

KFRI Research Report No.
(Interim report –Draft of KFRI 539/07)

DNA BAR CODING OF *DALBERGIA* SPECIES

K.K.N. Nair (till August 2008)
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ABSTRACT OF PROJECT PROPOSAL

1. Title : DNA bar coding of *Dalbergia* species
2. Investigators : 1. K.K.N. Nair (till August 2008)
2. M. Balasundaran
3. Research Fellows : 1. Mr. Sunil
Technical Asst. : 1. Divya Varghese P
4. Objectives :
 1. Field identification and collection of germplasm from various accessions of 12 *Dalbergia* species from the Western Ghats of Kerala and Tamil Nadu
 2. Isolation of genomic DNA
 3. PCR amplification of two loci using primers identified by NIPGR and NCL.
5. Duration : 3 years (August 2007- July 2010)
6. Funding agency : DBT

INTERIM REPORT (DRAFT) OF THE PROJECT KFRI 539/07: DNA BAR CODING OF *DALBERGIA* SPECIES

The project funded by Dept. of Biotechnology, Govt. of India started in August 2007 with Dr. K.K.N. Nair as PI and Dr. M. Balasundaran as Co-PI. After the superannuation of K.K. N. Nair in August 2008, Dr. Balasundaran was nominated as PI.

This is a coordinated project with Dr. Sabhyata Bhatia, Staff Scientist, National Institute of Plant Genomic Research, New Delhi, as the Coordinator and Dr. Vidya Gupta, Scientist F, National Chemical Laboratory, Pune as another PI. The major component of the work such as gene sequencing and sequence analysis is done by them. Dr. Sabhyata Bhatia, the project coordinator only was invited to present the progress report at DBT. The Project coordinator represented the other two PIs (from NCL and KFRI).

The major component of KFRI was collection of leaf samples from 20-30 genotypes of 11 species of *Dalbergia* from the different places of the Western Ghats and send dry leaf specimens or DNA extracted from the leaf samples to the two laboratories mentioned above. The taxonomic characterization of the genotypes is done.

About 95 per cent of the KFRI component has been completed. Samples were sent to the two laboratories as dried leaf samples during the initial period of the project as desired by them and subsequently as pure DNA. The genotypes collected were taxonomically characterized.

This interim report (draft) comprises the following:

1. The list of accessions of the species sent as dried leaf samples and DNA with date of despatch. The location of collection and accession numbers provided. The remark from the PIs from the other two laboratories on the samples (feedback received very rarely) is provided.
2. Description of the species providing morphological variations among the genotypes.
3. Line drawings of the species.
4. Photographs of the species.

This interim report will be updated and resubmitted.

List of samples sent to Dr. Vidya Gupta, NCL, Pune

Sl. No	Sample no.	Species	Codes used	Place of collection	Dried samples or purified DNA sent	
					Dried leaf samples	Purified DNA
1	101	<i>Dalbergia candenatensis</i>	Dc1 QAG	Banks of Ashtamudi lake, near Ashramam guest house, Kollam	16.01.08 Low yield	26-9-09
2	102	<i>Dalbergia candenatensis</i>	Dc2 QAG	Banks of Ashtamudi lake, near Ashramam guest house, Kollam	16.01.08 Low yield	26-9-09
3	103	<i>Dalbergia candenatensis</i>	Dc3 QAG	Banks of Ashtamudi lake, near Ashramam guest house, Kollam	16.01.08 Failed	26-9-09 19-11-09
4	104	<i>Dalbergia candenatensis</i>	Dc4 QAG	Banks of Ashtamudi lake, near Ashramam guest house, Kollam	16.01.08 Failed	26-9-09
5	105	<i>Dalbergia candenatensis</i>	Dc5 QAG	Banks of Ashtamudi lake, near Ashramam guest house, Kollam	16.01.08 Low yield	19-11-09
6	106	<i>Dalbergia candenatensis</i>	Dc6 AKF	Near fisheries Pharm, Ayiramthengu, Kayamkulam, Alleppey	16.01.08 Low yield	19-11-09
7	107	<i>Dalbergia candenatensis</i>	Dc7 AKF	Near fisheries Pharm, Ayiramthengu, Kayamkulam, Alleppey	16.01.08 Low yield	19-11-09
8	108	<i>Dalbergia candenatensis</i>	Dc8 PAC	Near Cherai bridge, Cherai, Paravoor, Ernakulam	15.03.08 Failed	26-9-09
9	109	<i>Dalbergia candenatensis</i>	Dc9 PAC	Near Cherai bridge, Cherai, Paravoor, Ernakulam	15.03.08 Failed	26-9-09
10	110	<i>Dalbergia candenatensis</i>	Dc10 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.	15.03.08 Failed	22-8-09
11	111	<i>Dalbergia candenatensis</i>	Dc11 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.	15.03.08 Failed	22-8-09
12	112	<i>Dalbergia candenatensis</i>	Dc12 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.	15.03.08 Failed	22-8-09 19-11-09
13	113	<i>Dalbergia candenatensis</i>	Dc13 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.	15.03.08 Failed	26-9-09
14	114	<i>Dalbergia candenatensis</i>	Dc14 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
15	115	<i>Dalbergia candenatensis</i>	Dc15 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09

16	116	<i>Dalbergia candenatensis</i>	Dc16 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09 19-11-09
17	117	<i>Dalbergia candenatensis</i>	Dc17 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09 19-11-09
18	118	<i>Dalbergia candenatensis</i>	Dc18 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
19	119	<i>Dalbergia candenatensis</i>	Dc19 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
20	120	<i>Dalbergia candenatensis</i>	Dc20 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
21	121	<i>Dalbergia candenatensis</i>	Dc21 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
22	122	<i>Dalbergia candenatensis</i>	Dc22 PAC	Anachal, On the way to Aluva, Paravoor, Ernakulam.		26-9-09
23	301	<i>Dalbergia rubiginosa</i>	Dr1 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
24	302	<i>Dalbergia rubiginosa</i>	Dr2 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
25	303	<i>Dalbergia rubiginosa</i>	Dr3 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
26	304	<i>Dalbergia rubiginosa</i>	Dr4 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
27	305	<i>Dalbergia rubiginosa</i>	Dr5 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	19-11-09
28	306	<i>Dalbergia rubiginosa</i>	Dr6 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
29	307	<i>Dalbergia rubiginosa</i>	Dr7 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
30	308	<i>Dalbergia rubiginosa</i>	Dr8 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
31	309	<i>Dalbergia rubiginosa</i>	Dr9 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
32	310	<i>Dalbergia rubiginosa</i>	Dr10 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	16.01.08 Success	
33	311	<i>Dalbergia rubiginosa</i>	Dr11 KB	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success	

34	312	<i>Dalbergia rubiginosa</i>	Dr12 KB	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
35	313	<i>Dalbergia rubiginosa</i>	Dr13 KB	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
36	314	<i>Dalbergia rubiginosa</i>	Dr14 KB	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
37	315	<i>Dalbergia rubiginosa</i>	Dr15 KB	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
38	316	<i>Dalbergia rubiginosa</i>	Dr16 KC	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
38	317	<i>Dalbergia rubiginosa</i>	Dr17 KC	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
40	318	<i>Dalbergia rubiginosa</i>	Dr18 KC	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
41	319	<i>Dalbergia rubiginosa</i>	Dr19 KC	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
42	320	<i>Dalbergia rubiginosa</i>	Dr20 KC	Beyond Bevenje bridge, Thekkal, Kasaragod.	16.01.08 Success
43	601	<i>Dalbergia paniculata</i>	Dp1 WP (601)	Near Malabar Cement Factory Mines, Walyar, Palakkad.	25.05.09 Not known
44	602	<i>Dalbergia paniculata</i>	Dp2 WP (602)	Near Malabar Cement Factory Mines, Walyar, Palakkad.	25.05.09 Not known
45	603	<i>Dalbergia paniculata</i>	Dp3 WP (603)	Near Malabar Cement Factory Mines, Walyar, Palakkad.	25.05.09 Not known
46	604	<i>Dalbergia paniculata</i>	Dp4 SP (604)	Sholayur, Palakkad	25.05.09 Not known
47	605	<i>Dalbergia paniculata</i>	Dp5 SP (605)	Sholayur, Palakkad	25.05.09 Not known
48	606	<i>Dalbergia paniculata</i>	Dp6 SP (606)	Sholayur, Palakkad	25.05.09 Not known
49		<i>Dalbergia paniculata</i>	DP09(CWLS)	Chinnar Wildlife Sanctuary	1-7-09

			(808)			Success	
71	809	<i>Dalbergia latifolia</i>	D19 MP (809)	Mukkali, Attappady, Palakkad	05.01.09 Success		
72	810	<i>Dalbergia latifolia</i>	D110 MP (810)	Mukkali, Attappady, Palakkad	05.01.09 Success		
73	811	<i>Dalbergia latifolia</i>	D111 VDT (811)	Vazhani Dam, Thrissur	25.05.09 Not known		
74	812	<i>Dalbergia latifolia</i>	D112 VDT (812)	Vazhani Dam, Thrissu	25.05.09 Not known		
75	813	<i>Dalbergia latifolia</i>	D113 VDT (813)	Vazhani Dam, Thrissu	25.05.09 Not known		
76		<i>Dalbergia latifolia</i>	D114 814(CWLS)	Chinnar Wildlife sanctuary		1-7-09	
77		<i>Dalbergia latifolia</i>	D116(CWLS)	Chinnar Wildlife sanctuary		1-7-09	
78		<i>Dalbergia latifolia</i>	D117(CWLS)	Chinnar Wildlife sanctuary		1-7-09	
79		<i>Dalbergia latifolia</i>	D118(KP)	Kasaragod, parappa		19-11-09	
80		<i>Dalbergia latifolia</i>	D119(KP)	Kasaragod, parappa		19-11-09	
81		<i>Dalbergia latifolia</i>	D120(KP)	Kasaragod, parappa		19-11-09	
82		<i>Dalbergia latifolia</i>	D121(KW)	Kurichiad, Wayanad		19-11-09	
83		<i>Dalbergia latifolia</i>	D122(KW)	Kurichiad, Wayanad		19-11-09	
84		<i>Dalbergia latifolia</i>	D123(KW)	Kurichiad, Wayanad		19-11-09	
85	1001	<i>Dalbergia volubilis</i>	Dv1 NSC	KFRI Nilambur Subcentre.	16.01.08 Not known	19-11-09	
86	1002	<i>Dalbergia volubilis</i>	Dv2 NSC	KFRI Nilambur Subcentre.	16.01.08 Not known	19-11-09	

87	1003	<i>Dalbergia volubilis</i>	Dv3 NSC	KFRI Nilambur Subcentre.	known 16.01.08 Not known	19-11-09
88	1004	<i>Dalbergia volubilis</i>	Dv4 TK (1004)	Social Forestry, Kuthiran mala, Thrissur	known 15.03.08 Failed	
89	1008	<i>Dalbergia volubilis</i>	Dv8 MDP (1008)	Mangalam Dam, Palakkad	05.01.09 Success	
90	1009	<i>Dalbergia volubilis</i>	Dv9 MP (1009)	Mukkali, Attappady, Palakkad	05.01.09 Success	
91	1010	<i>Dalbergia volubilis</i>	Dv10 MP (1010)	Mukkali, Attappady, Palakkad	05.01.09 Success	
92	1011	<i>Dalbergia volubilis</i>	Dv11 MP (1011)	Mukkali, Attappady, Palakkad	05.01.09 Success	
93		<i>Dalbergia volubilis</i>	Dv20 (QT)	Quilon, Thenmala		22-8-09
94		<i>Dalbergia volubilis</i>	Dv21(QT)	Quilon, Thenmala		22-8-09
95		<i>Dalbergia volubilis</i>	Dv22(QT)	Quilon, Thenmala		22-8-09
96		<i>Dalbergia volubilis</i>	Dv23(KP)	Kasaragod, parappa		19-11-09
97		<i>Dalbergia volubilis</i>	Dv24(KP)	Kasaragod, parappa		19-11-09
98		<i>Dalbergia volubilis</i>	Dv25(KP)	Kasaragod, parappa		19-11-09
99		<i>Dalbergia volubilis</i>	Dv26(KW)	Kurichiad, Wayanad		19-11-09
100		<i>Dalbergia volubilis</i>	Dv27(KW)	Kurichiad, Wayanad		19-11-09
101		<i>Dalbergia volubilis</i>	Dv28(KW)	Kurichiad, Wayanad		19-11-09
102		<i>Dalbergia volubilis</i>	Dv29(KW)	Kurichiad, Wayanad		19-11-09
103		<i>Dalbergia volubilis</i>	Dv30(KW)	Kurichiad, Wayanad		19-11-09
104		<i>Dalbergia volubilis</i>	Dv31 (NKP)	Naduvathumuzhi, Konni,		7-1-10

105	<i>Dalbergia volubilis</i>	Dv32(NKP)	Pathanamthitta Naduvathumuzhi, Konni, Pathanamthitta	7-1-10
106	<i>Dalbergia volubilis</i>	Dv33(NKP)	Naduvathumuzhi, Konni, Pathanamthitta	7-1-10
+ as per mail dated 26 May 2009				

