辞，その他

以上同定にあたり農林水産省，林業試験場の緒方健氏に種々御教示頂いたことを記し，謝意を表するものである。

Acknowledgement

The author expresses his gratitude to Dr. Ken Ogata of The Forestry and Forest Products Research Institute of Japan for his many helpful suggestions and his encouragement in carrying out this study.

Reference

1) Penguji Kayu Bulat Rimba, Indonesia
2) List of trees species in the forest complex Togian Island. – Green Book –

1.1.4 Summary

Micrographic Atlas of Togian Island Species, Sulawesi, Indonesia.

In this study, Togian wood species including 24 families of 36 genera, or 74 timbers have been identified macroscopically and microscopically. In this Atlas, the structure of each timber was provided 3 sections and the important anatomical features was also presented.

. The timbers from 6th and 7th shipment, were long log, 2nd shipment was short log, 5th shipment was flitches and 1st shipment was in the form of board samples. They have been studied their physical, mechanical and technological properties. Sample trees mainly Togian woods were collected from Togian island with the cooperation extended by Matsushita Denko.

The botanical names, vernacular or commercial names, designations and number of shipment are listed for each timbers in Table 1. The botanical species of some timbers are identified because they are mono species in Togian island. But some of them, for example, Myristicaceae is only mentioned its family name.

This Atlas contains only micrographs without any anatomical descriptive matter.

Some of the characteristics of tested timbers are listed in Table 2, Density, percentages of Brittle-heart, Silica content, Interlocked grain, Color, Texture and Diameter of log.

Table 1 List of tested timbers

No. of tested timber	Botanical name			Vernacul or commercial name	Designation	No. of shipment	Reference
1	*Anacardiaceae*	*Dracontomelon*	*mangiferum* Bl.	Loyo	Lo	5	
2	"	*Koordersiodendron*-1	*pinnatum* Mwrr.	Siuri	Si	7	
3	"	" -2	"	"	"	1	
4	"	*Spondias sp.*	–	Losong	Ls	5	
5	*Bombacaceae*	*Bombax sp.*	–	Perah ?	–	1	
6	*Burseraceae*	*Canarium sp.*-1	–	Togobandu	Tku	5	
7	"	" -2	–	Dama-Dama	Da	7	Dama-Dama: *C. asperum* Benth[1)]
8	"	" -3	–	Kanari	Ki	1	Kanari: *C. balsamiferum* Willd[1)]
9	"	" -4	–	"	–	2	
10	"	" -5	–	"	–	2	
11	"	*Santiria sp.*-1	–	Makakata-merah	Mkm	5	
12	"	" -2	–	"	"	6	
13	"	" -3	–	"	"	2	
14	*Celastraceae*	*Lophopetalum sp.*	–	Tiro	To	7	
15	*Combretaceae*	*Terminalia sp.*-1	– (M)	Makakata-putih	Mkp	6	Makakata-putih: *T. edulis* Blanco.[1)]
16	"	" -2	– (M)	Mange	Mge	5	
17	"	" -3	– (B)	–	–	6	(M): Mange
18	"	" -4	– (B)	–	–	7	(B): Bunga-bunga
19	"	" -5	– (B)	–	–	1	
20	"	" -6	– (M)	–	–	1	
21	"	" -7	– (B)	–	–	2	
22	"	" -8	– (M)	–	–	2	
23	*Datiscaceae*	*Octomeles sp.*	–	Benuang	Beg	7	*O. sumatrana* Miq.[1),2)]
24	*Ebenaceae*	*Diospyros sp.*	–	Ula	Ula	2	
25	*Euphorbiaceae*	*Drypetes sp.*	–	Bengkele ?	–	1	*D. globasa* Pax et Hoffm.[2)]

Cont.