List of samples sent to Dr. Sabhyata Bhatia, NIPGR, New Delhi

Sl. No.	Sample no.	Species	Codes used	Place of collection	Date	Remark from Dr. Sabhyata Bhatia	
						Date of sample or DNA sent from KFRI	DNA sent
1	201	<i>Dalbergia beddomei</i>	Db1 SVNP (201)	Silent valley National Park	11.08.08	More samples More samples not necessary	
2	202	<i>Dalbergia beddomei</i>	Db2 SVNP (202)	Silent valley National Park	11.08.08	More samples More samples not necessary	
3	203	<i>Dalbergia beddomei</i>	Db3 SVNP (203)	Silent valley National Park	11.08.08	More samples More samples not necessary	
4	204	<i>Dalbergia beddomei</i>	Db4 SVNP (204)	Silent valley National Park	11.08.08	More samples More samples not necessary	
5	205	<i>Dalbergia beddomei</i>	Db5 SVNP (205)	Silent valley National Park	11.08.08	More samples Not necessary	
6	206	<i>Dalbergia beddomei</i>	Db6 SVNP (206)	Silent valley National Park	11.08.08	More samples Not necessary	
7	207	<i>Dalbergia beddomei</i>	Db7 SVNP (207)	Silent valley National Park	11.08.08	More samples Not necessary	
8	208	<i>Dalbergia beddomei</i>	Db8 SVNP (208)	Silent valley National Park	11.08.08	More samples Not necessary	
9	209	<i>Dalbergia beddomei</i>	Db9 SVNP (209)	Silent valley National Park	11.08.08	More samples Not necessary	
10	210	<i>Dalbergia beddomei</i>	Db10 SVNP (210)	Silent valley National Park	11.08.08	More samples Not necessary	
11	211	<i>Dalbergia beddomei</i>	Db11 SVNP (211)	Silent valley National Park	11.08.08	More samples Not necessary	
12	212	<i>Dalbergia beddomei</i>	Db12 SVNP (212)	Silent valley National Park	11.08.08	More samples Not necessary	
13	213	<i>Dalbergia beddomei</i>	Db13 SVNP (213)	Silent valley National Park	11.08.08	More samples Not necessary	
14	214	<i>Dalbergia beddomei</i>	Db14 SVNP (214)	Silent valley National Park	11.08.08	More samples Not necessary	
15	215	<i>Dalbergia beddomei</i>	Db15 SVNP (215)	Silent valley National Park	11.08.08	More samples Not necessary	
16	216	<i>Dalbergia beddomei</i>	Db16 SVNP (216)	Silent valley National Park	11.08.08	More samples Not necessary	

17	217	<i>Dalbergia beddomei</i>	Db17 SVNP (217)	Silent valley National Park	11.08.08	More samples Not necessary
18	219	<i>Dalbergia beddomei</i>	Db19 SVNP (219)	Silent valley National Park	11.08.08	More samples Not necessary
19	220	<i>Dalbergia beddomei</i>	Db20 SVNP (220)	Silent valley National Park	11.08.08	More samples Not necessary
20	221	<i>Dalbergia beddomei</i>	Db20 KMTR (220)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu	23.10.08	More samples Not necessary
21	222	<i>Dalbergia beddomei</i>	Db21 KMTR (221)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu	23.10.08	More samples Not necessary
22	223	<i>Dalbergia beddomei</i>	Db22 KMTR (222)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu	23.10.08	More samples Not necessary
23	901	<i>Dalbergia sissooides</i>	Ds1 TK	Kuthiran mala, Thrissur	26.01.08	More samples Not necessary
24	906	<i>Dalbergia sissooides</i>	Ds6 PDF	Dhoni Farm, Palakkad.	26.01.08	More samples Not necessary
25	907	<i>Dalbergia sissooides</i>	Ds7 PDF	Dhoni Farm, Palakkad.	26.01.08	More samples Not necessary
26	908	<i>Dalbergia sissooides</i>	Ds8 PDF	Dhoni Farm, Palakkad.	26.01.08	More samples Not necessary
27	909	<i>Dalbergia sissooides</i>	Ds9 PDH	Dhoni hills, Palakkad.	26.01.08	More samples Not necessary
28	910	<i>Dalbergia sissooides</i>	Ds10 PDH	Dhoni hills, Palakkad.	26.01.08	More samples Not necessary
29	911	<i>Dalbergia sissooides</i>	Ds11 PDH	Dhoni hills, Palakkad.	26.01.08	More samples Not necessary
30	913	<i>Dalbergia sissooides</i>	Ds13 KP	Keerappady, Parambikulam.	26.05.08	More samples Not necessary
31	914	<i>Dalbergia sissooides</i>	Ds14 KP	Keerappady, Parambikulam.	26.05.08	More samples Not necessary
32	915	<i>Dalbergia sissooides</i>	Ds15 KP	Keerappady, Parambikulam.	26.05.08	More samples Not necessary
33	916	<i>Dalbergia sissooides</i>	Ds16 KP	Keerappady, Parambikulam.	26.05.08	More samples Not necessary
34	917	<i>Dalbergia sissooides</i>	Ds17 KP	Keerappady, Parambikulam.	26.05.08	More samples Not necessary
35	918	<i>Dalbergia sissooides</i>	Ds18 MDP (918)	Mangalm Dam Palakkad.	23.10.08	More samples Not necessary
36	919	<i>Dalbergia sissooides</i>	Ds19 MDP (919)	Mangalm Dam Palakkad.	23.10.08	More samples Not necessary
37	920	<i>Dalbergia sissooides</i>	Ds20 MDP (920)	Mangalm Dam Palakkad.	23.10.08	More samples Not necessary

38	921	<i>Dalbergia sissoides</i>	Ds21 MP (921)	Mukkali, Attappady, Palakkad	05.01.09	More samples Not necessary
39	922	<i>Dalbergia sissoides</i>	Ds22 MP (922)	Mukkali, Attappady, Palakkad	05.01.09	More samples Not necessary
40	923	<i>Dalbergia sissoides</i>	Ds23 MP (923)	Mukkali, Attappady, Palakkad	05.01.09	Not necessary
41	925	<i>Dalbergia sissoides</i>	Ds25 AWLS (925)	Aralam WLS, Kannur	20.04.09	More samples Not necessary
42	928	<i>Dalbergia sissoides</i>	Ds28 AWLS (928)	Aralam WLS, Kannur	20.04.09	More samples Not necessary
43	930	<i>Dalbergia sissoides</i>	Ds30 TTP (930)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	More samples Not necessary
44	931	<i>Dalbergia sissoides</i>	Ds31 TTP (931)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	More samples Not necessary
45	402	<i>Dalbergia sissoides</i>	Ds 02 PT (402)	Peechi, Thrissur		More samples Not necessary
46	403	<i>Dalbergia sissoides</i>	Ds 02 PT (403)	KFRI Campus		More samples not necessary
47	404	<i>Dalbergia sissoides</i>	Ds 02 PT (404)	KFRI Campus		More samples not necessary
48	412	<i>Dalbergia sissoides</i>	Ds 02 PT (412)	Dhoni hills, Palakkad		More samples not necessary
49	429	<i>Dalbergia sissoides</i>	Ds 02 PT (429)	Mukkali, Palakkad		More samples not necessary
50	430	<i>Dalbergia sissoides</i>	Ds 24 CWLS (924)	Chinnar wildlife sanctuary		6-8-2009
51	431	<i>Dalbergia sissoides</i>	DS 33 (934 QK)	Quilon, Kothapuzha		22-8-2009
52	432	<i>Dalbergia sissoides</i>	DS 34 (934 QK)	Quilon, Kothapuzha		22-8-2009
53	501	<i>Dalbergia horrida</i>	Dh1 NSC	Backside of Teak museum, KFRI Nilambur Subcentre.	26.01.08	More samples not necessary
54	502	<i>Dalbergia horrida</i>	Dh2 PDH	Sappal beat, Dhoni hills, Palakkad.	08.02.08	More samples not necessary
55	503	<i>Dalbergia horrida</i>	Dh3 PDH	Sappal beat, Dhoni hills, Palakkad.	08.02.08	More samples not necessary
56	504	<i>Dalbergia horrida</i>	Dh4 PDH	Sappal beat, Dhoni hills, Palakkad.	08.02.08	More samples not necessary
57	505	<i>Dalbergia horrida</i>	Dh5 PDH	Sappal beat, Dhoni hills, Palakkad.	08.02.08	More samples not necessary
58	506	<i>Dalbergia horrida</i>	Dh6 PDH	Sappal beat, Dhoni hills, Palakkad.	08.02.08	More samples not necessary
59	507	<i>Dalbergia horrida</i>	Dh7 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	06.05.08	More samples not necessary

60	508	<i>Dalbergia horrida</i>	Dh8 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	06.05.08	More samples not necessary
61	509	<i>Dalbergia horrida</i>	Dh8 KM	Methunganam, Near waterfall, Bevenje, Kasaragod.	06.05.08	More samples not necessary
62	510	<i>Dalbergia horrida</i>	Dh10 KC	Chandragiri bridge, Kasaragod.	06.05.08	More samples not necessary
63	511	<i>Dalbergia horrida</i>	Dh11 KC	Chandragiri bridge, Kasaragod.	06.05.08	More samples not necessary
64	512	<i>Dalbergia horrida</i>	Dh12 AVM	Vandanam, Near Medical College, Alleppey.	06.05.08	More samples not necessary
65	513	<i>Dalbergia horrida</i>	Dh13 AVM	Vandanam, Near Medical College, Alleppey.	06.05.08	More samples not necessary
66	514	<i>Dalbergia horrida</i>	Dh14 AVS	Vandanam Sastha Temple Campus, Alleppey.	06.05.08	More samples not necessary
67	515	<i>Dalbergia horrida</i>	Dh15 AVS	Vandanam, Sastha Temple Campus Alleppey.	06.05.08	More samples not necessary
68	516	<i>Dalbergia horrida</i>	Dh16 AVS	Vandanam Sastha Temple Campus, Alleppey.	06.05.08	More samples not necessary
69	517	<i>Dalbergia horrida</i>	Dh17 MP	Mukkali, Attappady, Palakkad	05.01.09	More samples not necessary
70	525	<i>Dalbergia horrida</i>	Dh25 AWLS (525)	Aralam WLS, Kannur	20.04.09	More samples not necessary
71	526	<i>Dalbergia horrida</i>	Dh26 AWLS (526)	Aralam WLS, Kannur	20.04.09	More samples not necessary
72	527	<i>Dalbergia horrida</i>	Dh27 TTP (527)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	More samples not necessary
73	528	<i>Dalbergia horrida</i>	Dh28 TTP (528)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	More samples not necessary
74	701	<i>Dalbergia lanceolaria</i>	Dlan1 NSC	Near Teak Museum, KFRI Subcentre, Nilambur.	26.01.08	Failed 19-11-2009
75	702	<i>Dalbergia lanceolaria</i>	Dlan2 NSC	Near Teak Museum, KFRI Subcentre, Nilambur.	26.01.08	Failed 19-11-2009
76	703	<i>Dalbergia lanceolaria</i>	Dlan3 NSC	Near Teak Museum, KFRI Subcentre, Nilambur.	26.01.08	19-11-2009
77	704	<i>Dalbergia lanceolaria</i>	Dlan4 PDH	Dhoni hills, Palakkad.	26.01.08	
78	707	<i>Dalbergia lanceolaria</i>	Dlan7 NP (709)	Near Cherunelli Colony, Pothundy, Nelliampathy.	06.05.08	
79	708	<i>Dalbergia lanceolaria</i>	Dlan8 NP (710)	Near Cherunelli Colony, Pothundy, Nelliampathy.	06.05.08	
80	711	<i>Dalbergia lanceolaria</i>	Dlan9 PW (711)	Walayar, Palakkad.	06.05.08	

81	712	<i>Dalbergia lanceolaria</i>	Dian12 KFRI (712)	KFRI campus		19-11-2009
82	713	<i>Dalbergia lanceolaria</i>	Dian12 KFRI (713)	KFRI campus		19-11-2009
83	714	<i>Dalbergia lanceolaria</i>	Dian12 KFRI (714)	KFRI campus		
84	715	<i>Dalbergia lanceolaria</i>	Dian12 KFRI (715)	KFRI campus		
85	716	<i>Dalbergia lanceolaria</i>	Dian16 CWLS	Chinnar wildlife sanctuary		6-7-2009
86	717	<i>Dalbergia lanceolaria</i>	Dian17 CWLS	Chinnar wildlife sanctuary		6-7-2009
87	718	<i>Dalbergia lanceolaria</i>	Dian18 CWLS	Chinnar wildlife sanctuary		6-7-2009
88	719	<i>Dalbergia lanceolaria</i>	Dian19 KM (719)	Kasaragod, Methunganam		21-10-2009
89	720	<i>Dalbergia lanceolaria</i>	Dian20 TW (720)	Tholpetty, wayanad		19-11-2009
90	721	<i>Dalbergia lanceolaria</i>	Dian21 KW(721)	Kurichyad, wayand		19-11-2009
91	722	<i>Dalbergia lanceolaria</i>	Dian22 KW(722)	Kurichyad, wayand		19-11-2009
92	723	<i>Dalbergia lanceolaria</i>	Dian23 TW(723)	Tholpetty, wayanad		19-11-2009
93	724	<i>Dalbergia lanceolaria</i>	Dian24 CAP(724)			19-11-2009
94	725	<i>Dalbergia lanceolaria</i>	Dian25 KE(725)	Kottappara, Ernakulam		19-11-2009
95	726	<i>Dalbergia lanceolaria</i>	Dian26 KE(726)	Kottappara, Ernakulam		19-11-2009
96	727	<i>Dalbergia lanceolaria</i>	Dian27 KE(727)	Kottappara, Ernakulam		19-11-2009
97	728	<i>Dalbergia lanceolaria</i>	Dian28 NKP(728)	Naduvathumuzhi, Konni		7-1-2010
98	729	<i>Dalbergia lanceolaria</i>	Dian29 NKP(729)	Naduvathumuzhi, Konni		7-1-2010
99	730	<i>Dalbergia lanceolaria</i>	Dian30 NKP(730)	Naduvathumuzhi, Konni		7-1-2010
100	1101	<i>Dalbergia spinosa</i>	Dsp1 KMTR (1101)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
101	1102	<i>Dalbergia spinosa</i>	Dsp2 KMTR (1102)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
102	1103	<i>Dalbergia spinosa</i>	Dsp3 KMTR (1103)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
103	1104	<i>Dalbergia spinosa</i>	Dsp4 KMTR (1104)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
104	1105	<i>Dalbergia spinosa</i>	Dsp5 KMTR (1105)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
105	1108	<i>Dalbergia spinosa</i>	Dsp8 KMTR (1108)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
106	1109	<i>Dalbergia spinosa</i>	Dsp9 KMTR (1109)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
107	1110	<i>Dalbergia spinosa</i>	Dsp10 KMTR (1110)	Mundanthurai Tiger Reserve, Thirunelveli, Tamil Nadu.	23.10.08	
108	1111	<i>Dalbergia spinosa</i>	Dsp11 MTR (1111)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	
109	1112	<i>Dalbergia spinosa</i>	Dsp12 MTR (1112)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	
110	1113	<i>Dalbergia spinosa</i>	Dsp13 MTR (1113)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	

111	1114	<i>Dalbergia spinosa</i>	Dsp14 MTR (1114)	Reserve, Thirunelveli, Tamil Nadu	05.01.09	
112	1115	<i>Dalbergia spinosa</i>	Dsp15 MTR (1115)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	
113	1116	<i>Dalbergia spinosa</i>	Dsp16 MTR (1116)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	21-10-2009
114	1117	<i>Dalbergia spinosa</i>	Dsp17 MTR (1117)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	21-10-2009
115	1118	<i>Dalbergia spinosa</i>	Dsp18 MTR (1118)	Manimuthar, Kalakkad Tiger Reserve, Thirunelveli, Tamil Nadu	05.01.09	21-10-2009
116	1119	<i>Dalbergia spinosa</i>	Dsp19 KMTR	Kalakkad Mundanthurai Tiger reserve	05.01.09	21-10-2009
117	1120	<i>Dalbergia spinosa</i>	Dsp20 KMTR	Kalakkad Mundanthurai Tiger reserve		21-10-2009
118	1201	<i>Dalbergia pseudo-sisso</i>	Dps1 TTP (1201)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
119	1202	<i>Dalbergia pseudo-sisso</i>	Dps2 TTP (1202)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
120	1203	<i>Dalbergia pseudo-sisso</i>	Dps3 TTP (1203)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
121	1204	<i>Dalbergia pseudo-sisso</i>	Dps4 TTP (1204)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
122	1205	<i>Dalbergia pseudo-sisso</i>	Dps5 TTP (1205)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
123	1206	<i>Dalbergia pseudo-sisso</i>	Dps6 TTP (1206)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
124	1207	<i>Dalbergia pseudo-sisso</i>	Dps7 TTP (1207)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
125	1211	<i>Dalbergia pseudo-sisso</i>	Dps11 TTP (1211)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
126	1212	<i>Dalbergia pseudo-sisso</i>	Dps12 TTP (1212)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
127	1213	<i>Dalbergia pseudo-sisso</i>	Dps13 TTP (1213)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
128	1214	<i>Dalbergia pseudo-sisso</i>	Dps14 TTP (1214)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	

129	1215	<i>Dalbergia pseudo-sisso</i>	Dps15 TTP (1215)	Pathanamthitta Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
130	1216	<i>Dalbergia pseudo-sisso</i>	Dps16 TTP (1216)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
131	1217	<i>Dalbergia pseudo-sisso</i>	Dps17 TTP (1217)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
132	1221	<i>Dalbergia pseudo-sisso</i>	Dps21 TTP (1221)	Thannithode-Thekkuthode, Pathanamthitta	20.04.09	
133	1223	<i>Dalbergia pseudo-sisso</i>	Dps23 ETP (1223)	Erattayar, Thannithode, Pathanamthitta		7-1-2010
134	1224	<i>Dalbergia pseudo-sisso</i>	Dps24 ETP (1224)	Erattayar, Thannithode, Pathanamthitta		7-1-2010
135	1225	<i>Dalbergia pseudo-sisso</i>	Dps25 ETP (1225)	Erattayar, Thannithode, Pathanamthitta		7-1-2010
136	1226	<i>Dalbergia pseudo-sisso</i>	Dps26 ETP (1226)	Erattayar, Thannithode, Pathanamthitta		7-1-2010
137	1227	<i>Dalbergia pseudo-sisso</i>	Dps27 ETP (1227)	Erattayar, Thannithode, Pathanamthitta		7-1-2010
138	1228	<i>Dalbergia pseudo-sisso</i>	Dps28 ETP (1228)	Erattayar, Thannithode, Pathanamthitta		7-1-2010

***Dalbergia lanceolaria* - D.lan 15 KFRIC (715)**

Trees, 25 m high; 100 cm girth at base, bark rough; trunk straight with spreading branches, branchlets sub-bifarious, glabrous.

Leaves - imparipinnate, alternate, 9-18cm long, stipulate, rachis glabrous, puberulous when young, 8-17cm long, leaflets 7 to 14, rarely 16, elliptic, ovato-oblong, obovate, rarely suborbicular, entire, reticulate veined, subcoriaceous, obtuse to retuse at apex, mostly retuse, rarely emarginate at apex; cuneate to rounded at base, bright green above, paler beneath, leaflets puberulous when young, glabrous when matured; petiolules 0.3-0.5 cm long, slender, pubescent when young; stipules 0.3-0.9cm long, lanceolate, subfalcate, caducous.

Leaflets - 3x2cm, 3.5x2cm, 2.5x1.6cm, 3x1.7cm, 2.5x1.2cm, 4x2.5cm, 3.5x2.2cm, 3.5x1.4cm, 3x1cm, 2.5x1cm, 4x1.5cm, 2.8x1.2cm, 2x1.5cm, 2x1.5cm, 3.7x2.5cm, 3.3x1.6cm.

Inflorescence: Terminal and axillary in lax, rusty pubescent panicles; 5.5-14cm long; flowers pinkish blue, 0.8-1cm long, pedicels up to 0.4cm long, rufous hairy; bracts minute, oblong, caducous; calyx campanulate, 0.3-0.4cm long, dark brown colour, hairy, 5 lobed with upper two lobes subconnate, obtuse, lateral two ovate and acute, the lowest longest; corolla with 5 clawed petals, vexillum long clawed, orbicular, retuse at apex, reticulate veined, thickened at base, wings 0.0-0.9cm long, oblong, auricled, faintly reticulate veined with often reflexed margins, ovate at apex, larger than keels; keels 0.0-0.8cm long, boat shaped, oblong, auricled, faintly reticulate veined, broadly rounded at apex; stamens 10, isodiadelphous, staminal column split on the upper side, glabrous, 0.2-0.3cm long, filaments alternatively larger and shorter; pistil 0.7-0.8cm long, pubescent, ovary stipitate, usually 3-lobed, style slender, 0.3-0.4 cm long, stigma minute, capitate.

Pods: stipitate, reticulated through, 1-4 seeded, obtuse at apex, rarely acute with often a short apicula at apex, seeds reniform, compressed.

Specimen examined: KFRI campus, Peechi, Thrissur.

***Dalbergia latifolia* - D.l 13 PWLS**

Tree, about 30m high, 2m girth at base, branches spreading, branchlets subbifarious, glabrous.

Leaves: imparipinnate, compact on twiggy branchlets, alternate, 8.5-21cm long; leaflets alternate to subopposit, rarely opposite. 5 to 10 numbers, usually 7 rarely 9 and 10, ovate, suborbicular, glabrous on both sides, green above, pale green when young, dark green when matured, glaucascent beneath, rounded, emarginated, rarely subacute at apex, rounded and cuneate at base; rachis straight, glabrous; petiolules 0.5-1.0cm long, slender, stipules small, caducous;

Leaflets: 6.5x4.7cm, 6.3x4.1cm, 4.5x2.5cm, 4.5x3cm, 5.9x3.5cm, 6.4x4.3cm, 6.6x4.5cm, 3.8x2.3cm, 4.2x2.1cm, 5.5x3cm, 3.5x2.6cm, 6x4.5cm

Inflorescence: Axillary corymbose panicles, 4-12cm long, fascicled on old wood below the upper leaves; bracts minute, bracteoles membranous, very caducous; flowers white, some are slightly yellowish, scented, 0.4-0.7cm long; pedicels slender, 0.2-0.5cm long; calyx campanulate, 0.3-0.5cm long, slightly puberulous when young, 5-lobed with upper two lobes subconnate; corolla with 5 distinctly clawed petals, vexillum 0.4-0.6cm long, sub orbicular, reflexed, emarginate at apex, reticulate veined; wings 0.4-0.5cm long, auricled, reticulate veined, acute at apex with often

reflexed margins, keels 0.3-0.7cm long, auricled, reticulate veined, subconnate at apex, stamens 9, monoadelphous, staminal column 0.3-0.5 cm long, longitudinally split above the filaments; pistil 0.2-0.4cm long, glabrous, ovary stipitate, 3-5 ovuled, style slender, stigma capitate.

Specimens examined: Thunakkadavu, Parambikulam wildlife sanctuary, palakkad.

***Dalbergia latifolia* – D.1 05 MDP (805)**

Tree, 15m heigh, 250cm girth at base, stem erect with crown of spreading branches, bark smooth, peeled off, branchlets glabrous,

Leaves: imparipinnate, alternate, stipulate, 13.5-38cm long; leaflets alternate, 5-9 in numbers, usually 7, entire, obtuse to emarginate at apex, oblong, cuneate to rounded at base, coriaceous, glabrous, glaucous beneath, distal one usually larger than others; lateral veins 6-7 pairs.

***Dalbergia latifolia* – D.1 09 MP (809)**

Tree, 18 m heigh, 200cm girth at base, bark smooth, branches subpendulous.

Leaves: imparipinnate, alternate, 10.5-23cm long, leaflets alternate, rarely subopposite, orbicular to broadly ovate, emarginate, obtuse, and rarely acute at apex, shortly cuneate to rounded at base, some leaflets have oblique base, glabrous, glaucous beneath, distal one always larger than others, lateral veins 6-7 pairs, ascending; petiolules glabrous, 0.5-0.9cm long; rachis glabrous, slender, straight, 5-18.5cm long.

Fruits: Pods in corymbose panicles, oblong, lanceolate, flat, indehiscent, coriaceous, glabrous, obtuse at apex, abruptly pointed at apex, narrowed at base in to stalk, coriaceous, sparingly veined, especially over the seed, seed compressed, oval to slightly reniform, smooth, brown to black.

Specimen examined: Nellipathy, Attappady hills, Palakkad.

***Dalbergia latifolia* -1**

Tree, 7m heigh, 1m girth at base, stem erect with crown of spreading branches, bark smooth.

Leaves: Imparipinnate, alternate, 12.5-22cm long, (22cm, 20cm, 18cm, 21.5cm, 17cm, 19cm, 16cm, 20.5cm, 14cm, 19.5cm, 13cm, 15cm, 12.5cm); leaflets 5-9 numbers, usually 8, alternate, rarely subopposite, orbicular to broadly obovate, entire, emarginate at apex, rarely acute, cuneate to rounded at base, distal one usually larger than others, coriaceous, glabrous, glaucous beneath; (4x4cm, 3.5x3.5cm, 4x3.5cm, 4x3cm, 3.5x3cm, 3x2.5cm, 4x3.6cm, 4.5x4cm, 3.5x2.5cm, 3.5x2cm, 4x2.8cm, 4.4x3.5cm, 4.5x2.5cm, 3.5x3cm, 3x2.8cm); rachis straight, rounded, glabrous, 8-19cm long, (11.5cm, 16cm, 15.5cm, 19cm, 17cm, 17.5cm, 16cm, 13cm, 14cm, 10.5cm, 10cm, 8cm); lateral veins 6-8 pairs, petiolules 0.4-0.5cm long, glabrous;

Flowers: -19cm long, arranged in axillary corymbose, panicles fascled on old wood below upper leaves. Inflorescence 3-5 cm long, flowers white, 0.4-0.6cm long, bracts

small, caducous, bracteoles 2, caducous, pedicel slender, 0.2-0.3cm long; calyx campanulate, 0.3-0.4cm long, 5-toothed, upper 2 subconnate, lateral pairs obtuse, lower most acute, veined, glabrous; corolla ovate to broadly elliptic, clawed, wings and keels, blade auricled, veined; stamens 9, monoadelphous, staminal sheath 0.4-0.7cm long, filaments free on their upper third, longer ones alternating with shorter ones, ovary oblong, stipitate, 0.5-0.7cm long, glabrous, ovules 3-5, style slender, curved, stigma minute.

Specimen examined: Anna Nagar, Chemmanampathy, Palakkad.