No. of tested timber	Botanical name			Vernacul or commercial name	Designation	No. of shipment	Reference
26	*Euphorbiaceae*	*Sapium sp.*-1	–	Morongkulasi	Mor	5	
27	"	" -2	–	"	"	1	
28	*Gonystylaceae*	*Gonystylus sp.*	*macrophyllus* A. Shaw.	–	–	7	
29	*Guttiferae*	*Calophyllum sp.*-1	–	Bintangor	Btr	7	*C. soulattri* Burm. f.[1), 2)]
30	"	" -2	–	"	"	2	
31	*Lauraceae*	*Litsea sp.*-1	–	Indang	Id	5	
32	"	" -2	–	"	"	6	
33	"	" -3	–	"	"	7	
34	"	" -4	–	"	"	2	
35	*Meliaceae*	*Aglaia sp.*-1	–	Awu ?	–	5	*or Amoora sp.*-1
36	"	" -2	–	"	–	1	*or* " -2
37	"	*Azadirachta sp.*-1	*excelsa* Jacobs	Pia	Pia	1	
38	"	" -2	"	"	"	2	
39	"	*Dysoxylum sp.*	–	–	–	7	
40	"	*Sandoricum sp.*-1	–	–	–	6	
41	"	" -2	–	–	–	2	
42	*Moraceae*	*Artocarpus sp.*	–	Tea	Tea	7	*A. sericicarpus* Jarrett[1)]
43	"	*Ficus sp.*-1	–	Bunta	But	5	*F. varigata* Bl.[1), 2)]
44	"	" -2	–	"	"	7	
45	*Myristicaceae*-1	–	–	–	–	7	
46	" -2	–	–	Yaru ?	–	2	
47	*Myrtaceae*	*Eugenia sp.*	–	–	–	7	
48	"	*Kjellbergiodendron sp.*	–	Banebo ?	–	1	
49	*Podocarpaceae*	*Podocarpus sp.*-1	–	Kayu-cina	Ka	7	*P. blumei* Endl.[1)]
50	"	" -2	–	"	"	2	
51	*Rosaceae*	*Parinari sp.*	–	Kayaka	Kya	1	
52	*Rubiaceae*	*Anthocephalus sp.*	*chinensis* R. ex Welp.	Sugimanai	Sgi	2	
53	*Sapindaceae*	*Pometia sp.*-1	*pinnata* Forst.	Tawan	Ma	7	

Cont.

No. of tested timber	Botanical name			Vernacul or commercial name	Designation	No. of shipment	Reference
54	*Sapindaceae*	*Pometia sp.*-2	*pinnata* Forst.	Tawan	Ma	2	
55	*Sapotaceae*	*Madhuca sp.*	–	–	–	7	
56	"	*Palaquium sp.*-1	–	Nantu	Nu	6	Nantu: *obtussifolium* Burck[1)]
57	"	" -2	–	"	"	7	Kume: *obovatum* Engl.[1)]
58	"	" -3	–	"	"	1	
59	"	" -4	–	"	"	2	
60	"	" -5	–	"	"	2	
61	*Simarubaceae*	*Ailanthus sp.*-1	–	Pongoli ?	–	6	
62	"	" -2	–	–	–	7	
63	*Sonneratiaceae*	*Duabanga sp.*-1	–	Bengkele	Ble	6	*D. moluccana* Bl.[1), 2)]
64	"	" -2	–	"	"	5	
65	"	" -3	–	"	"	5	
66	"	" -4	–	"	"	1	
67	*Sterculiaceae*	*Heritiera sp.*-1	*littoralis* Dryand.	Lungulo	–	6	
68	"	" -2	"	"	–	7	
69	"	" -3	"	"	–	2	
70	"	*Tarrietia sp.*-1	–	Palapi	Pi	1	*T. javanica* Bl.[1)]
71	"	" -2	–	"	"	2	
72	"	*Sterculia sp.*-1	–	–	–	6	
73	"	" -2	–	–	–	5	
74	*Ulmaceae*	*Celtis sp.*	–	Tagambe	Tge	1	

* : Peuguji Kayu Bulat Rimba, Indonesia.

** : List of trees species in the forest Complex Togian Island. (Green Book)

Table 2 Some characteristics of tested timbers

No. of tested timber	Botanical name		Specific gravity	Brittle-heart, % in diameter	Silica content (%)	Interlocked grain, degree S: S-direction Z: Z-direction	Color	Texture	Diameter of tested log (cm)
1	*Anacardiaceae*	*Dracontomelon sp.*	–	28	0.025	–	dark gray-black strips	medium-coarse	64
2	"	*Koordersiodendron sp.*-1	–	35	–		dark red brown	fine	46
3	"	" -2	0.92	–	–	–	"	"	–
4	"	*Spondias sp.*	–	0	0.008		gray-brown	medium	76
5	*Bombacaceae*	*Bombax sp.*	0.59	–	–	–	light brown	medium	–
6	*Burseraceae*	*Canarium sp.*-1	–	15	0.589	–	light pink-light brown	medium-fine	62
7	"	" -2	–	31	–	–	"	"	43
8	"	" -3	0.51	–	–	–	"	"	–
9	"	" -4	0.54	–	–	–	"	"	37
10	"	" -5	0.45	–	–	–	"	"	36
11	"	*Santiria sp.*-1	–	21	0.623	–	light brown	medium-fine	68
12	"	" -2	–	33	0.568	s-10, z-7	"	"	54
13	"	" -3	0.63	–	–	–	"	"	31
14	*Celastraceae*	*Lophopetalum sp.*	–	0	–	–	white-light brown	medium-fine	48
15	*Combretaceae*	*Terminalia sp.*-1	–	38	0.039	s-7, z-10	(M): light pink-brown	fine	48
16	"	" -2	–	21	0.014	–	"	"	66
17	"	" -3	–	19	0.023	s-10, z-8	(B): light yellow-brown	medium	48
18	"	" -4	–	20	–	–	"	"	43
19	"	" -5	0.71	–	–	–	"	"	–
20	"	" -6	0.34	–	–	–	(M): "	(M): "	–
21	"	" -7	0.62	–	–	–	(B): "	(B): "	29
22	"	" -8	0.57	–	–	–	(M): "	(M): "	40