Dalbergia latifolia 2 – D.1 02 CP (802)

Tree, 10m high, 50cm girth at base, stem erect with spreading branches, bark smooth, some barks are peeled off.

Leaves: imparipinnate, alternate, 9.5-21cm long; leaflets 5-9 numbers, usually 8, alternate, rarely subopposite, orbicular to broadly obovate, entire, obtuse to emarginate at apex, shortly cuneate to rounded at base, coriaceous, glabrous, glaucous beneath, distal one larger, lateral veins 6-7 pairs, petiolules 0.5-0.7cm long, glabrous,

Dalbergia latifolia 3 – D.1 MP 803

Tree, 12m high, 2m girth at base, bark smooth, stem erect with crown of spreading branches, branches pendulous.

Leaves: imparipinnate, alternate, 7.2-16cm long, (14.5cm, 14cm, 13cm, 13.5cm, 7.2cm, 9.4cm, 15cm, 16cm, 10.5cm, 11.2cm, 15.5cm); rachis straight, glabrous, 3.5-12.5cm long, (12cm, 5cm, 11.5cm, 12.5cm, 3.5cm, 9.5cm, 10.5cm, 10cm, 8cm, 8.5cm); leaflets 3-9 numbers, usually 7, rarely 5, 8 and 9, alternate and subopposite, orbicular to broadly obovate, entire, obtuse to emarginate at apex, rarely acute, shortly cuneate to rounded at base, coriaceous, glabrous, glaucous beneath, distal one usually larger than others, lateral veins 6-7 pairs, ascending, petiolules 0.4-0.6cm long, glabrous.

Pods: Pod oblong to lanceolate, flat, indehiscent, coriaceous, glabrous, abruptly pointed at apex, narrowed at base in to a stalk, coriaceous, sparingly veined especially over the seed; seed compressed, oval to slightly reniform.

Specimen examined: Goolikadavu, Agali, Attappady, Palakkad.

Dalbergia latifolia- D.1 05 MDP (805)

Tree, 2.5m girth at base, 15m high, stem erect with crown of spreading branches, bark smooth.

Leaves: imparipinnate, alternate, stipulate, 13.5-38cm long, (13.5cm, 22.5cm, 21cm, 35.5cm, 27cm, 34cm, 22cm, 30cm, 38cm, 20cm, 16.5cm, 26cm); leaflets 5-9 numbers, usually 7, alternate, entire, obtuse to emarginate at apex, oblong, cuneate to rounded at base, coriaceous, glabrous, glaucous beneath, distal one usually larger than others; lateral veins 6-7 pairs, coriaceous; rachis slender, glabrous, 12-28cm long, (25cm, 16cm, 28cm, 17cm, 12cm, 25.5cm, 23cm, 20cm, 21cm, 18cm) petiolules 0.5-0.1cm long, slender, glabrous.

Plant is not in flowering and fruiting stage.

Specimen examined: Mangalm dam catchment area, Palakkad.

***Dalbergia latifolia* – D.1 06 MDP (806)**

Tree, 1.5m girth at base, 10m heigh, stem erect with crown of spreading branches.

Leaves: imparipinnate, alternate, stipulate, 15-33cm long (20cm, 24cm, 25cm, 16cm, 17cm, 19cm, 28cm, 33cm, 27cm, 15cm); leaflets 5-9 numbers, usually 7, rarely 9, ovate and obovate, obtuse to emarginated at apex, cuneate to rounded at base, oblong, coriaceous, glabrous, glaucous beneath; lateral veins 6-7 pairs, distal one larger than others; rachis slender, glabrous, straight, 13-25cm long; petiolules glabrous, 0.4-0.8cm long.

Fruits: Pods oblong, oblong to lanceolate, flat, indehiscent, coriaceous, glabrous, pointed at apex, narrowed at base in to a stalk, veined over the seed, seed compressed, oval, smooth, brown to black.

Specimen examined: Mangalam dam catchment area, Palakkad.

***Dalbergia latifolia* – D.1 07 MDP (807)**

Tree, 25m heigh, 3m girth at base, stem erect with crown of spreading branches, bark smooth, branhes glabrous.

Leaves: imparipinnate, alternate, stipulate, 11-23.5cm long, (15cm, 23.5cm, 20.5cm, 11cm, 14cm, 11.5cm, 12cm, 16cm, 20cm, 21cm); rachis straight, slender, glabrous, 7-19.5cm long; leaflets 5-9 in numbers, mostly 7 and 9, rarely 6 and 8, alternate, orbicular and broadly obovate, entire, emarginated at apex, rarely acute, cuneate to rounded at base, rarely oblong, coriaceous, glabrous above, glaucous beneath, distal one larger than others; lateral veins 6-7 pairs, ascending; petiolules 0.4-0.6cm long, glabrous.

Fruits: Pods, oblong, oblong to lanceolate, flat, indehiscent, coriaceous, glabrous, abruptly pointed at apex, narrowed at base in to a stalk, sparingly veined especially over the seed, seed compressed, oval, slightly reniform in shape, smooth, brown to black colour, 1-4 seeded.

Specimen collected: Mangalm dam catchment area, Palakkad.

***Dalbergia latifolia* – D.1 09 MP (809)**

Tree, 18m heigh, 2m at base, stem erect with crown of spreading branches, braches glabrous, bark smooth.

Leaves: imparipinnate, alternate, 10.5-23cm long, (18.5cm, 11cm, 10.5cm, 23cm, 12.5cm, 19cm, 16.5cm, 18cm, 20.5cm, 22cm, 15cm, 14cm, 13.5cm); leaflets alternate, rarely subopposite, orbicular to broadly obovate, entire, obtuse to emarginated at apex, rarely acute, shortly cuneate to rounded at base, some leaflets have oblique base, coriaceous, glabrous, glaucous beneath, distal one always larger than others, lateral veins 6-7 pairs, ascending; petiolules glabrous, 0.5-0.9cm long; rachis glabrous, slender, straight, 5-18.5cm long.

Fruits: Pods in corymbose panicles, oblong to oblong- lanceolate, flat, indehiscent, coriaceous, glabrous, obtuse at apex, abruptly pointed at apex, narrowed at base in to a stalk, coriaceous, sparingly veined over the seed, seed compressed, oval to slightly reniform, smooth, brown to black coloured.

Specimen examined: Near nellipathy forest station, on the way to chittoor dam site, Goolikadavu, Attappady, Palakkad.

Dalbergia latifolia – D.1 10 MP (810)

Tree, 10m high, 1m girth at base, bark smooth, stem erect with crown of spreading branches, glabrous.

Leaves: imparipinnate, alternate, 10.5 – 22 cm long; leaflets 3-9 numbers, usually 7, rarely 3 and 9, alternate, rarely subopposite, orbicular to broadly obovate, entire, shortly cuneate, rounded at base, rarely oblique base, obtuse to emarginated at apex, rarely acute at apex, entire, coriaceous, glabrous, glaucous beneath, distal one always larger than others, lateral veins 6-7 pairs, ascending; petiolules glabrous, 0.3-0.9cm long; rachis slender, straight, glabrous, 6.5-18cm long

Fruits: Pods in corymbose panicles, fasciated on old woods below the upper leaves, oblong to lanceolate, flat, indehiscent, coriaceous, sparingly veined over the seed, 1-3 seeded, seeds compressed, slightly reniform, obtuse at apex, narrowed at base in to a stalk, seeds smooth, brown to black coloured.

Specimen examined: Chittoor, Goolikadavu, Attappady.

Dalbergia latifolia – D.1 11 PDP (811)

Tree, 8m high, 0.7m girth at base, branches crowned, glabrous, bark smooth.

Leaves: imparipinnate, alternate, 10-23cm long (17.5cm, 17cm, 13.5cm, 12cm, 14.5cm, 10cm, 16cm, 23cm, 21cm, 18cm, 20.5cm, 15cm, 23cm, 18.5cm, 19cm); glabrous; leaflets 3-9 numbers, usually 5 and 7, rarely 9, alternate, subopposite, orbicular to broadly obovate, entire, obtuse to emarginated at apex, rarely acute, shortly cuneate to rounded at base, coriaceous, glabrous, glaucous beneath, distal one always larger than others, lateral veins 6-7 pairs, ascending; rachis straight, glabrous, 7.5-17cm long, petiolules 0.4-1cm long, glabrous

Dalbergia beddomei Toth.

Unarmed liana; stem cylindrical 5-50 cm girth, smooth; branches white spotted, rarely hooked; branchlets twining or straggling, brown pubescent when young.

Leaves: Imparipinnate, alternate, 5.0-21.0 cm long; rachis 4.0-17.0 cm long, pubescent; leaflets 5-11, rarely 9 or 14, ovate, elliptic or obovate, glabrous and white green above, yellowish brown pubescent beneath, 1.0-7.0 x 0.5-4.0 cm; rounded, acute, or slightly notched at apex, acute, obtuse or rounded at base; petiolulous 0.2-0.5 cm long, stout, pubescent; stipules 0.4-0.8 cm long, ovate or ovate-oblong, pubescent, caducous.

Inflorescence: Axillary and terminal, much branched pubescent panicles, 5.0-10.0 cm long; peduncles, branches and pedicels pubescent, pedicels about 0.2 cm long, pubescent; bracts 0.2-0.4 cm long, ovate, acute, pubescent; bracteoles 0.2-0.3 cm long, ovate, acute, pubescent, persistent. Flowers yellowish-white with a tinge of green, 0.6-1.0 cm long; calyx 0.4-0.8 cm long, campanulate, pubescent, 5-lobed, upper two lobes sub-connate, prominently reticulately veined inside; corolla of 5 petals; vexillum long clawed, 0.4-0.7 cm long, ovate, cleft at apex, glabrous; wings 0.5-0.8 cm long, sub-connate, oblong; keels 0.4-0.6 cm long; stamens 9, monoadelphous, staminal column 0.4-0.6 cm long, longitudinally split above, slightly pubescent; filaments scabrid; anthers stellate; pistil 0.5-0.6 cm long, stipitate, prominently hairy along the upper suture, 1-3 ovuled; style slender, glabrous, stigma

minute, capitate. Pods 3.5-5.0 x 1.0-2.0 cm, oblong, 1-2 seeded, shortly stalked, reticulately veined, acute with a short apiculae at apex, narrowed at base; seeds reniform, compressed.

Habitat: Evergreen forests, along the sides of mountain streams.

Flowers: January to February.

Fruits: March to May.

Distribution: Silent Valley (Palakkad) in Kerala, Thirunelveli in Tamil Nadu.

Materials collected: Silent Valley National Park (Palakkad), Injakuli in Mundanthurai (Thirunelveli, Tamil Nadu).

***Dalbergia horrida* (Dennst.) Mabberley**

Armed liana, 10-80cm girth; with occasionally prostrate branches; main stem stout, branched or unbranched thorns or hooks; branchlets sub-bifarious, pubescent, green when young.

Leaves: Imparipinnate, alternate, 4.0-17.0 cm long; rachis 3.0-15.0 cm long, pubescent or glabrous; leaflets 9-17, rarely 5 or 21, pubescent when young, glabrous or sparsely pubescent when mature; 0.5-3.5 x 0.5-2.0 cm, elliptic, oblong, obtuse; truncate or emarginated at apex; cuneate or rounded at base; petiolulous about 0.1 cm long, slightly pubescent or glabrous; stipules minute pubescent, caducous.

Inflorescence: Axillary, in cymose panicles towards the apex of branches, 5.0-15.0 cm long; peduncles, branches and pedicels rusty pubescent; bracts minute, oblong, obtuse; bracteoles about 0.1 cm long, oblong, obtuse. Flowers white, 0.3-0.4 cm long; calyx campanulate, 0.1-0.2 cm long, pubescent, 5-lobed, upper two lobes subconnate, acute; corolla with 5-clawed petals; vexillum long clawed, about 0.2 cm long, ovate, oblong or obovate, emarginated at apex, reticulately veined on the blade; wings-upto 0.2 cm long, shortly clawed, oblong, prominently single nerved, obtuse at apex; keels about 0.2 cm long, shortly clawed, auricled, reticulately veined; stamens 9, monadelphous, staminal column 0.2-0.3 cm long, split along the upper side, glabrous; pistil about 0.2 cm long, pubescent; ovary stipitate; style short, obscure; stigma blunt. Pods 4.0-9.0 x 1.5-2.0 cm, velvety pubescent when young, almost glabrous when mature, thick above the seeds, finely reticulately veined through out, 1-3 seeded, shortly stalked, obtuse at apex, acute at base; seeds 0.5-1.0 x 0.3-0.5 cm reniform, compressed.

Habitat: Deciduous forests upto 1000 m.

Flowers: November to February

Fruits: December to April.

Distribution: Almost through out in Kerala, Tamil Nadu, Karnataka, Goa and Maharashtra in India.

Materials collected: Methumganam, Bevinge, Mulleria, Parappa (Kasargod); Kurichiyad (Wayanad); Aralam Wildlife Sanctuary (Kannur); Karuvarakundu, KFRI Sub-Centre, Nilambur (Malappuram); Mukkali, Attapady, Parambikulam Wildlife Sanctuary, Dhoni Hills (Palakkad); Palappilly, Chimmony (Thrissur); Vandanam (Alapuzha); Thannithode (Pathanamthitta); Thenmala (Kollam); Bonaccord (Thiruvananthapuram).

***Dalbergia latifolia* Roxb.**

Tree, 10-30m high, bark flaking, main trunk upto 1 m in diameter, stem erect with a crown of spreading branches, branchlets sub-bifarious, sometimes pendulous, glabrous.

Leaves: Imparipinnate, alternate, compact on twiggy branchlets, 10-28 cm long; rachis straight, glabrous, 7-21 cm long, slender, glabrous; leaflets 3-11, often 5-9, broadly ovate, sub-orbicular rarely sub-ovate, glabrous above, pale or sub-glaucascent beneath, 2.0-9.0 x 1.5-8.0 cm, rounded, obtuse, emarginate or rarely subacute at apex, obtuse, rounded or cuneate at base; petiolulous 0.4-1.0 long, slender, stipules small cauducous.

Inflorescence: Axillary or extra-axillary, lax, divaricate, corymbose panicles, 4-12 cm long, usually produced from the axils of fallen leaves; bracts minute, bracteoles membranous, cauducous; flowers white or slightly yellowish, scented, 0.5-1.0 cm long; pedicels filiform, 0.2-0.4cm long; calyx companulate, 0.4-0.6cm long, slightly puberulous when young, 5-lobed with upper two lobes subconnate; corolla with 5 distinctly clawed petals; vexillum 0.4-0.6cm long, sub orbicular, reflexed, emarginate at apex, reticulate veined; wings 0.4-0.5cm long, auricled, reticulate veined, acute at apex with often reflexed margins, keels 0.4-0.6 cm long, auricled, reticulate veined, subconnate at apex, stamens 9, monoadelphous, staminal column 0.3-0.8 cm long, longitudinally split above the filaments, free in their upper third, indistinctly shorter and longer; pistil 0.2-0.4 cm long, glabrous, ovary 3-5 ovuled, stipitate, style slender; stigma capitate. Pods 4.5-12 x 1.0-3.0 cm, strap-shaped, reticulate veined through out, obtuse at apex, with or without a short apicalte, 1-3 or rarely 4 seeded; seeds 0.6-0.8 x 0.4-0.5 cm, reniform, compressed, brown.

Habitat: Deciduous forests, about 50-1000 m.

Flowers: January to March, rarely August to October.

Fruits: November to February, occasionally in June.

Distribution: Almost through out in Kerala, almost through out India.

Materials collected: Kurichiyad (Wayanad); Aralam Wildlife Sanctuary (Kannur); Parappa (Kasargod); Karuvarakundu, KFRI Sub-Centre, Nilambur (Malappuram); Attapady, Chemmanampathy, Parambikulam Wildlife Sanctuary, Mangalam Dam (Palakkad); Vazhani, Palappilly (Thrissur); Kottappara (Eranakulam); Chinnar Wildlife Sanctuary (Idukki).

***Dalbergia pseudo-sisso* Miq.**

Habit: liana, 10-100 cm girth at base, bark rough, branches twining, glabrous.

Leaves: imparipinnate; alternate, 5.0-25.0 cm long, rachis 4.0-10.0 cm long, glabrous, leaflets 2 or 5, usually 3, glabrous, thin, oblong, 5.0-14.0 x 2.0-7.0 cm, slightly narrowed from beyond the middle to the cuneate or rounded base, widely rounded and abruptly cuspidate and retuse at apex; petiolulous 0.4-0.9 cm long, slightly puberulous; stipulate, stipules caducous, lateral veins-6-8 pairs.

Inflorescence: lax, axillary or terminal panicles with sub-corymbose branchlets, 5.0-17.0 cm long, grey-downy; bracts ovate, caducous, puberulous; bracteoles slender, subulate. Flowers creamy white, 0.7-0.9 cm long; pedicel 0.2-0.3 cm long, grey downy; calyx 0.4-0.6 cm long, puberulous externally, 5-lobed, lobes sub-equal, upper

two sub-connate, wide triangular, the lowest narrow; corolla with 5, slender long clawed petals; vexillum 0.4-0.6 cm long, irregularly orbicular-oblong with reflexed limb; keel 0.4-0.6; wings 0.4-0.6 cm long, oblong, retuse, auricled; stamens 10, monadelphous, staminal column 0.3-0.4 long, split above; filaments free in their upper third, alternately shorter and longer, slender; pistil 0.5-0.7 cm long, slender; ovary densely pubescent, stipitate, 1-2 ovuled, style 0.1-0.2 cm, slender, incurved, stigma minute. Pods 6.0-12.0 x 1.0-2.0 cm, broadly ligulate, obtuse, firmly coriaceous, puberulous, reticulately veined especially opposite the seeds; seeds 1.0-2.0 x 0.4-0.5 cm, oblong, reddish brown, shiny.

Habitat: Along stream sides up to 1000 m.

Flowers: February to April.

Fruits: April to June.

Distribution: Thekkuthodu, Thannithode (Pathanamthitta), Bonaccord (Thiruvananthapuram) in Kerala; Mundanthurai, Thirunelveli in Tamil Nadu.

Dalbergia sissoides Grah.

Trees, 7-25 m high; bark smooth, sometimes peeling off from the main trunk; branches spreading; branchlets sub-bifarious, sometimes sub-pendulous.

Leaves: Imparipinnate, alternate, 7 cm long; yellowish-green when young; rachis 6-22 cm long, glabrous, rarely puberulous; leaflets 5-7, rarely 9 or 10, elliptic, ovate or obovate rarely sub-orbicular, glabrous on both sides, green above, glaucacent beneath, pale green when young, dark green when mature, 2.0-9.0 x 1.5-5.0 cm; acute, obtuse or rarely emarginate at apex, more or less cuneate at base; petiolulous 0.4-1.0 cm long, glabrous.

Inflorescence: In large panicles 5.0-15.0 cm long; terminal or in the axils of upper leaves. Flowers milky-white, fragrant, 0.5-0.9 cm long; pedicels 0.3-0.5 cm long; bracts minute, bracteoles membranous, caducous; calyx 0.4-0.6 cm long campanulate, 5-lobed, slightly puberulous when young; lobes sub-equal, the upper two sub-connate, lower three sub-equal, oblong, obtuse or sub-acute; corolla with 5 petals, clawed except the vexillum; vexillum 0.4-0.6 cm long, cuneate, reflexed, reticulately veined, wavy along the margins; wings 0.5-0.7 cm long, obovate, clawed, reticulately veined, obtuse or rounded at apex; keels, 0.5-0.8 cm long, auricled, reticulately veined, oblique or blunt at apex; stamens 9 or rarely 10, monadelphous, staminal column 0.4-0.6 cm long, split along the upper side; filaments free in their upper third, sub-equal, glabrous; anthers blunt or cleft at apex; pistil up to 0.6 cm long, glabrous; ovary long stipitate, glabrous, 1-4 ovuled; style slender, narrowed into the ovary; stigma small. Pods 3-8 x 0.8-1.8 cm, reticulate veined through out, firmly coriaceous, 1-3 or rarely 4-seeded, gradually cuneate towards the base, acute at apex with often a short apiculae; seeds 0.4-0.8 x 0.3-0.5 cm, reniform rarely elliptic, compressed, smooth.

Habitat: Deciduous forests and plantations, from sea level upto 1000 m.

Flowers: December-April.

Fruits: March to August, sometimes persistent through out the year.

Distribution: Almost through out in Kerala, Tamil Nadu and Karnataka.

Materials collected: Kurichiyad (Wayanad); Aralam Wildlife Sanctuary (Kannur); Karuvarakundu, KFRI Sub-Centre, Nilambur (Malappuram); Attapady,

Chemmanampathy, Parambikulam Wildlife Sanctuary, Mangalam Dam (Palakkad); Peechi, Vazhani, Vilangannur, KFRI, Palappilly (Thrissur); Kottappara (Eranakulam); Chinnar Wildlife Sanctuary (Idukki); Kolathupuzha (Kollam); Thannithodu (Pathanamthitta).

Dalbergia spinosa Roxb.

Errect or climbing shrub, stem 10.0-40.0 cm girth, branches stiff, straight, hooked or with pungent thorns; branchlets subhorizontal, short, glabrous.

Leaves: Imparipinnate, alternate, 1.5-8.0 cm long; scattered on the branches or crowded at the nodes of thorny branchlets; rachis 1.0-6.5 cm long, glabrous; leaflets 5-17, mostly 8-13, ovate, obtuse or rounded, glabrous, 0.4-1.6 x 0.2-1.0 cm, obtuse or retuse at apex; rounded at base; petiolulous 0.1 cm, glabrous.

Inflorescence: Congested racemes, corymbs or panicles, 2.5-3.5 cm long; peduncles and branches glabrous; pedicels 0.2-0.3 cm long, glabrous; bracts and bracteoles ovate, minute, deciduous.

lanceolate or sub-orbicular, concave, obtuse, covering the lower third of calyx.

Flowers white 0.3-0.4 cm long; calyx 0.2 cm long, campanulate, glabrous, 5-lobed, lobes ovate, obtuse, except the narrowly lanceolate, acute lowest; corolla with 5 shortly clawed petals; vexillum 0.3-0.4 cm long, elliptic, oblong or obovate-retuse, glabrous; wings 0.3 cm long, cuneate or truncate at base, obtuse at apex; keels 0.2 cm long; cuneate at base, obtuse or rounded at apex. Stamens 10 in two bundles of 5 each or rarely monadelphous with the staminal column split along the upper side; staminal column 0.3 cm long, glabrous; filaments 0.2 cm long; pistil 0.2-0.3 cm long, pilose or glabrous; ovary subglobose, 1-2 ovuled, stipitate; style short, narrowed towards apex; stigma capitate. Pods 2.5-3.5 x 1.0-1.5 cm, reniform, -falcate, thickened, rigidly coriaceous, long stipitate, 1 or rarely 2 seeded; seeds 0.4-0.7 x 1.2-1.5 cm, reniform, falcate compressed, 0.3-0.8 x 0.2-0.4 cm.

Habitat: In dry deciduous forests

Flowers: May to June.

Fruits: July to September.

Distribution: Travancore forests in Kerala, Tamil Nadu, Karnataka, Maharashtra, Sunderbans in West Bengal.

Materials collected: Mundanthurai in Thirunelveli forests (Tamil Nadu).

Dalbergia volubilis Roxb.

Liana with longitudinally rigid stem, 10-90 cm girth, with rough irregular bark; branches weak sub-bifarious; branchlets green, glabrescent when young.

Leaves: Imparipinnate, alternate, 4-25 cm long; rachis 3.0-21.0 cm long, glabrescent; leaflets 5-17, mostly 7-11, rarely 17, ovate, ovate-oblong or obovate, often slightly emarginated, mucronulate, bright green above, paler beneath, glabrous, 1.3-7.5 x 0.8-6.0 cm; acute, obtuse, rounded or emarginated apex; acute, obtuse or rounded at base;

petiolulous 0.2-0.5 cm long, brown, pubescent or glabrous; stipules 0.2-0.5 cm long, ovate, lanceolate, caducous.

Inflorescence: Axillary or terminal, corymbose, brown pubescent panicles, 2.0-8.0 cm long; peduncles, branches and pedicels brown pubescent; bracts 0.2-0.3 cm long, ovate, caducous, ciliate; bracteoles 0.1-0.2 cm long lanceolate or ovate, persistent, glabrous; pedicels 0.2-0.3 cm long, slightly pubescent. Flowers white with bluish or pinkish tinge, 0.5-1.0 cm long; calyx 0.5-0.6 cm long, campanulate, pubescent, 5-lobed, lobes ovate or lanceolate, the upper two lobes sub-connate; corolla of 5-clawed petals; vexillum long clawed, 0.4-0.5 cm long, sub-orbicular, reflexed, glabrous, reticulate veined, emarginated at apex; wings 0.4-0.5 cm long, oblong, auricled, reticulate veined, reflexed along the margins; keels 0.3-0.4 cm long, connate towards apex, oblong, sub-auricled, reticulate veined; stamens 9 or 10, monadelphous, staminal column 0.3-0.4 cm long, longitudinally split along the upper side, glabrous; filaments almost half the length of the staminal column; pistil 0.3-0.5 cm long, pubescent, ovary stipitate, 1-4 ovuled; styles slender; stigma capitate, minute. Pods 4.0-9.0 x 2.0-3.0 cm, stipitate, reticulated through out, 1-4 seeded, acute or obtuse with often a short apicula at apex; seeds 0.5-1.0 x 0.3-0.5 cm, reniform, compressed.