Cont.

No. of tested timber	Botanical name		Specific gravity	Brittle-heart, % in diameter	Silica content (%)	Interlocked grain, degree S: S-direction Z: Z-direction	Color	Texture	Diameter of tested log (cm)
23	*Datiscaceae*	*Octomeles sp.*	–	16	–	–	red brown	medium-fine	59
24	*Ebenaceae*	*Diospyros sp.*	0.54	–	–	–	purple brown	medium	34
25	*Euphorbiaceae*	*Drypetes sp.*	0.94	–	–	–	white	fine	–
26	"	*Sapium sp.*-1	–	0	1.596	–	light pink	medium-coarse	76
27	"	" -2	0.36	–	–	–	"	"	–
28	*Gonystylaceae*	*Gonystylus sp.*	–	0	–	–	white	medium-fine	54
29	*Guttiferae*	*Calophyllum sp.*-1	–	28	–	–	light pink-brown	fine	49
30	"	" -2	0.57	–	–	–	"	"	33
31	*Lauraceae*	*Litsea sp.*-1	–	21	0.005	–	red brown	fine	66
32	"	" -2	–	28	0.020	s-3, z-3	"	"	50
33	"	" -3	–	23	–	–	red brown	fine	61
34	"	" -4	0.51	–	–	–	"	"	36
35	*Meliaceae*	*Aglaia sp.*-1	–	22	0.003	–	red brown	medium	64
36	"	" -2	0.59	–	–	–	"	"	–
37	"	*Azadirachta sp.*-1	0.59	–	–	–	red brown-light brown	fine	–
38	"	" -2	0.42	–	–	–	"	"	35
39	"	*Dysoxylum sp.*	–	52	–	–	light red brown	medium-fine	55
40	"	*Sandoricum sp.*-1	–	0	0.042	s-4, z-9	pink-red brown	fine	66
41	"	" -2	0.41	–	–	–	"	"	31
42	*Moraceae*	*Artocarpus sp.*	–	24	–	–	white	coarse	48
43	"	*Ficus sp.*-1	–	0	0.020	–	gray-brown	medium-coarse	74
44	"	" -2	–	0	–	–	"	"	59
45	*Myristicaceae*-1	–	–	23	–	–	light red brown	coarse	52
46	" -2	–	0.41	–	–	–	"	"	29

Cont.

No. of tested timber	Botanical name		Specific gravity	Brittle-heart, % in diameter	Silica content (%)	Interlocked grain, degree S: S-direction Z: Z-direction	Color	Texture	Diameter of tested log (cm)
47	*Myrtaceae*	*Eugenia sp.*	–	0	–	–	purple red	fine	44
48	"	*Kjellbergiodendron sp.*	0.97	–	–	–	dark brown	fine	–
49	*Podocarpaceae*	*Podocarpus sp.*-1	–	0	–	–	light pink-light brown	coarse	45
50	"	" -2	0.56	–	–	–	"	"	31
51	*Rosaceae*	*Parinari sp.*	0.94	–	–	–	dark red brown (false heart: black)	coarse	–
52	*Rubiaceae*	*Anthocephalus sp.*	0.55	–	–	–	light pink-light brown	fine	33
53	*Sapindaceae*	*Pometia sp.*-1	–	20	–	–	light pink-light brown	fine	46
54	"	" -2	0.80	–	–	–	"	"	29
55	*Sapotaceae*	*Madhuca sp.*	–	15	–	–	brown	fine	64
56	"	*Palaquium sp.*-1	–	21	0.142	s-4, z-9	light red brown	fine	42
57	"	" -2	–	39	–	–	"	"	51
58	"	" -3	0.43	–	–	–	"	"	–
59	"	" -4	0.43	–	–	–	"	"	30
60	"	" -5	0.41	–	–	–	"	"	36
61	*Simarubaceae*	*Ailanthus sp.*-1	–	0	0.055	s-9, z-7	white	medium	60
62	"	" -2	–	22	–	–	"	"	53
63	*Sonneratiaceae*	*Duabanga sp.*-1	–	0	0.043	s-3, z-9	clay-gray-brown	medium-coarse	48
64	"	" -2	–	0	0.020	–	"	"	58
65	"	" -3	–	32	0.031	–	"	"	76
66	"	" -4	0.48	–	–	–	"	"	–
67	*Sterculiaceae*	*Heritiera sp.*-1	–	28	0.154	s-6, z-9	light brown	medium	50
68	"	" -2	–	21	–	–	"	"	43
69	"	" -3	0.68	–	–	–	"	"	31
70	"	*Tarrietia sp.*-1	0.61	–	–	–	red brown	coarse	–