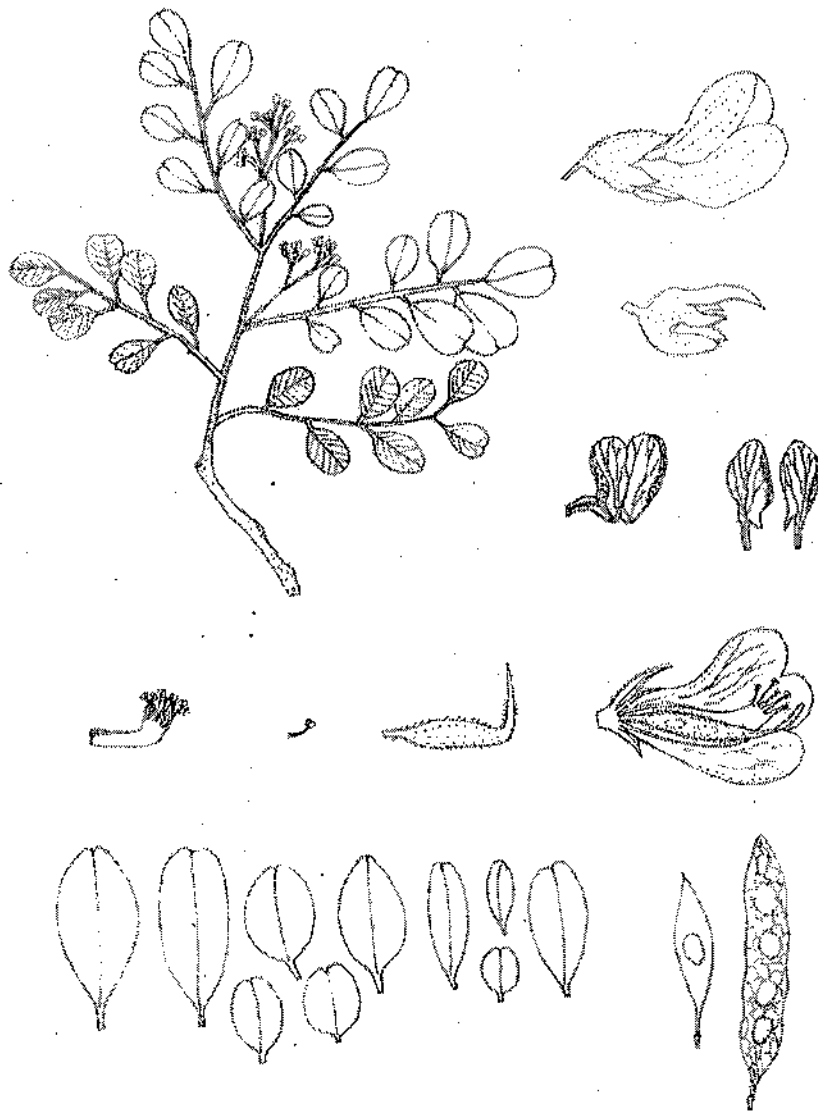
Habitat: Deciduous forests from sea level upto 1000 m; common in forest plantations, along the forest road sides *etc.*

Flowers: November to July.

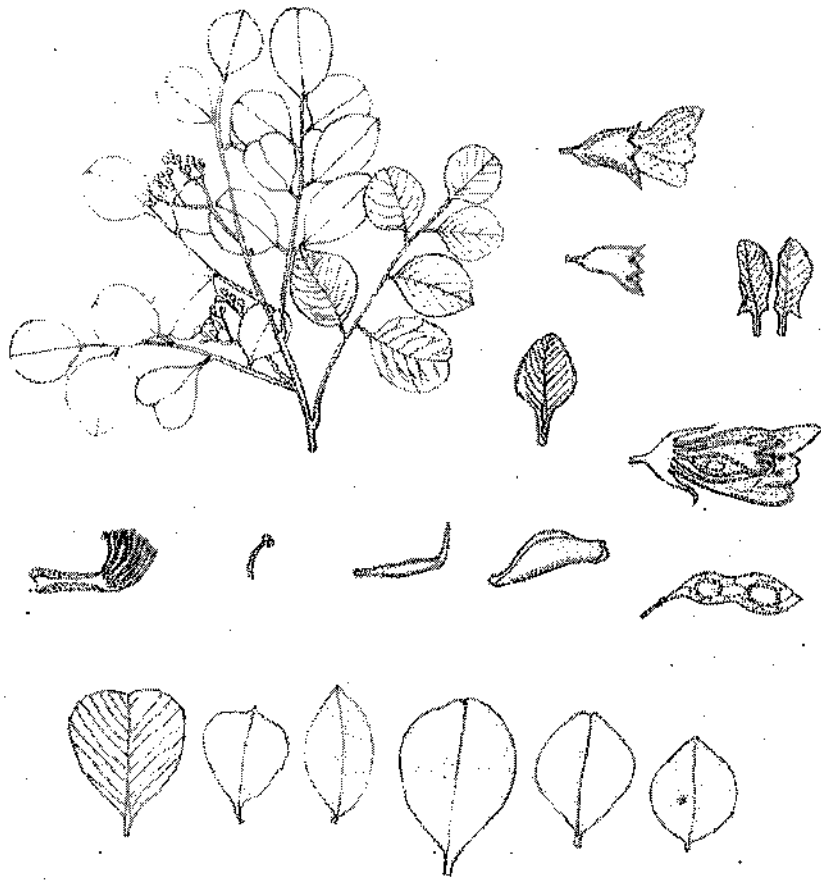
Fruits: February to June.

Distribution: Almost through out in Kerala and almost through out India.

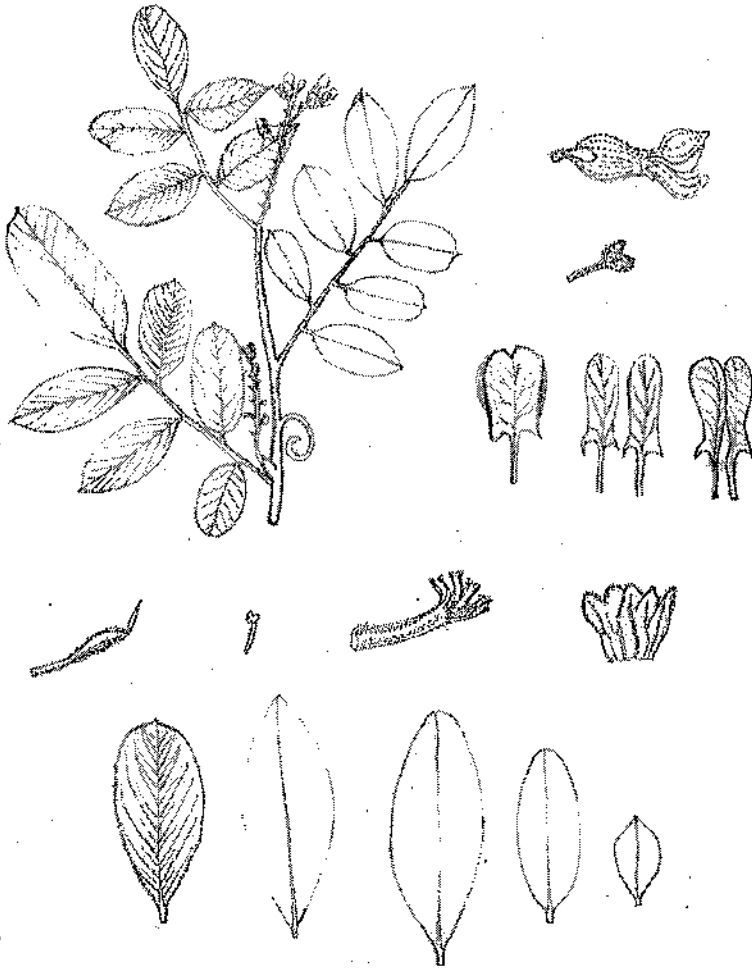
Materials collected: Parappa, Methunganam, Mulleria (Kasargod); Kurichiyad, Tholpetty (Wayanad); Aralam Wildlife Sanctuary (Kannur); Karuvarakundu, KFRI Sub-Centre, Nilambur (Malappuram); Attapady, Pothundy, Parambikulam Wildlife Sanctuary, Mangalam Dam (Palakkad); Kuthiran, Peechi, Vilangannur, KFRI, Palappilly (Thrissur); Kottappara (Eranakulam); Thenmala (Kollam); Thannithodu, Naduvethumoozhi, Pampa (Pathanamthitta); Bonaccord (Thiruvananthapuram).



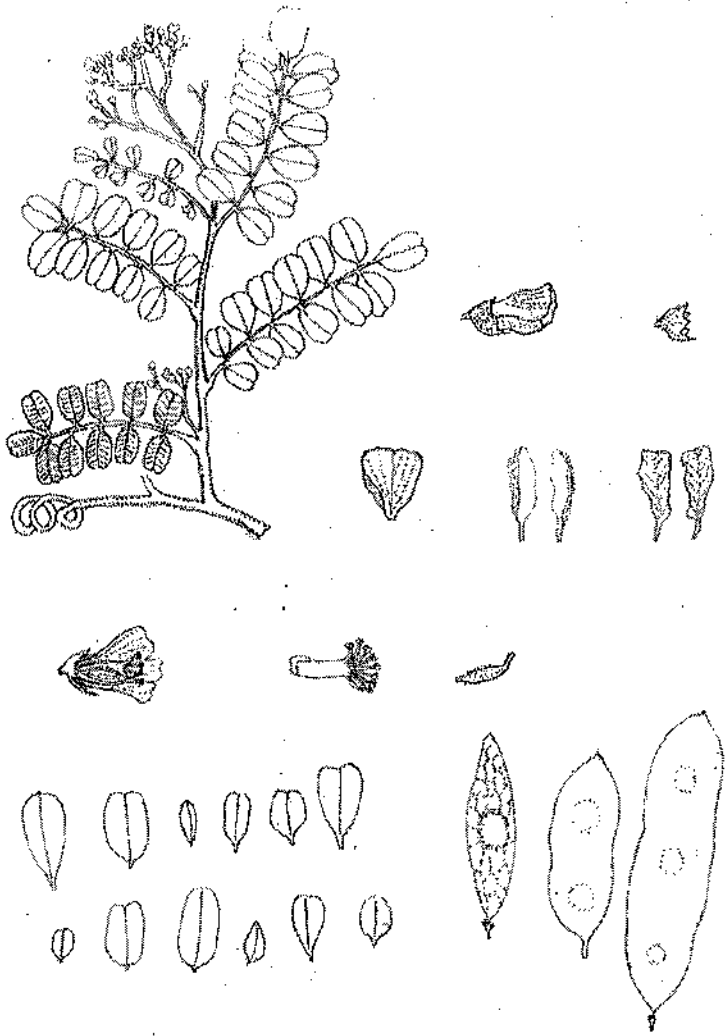
Dalbergia lanceolaria



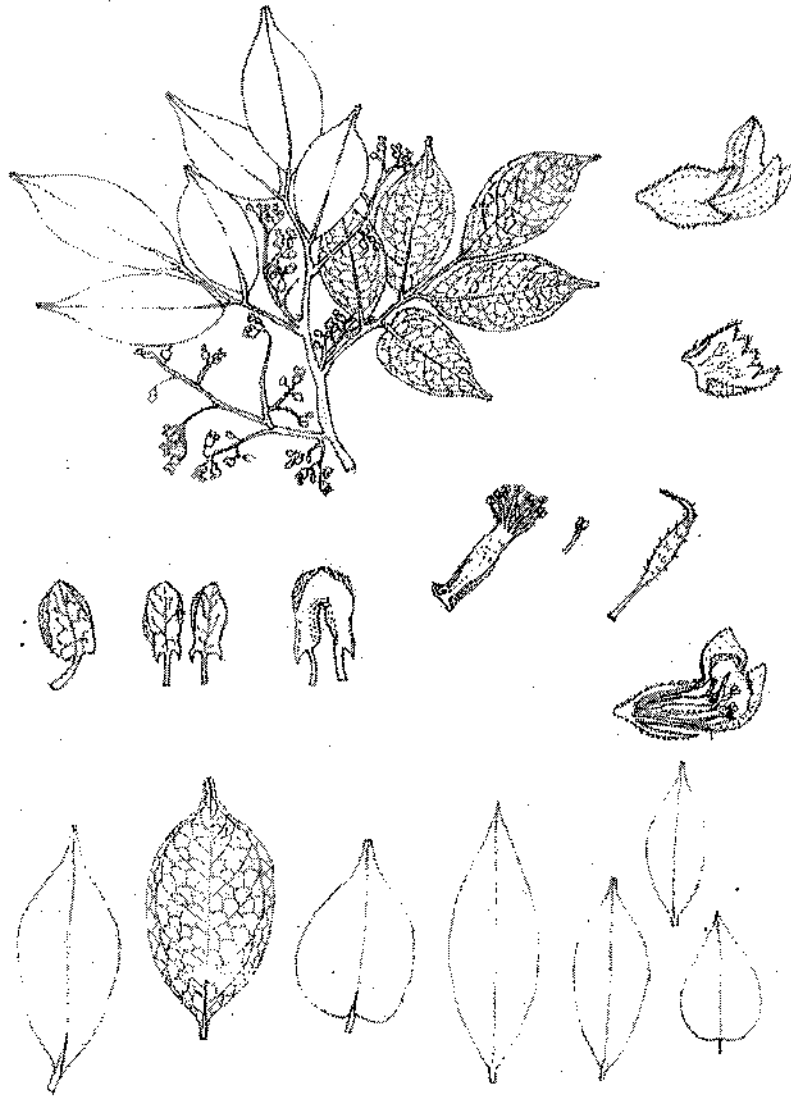
Dalbergia latifolia.



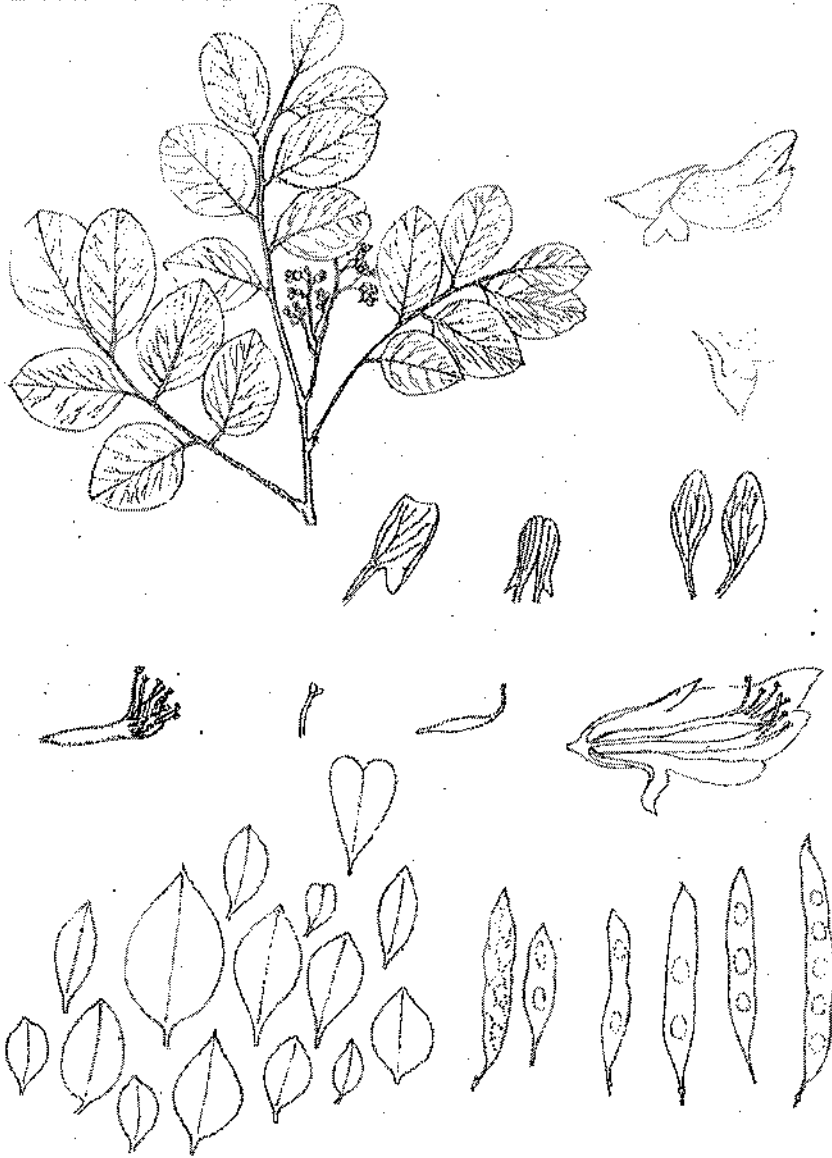
Dalbergia beddomei



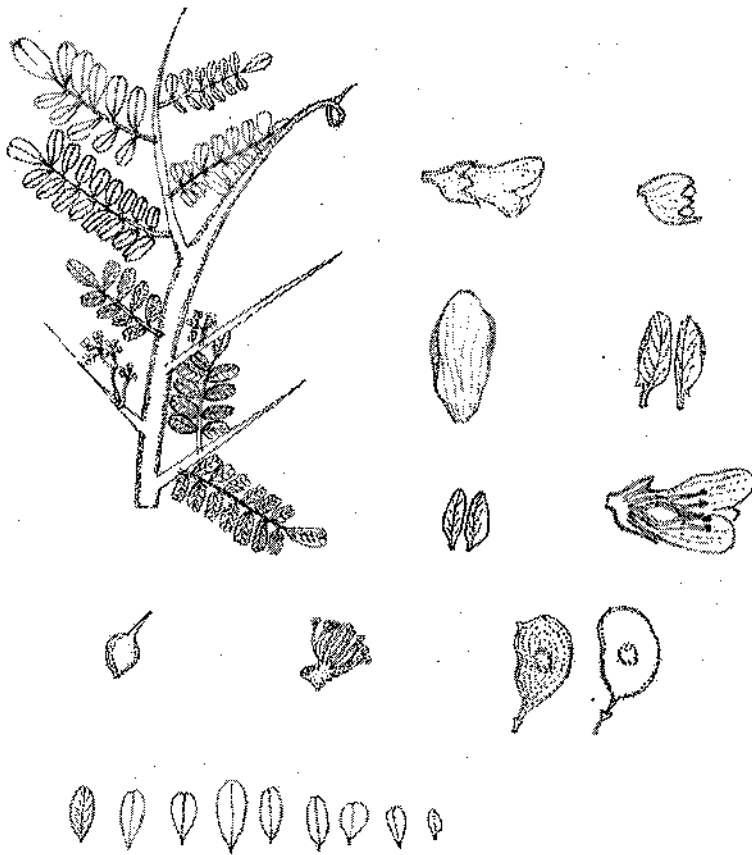
Dalbergia horrida



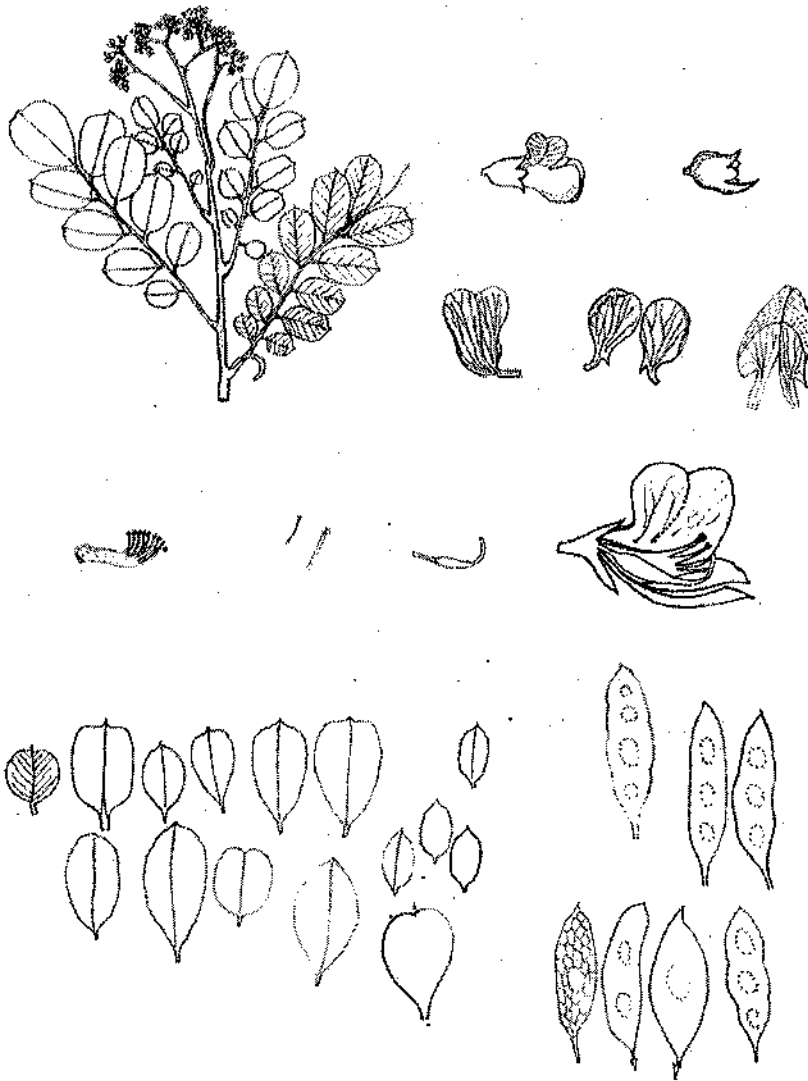
Dalbergia pseudo-sisso



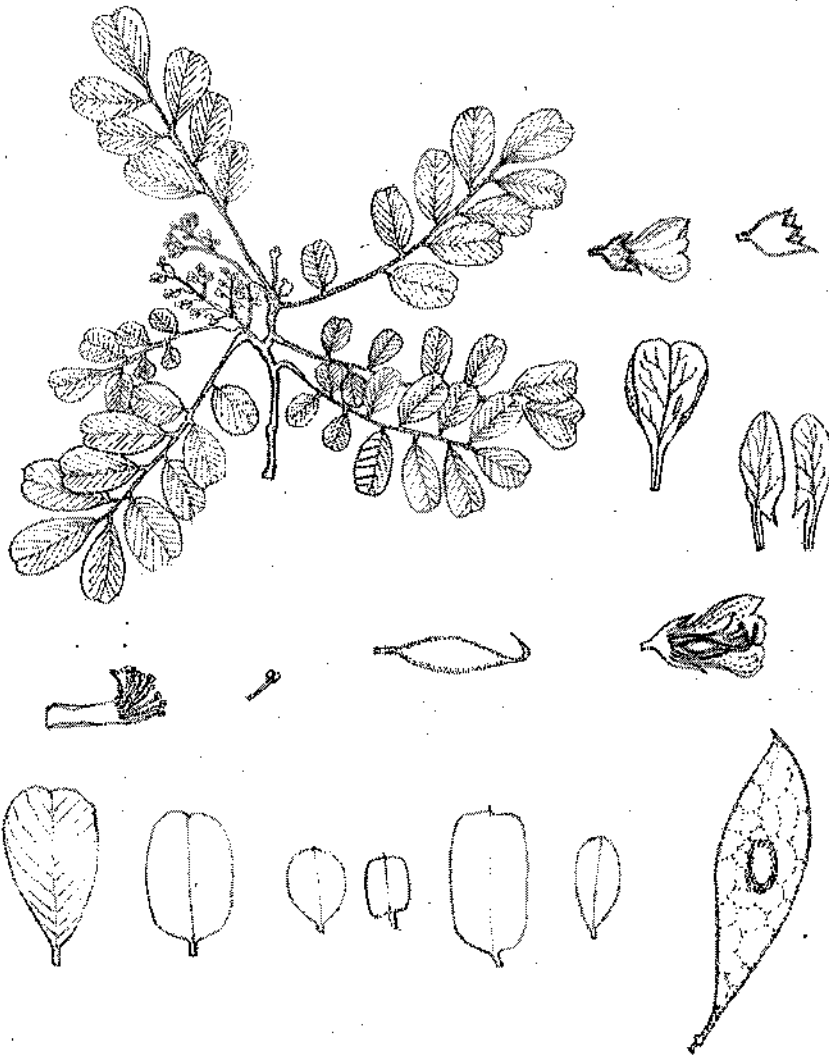
Dalbergia sissooides



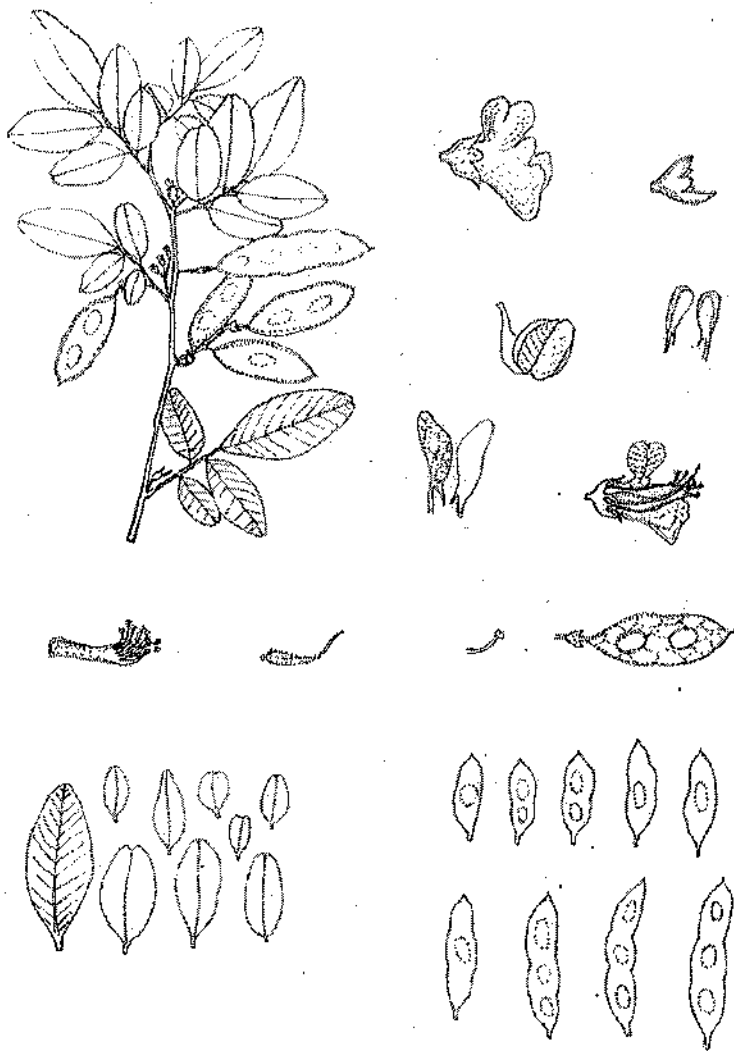
Dalbergia spinosa



Dalbergia volubilis



Dalbergia paniculata



Dalbergia rubiginosa



Dalbergia cantenatensis

Dalbergia lanceolaria



Habit

KFRI



Twig with inflorescence

KFRI



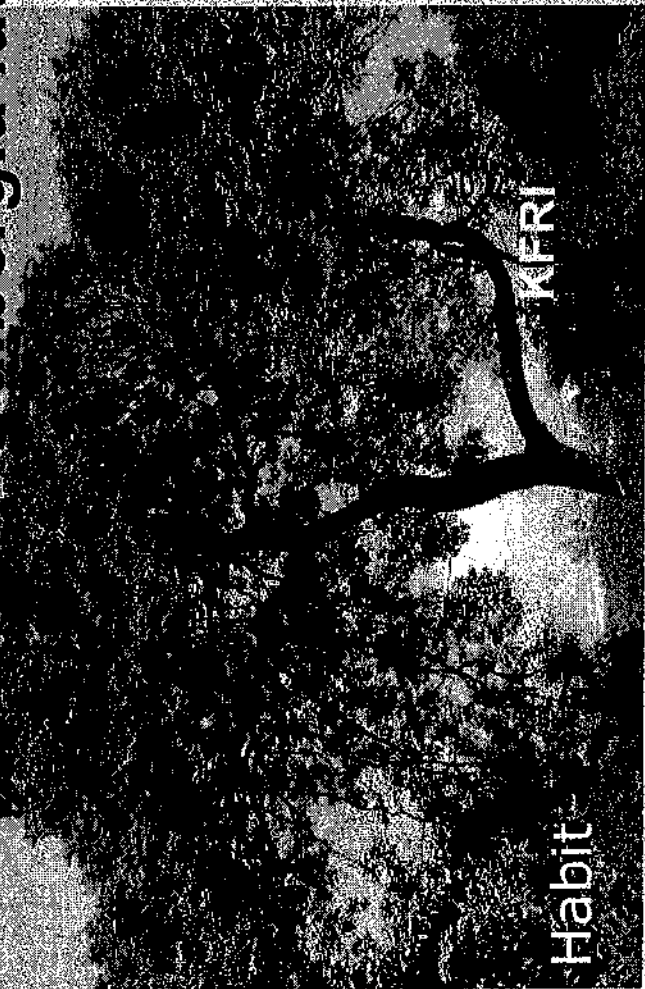
An inflorescence

KFRI



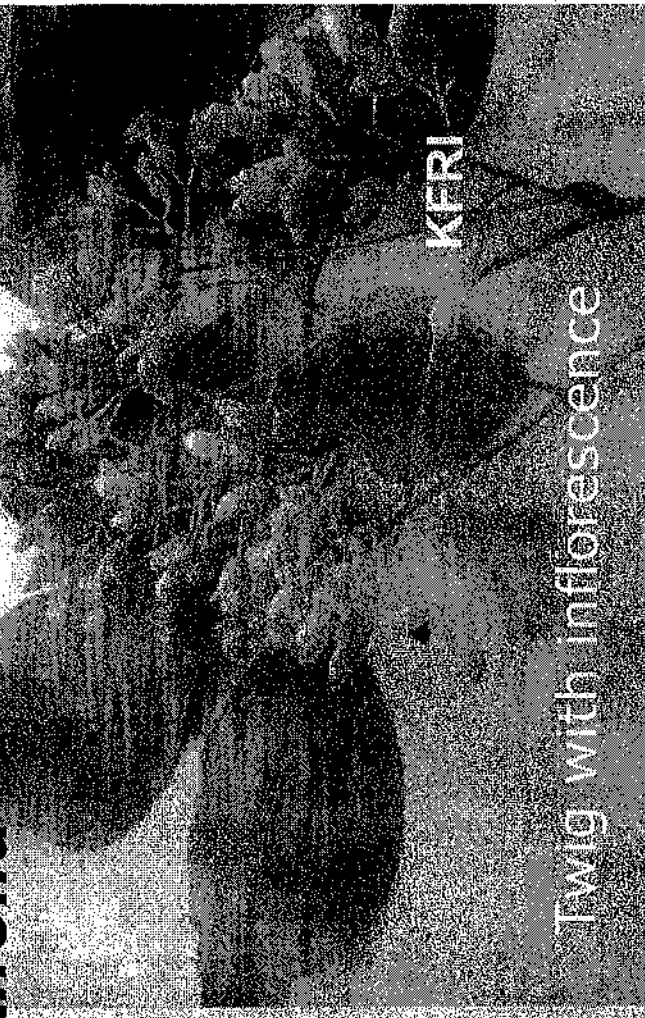
Flowers

KFRI



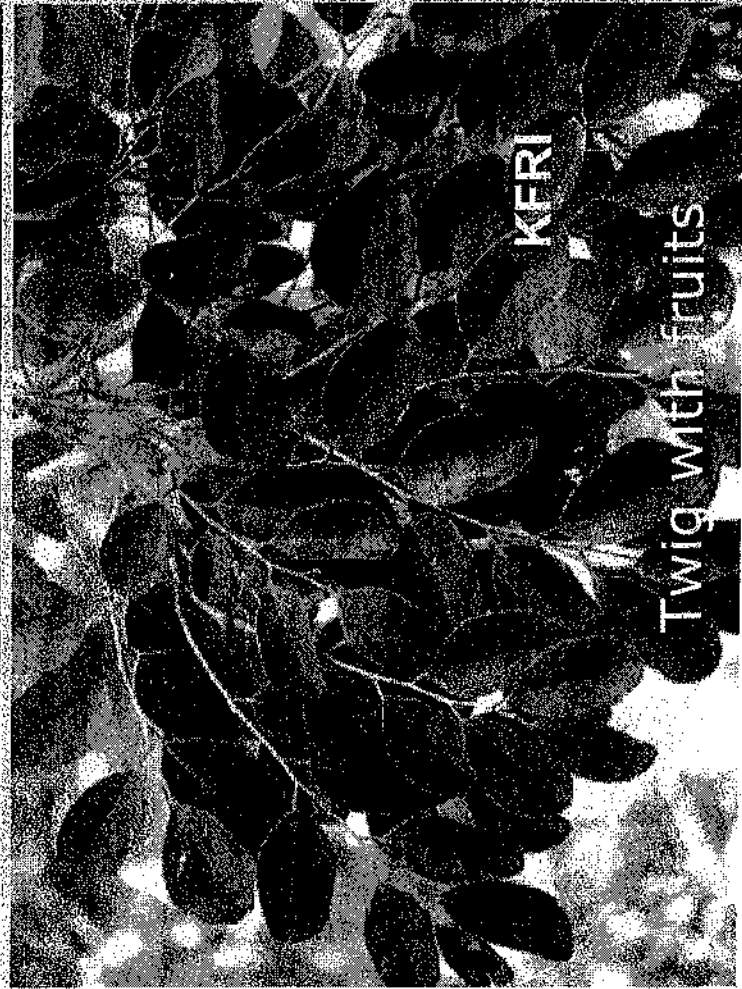
Habit