Cont.

No. of tested timber	Botanical name		Specific gravity	Brittle-heart, % in diameter	Silica content (%)	Interlocked grain, degree S: S-direction Z: Z-direction	Color	Texture	Diameter of tested log (cm)
71	*Sterculiaceae*	*Tarrietia sp.*-2	0.54	–	–	–	red brown	coarse	31
72	"	*Sterculia sp.*-1	–	30	0.157	s-3, z-0	white	medium-coarse	46
73	"	" -2	–	16	0.023	–	"	"	54
74	*Ulmaceae*	*Celtis sp.*	0.89	–	–	–	white	fine	–

X40

X40

X40

X100

Anacardiaceae

Dracontomelon mangiferum Bl. (1)

X40

X40

X100

X40

X100

Anacardiaceae

Koordersiodendron pinnatum Mwrr. (2)

X40

X40

X40

X100

Anacardiaceae

Spondias sp. (4)

X40

X40

X40

X100

Bombacaceae

Bombax sp. (5)

X40

X40

X40

X100

Burseraceae

Canarium sp. (7)

X40

X40

X40

X100

Burseraceae

Santiria sp. (11)

X40

X40

X40

X100

Celastraceae

Lophopetalum sp. (14)

X40

X40

X40

X100

Combretaceae

Terminalia sp. –M (15)

X40

X40

X40

X100

Combretaceae

Terminalia sp. –B (18)

X40

X40

X100

X40

X100

Datiscaceae

Octomeles sp. (23)

X40

X40

X40

X100

Ebenaceae

Diospyros sp. (24)

X40

X40

X40

X100

Euphorbiaceae

Drypetes sp. (25)

X40

X40

X40

X100

Euphorbiaceae

Sapium sp. (26)

X40

X40

X40

X100

Gonystylaceae

Gonystylus macrophyllus A. Shaw. (28)

X40

X40

X40

X100

Guttiferae

Calophyllum sp. (29)

X40

X40

X40

X100

X100

Lauraceae

Litsea sp. (33)

X40

X40

X40

X100

Meliaceae

Aglaia sp. (*or Amoora sp.*) (35)

X40

X40

X40

X100

Meliaceae

Azadirachta excelsa Jacobs (37)

X40

X40

X40

X100

Meliaceae

Dysoxylum sp. (39)

X40

X40

X40

X100

Meliaceae

Sandoricum sp. (40)

X40

X40

X100

X40

X100

Moraceae

Artocarpus sp. (42)

X40

X40

X40

X100

Moraceae

Ficus sp. (44)

X40

X40

X40

X100

Myristicaceae (45)

X40

X40

X40

X100

Myrtaceae

Eugenia sp. (47)

X40

X40

X40

X100

Myrtaceae

Kjellbergiodendron sp. (48)

X40

X40

X40

X100

Podocarpaceae

Podocarpuo sp. (49)

X40

X40

X40

X100

Rosaceae

Parinari sp. (51)

X40

X40

X40

X100

Rubiaceae

Anthocephalus chinensis Rex welp. (52)

X40

X40

X40

X100

Sapindaceae

Pometia pinnata Forst. (53)

X40

X40

X40

X100

Sapotaceae

Madhuca sp. (55)

X40

X40

X40

X100

Sapotaceae

Palaquium sp. (57)

X40

X40

X40

X100

Simarubaceae

Ailanthus sp. (62)

X40

X40

X40

X100

Sonneratiaceae

Duabanga sp. (63)

X40

X40

X40

X100

Sterculiaceae

Heritiera littoralis Dryand. (67)

X40

X40

X40

X100

Sterculiaceae

Tarrietia sp. (70)

X40

X40

X40

X100

Sterculiaceae

Sterculia sp. (72)

X40

X40

X40

X100

Ulmaceae

Celtis sp. (74)