KFRI



Twig with inflorescence

KFRI



Twig with fruits

KFRI



Fruits

KFRI

Dalbergia beccomel

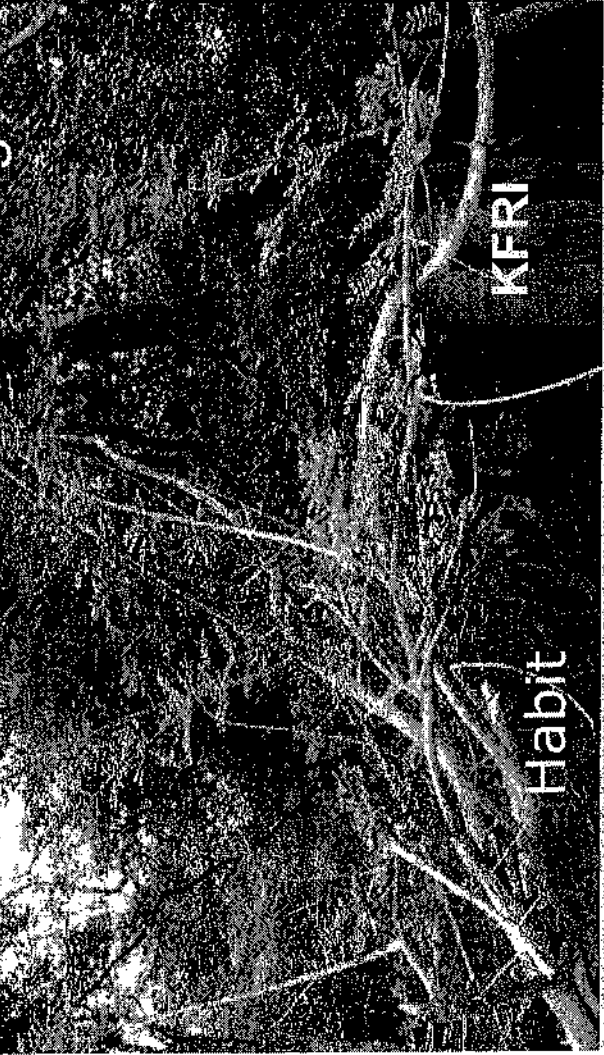
a. Habit

b. Climbing stem with tag of KFRI

c. Twig with inflorescence

d. Twig with fruit





Habit

KFRI



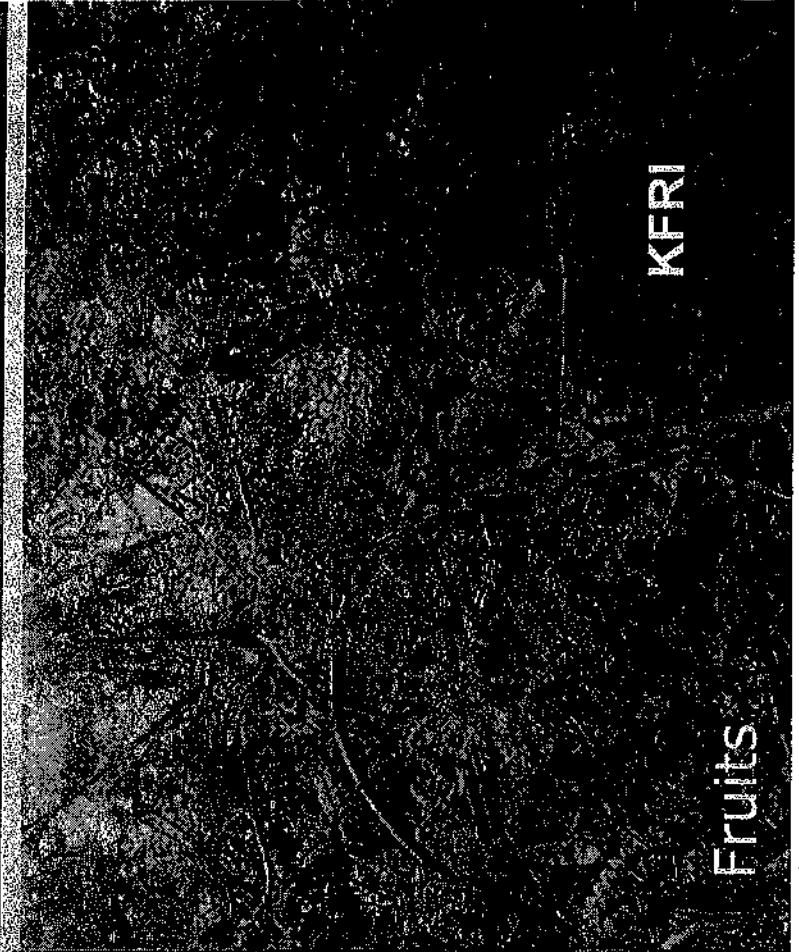
Twig with inflorescence

KFRI



Flowers

KFRI



Fruits

KFRI

Planting for productivity



KFRI

Habit

Twig with inflorescence



KFRI

Flowers

Fruits

Planting for productivity

Daipeigia voiubinis



Climbing stem

KFRI



Twig with flowers

KFRI



Inflorescence

KFRI



Fruits

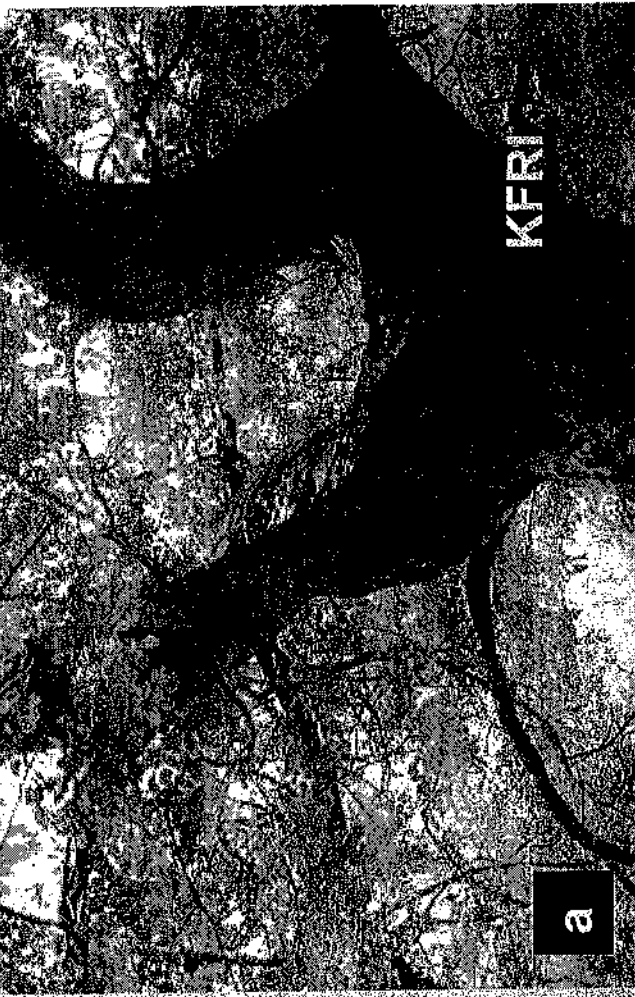
KFRI

Dalbergia paniculata

a. Habit

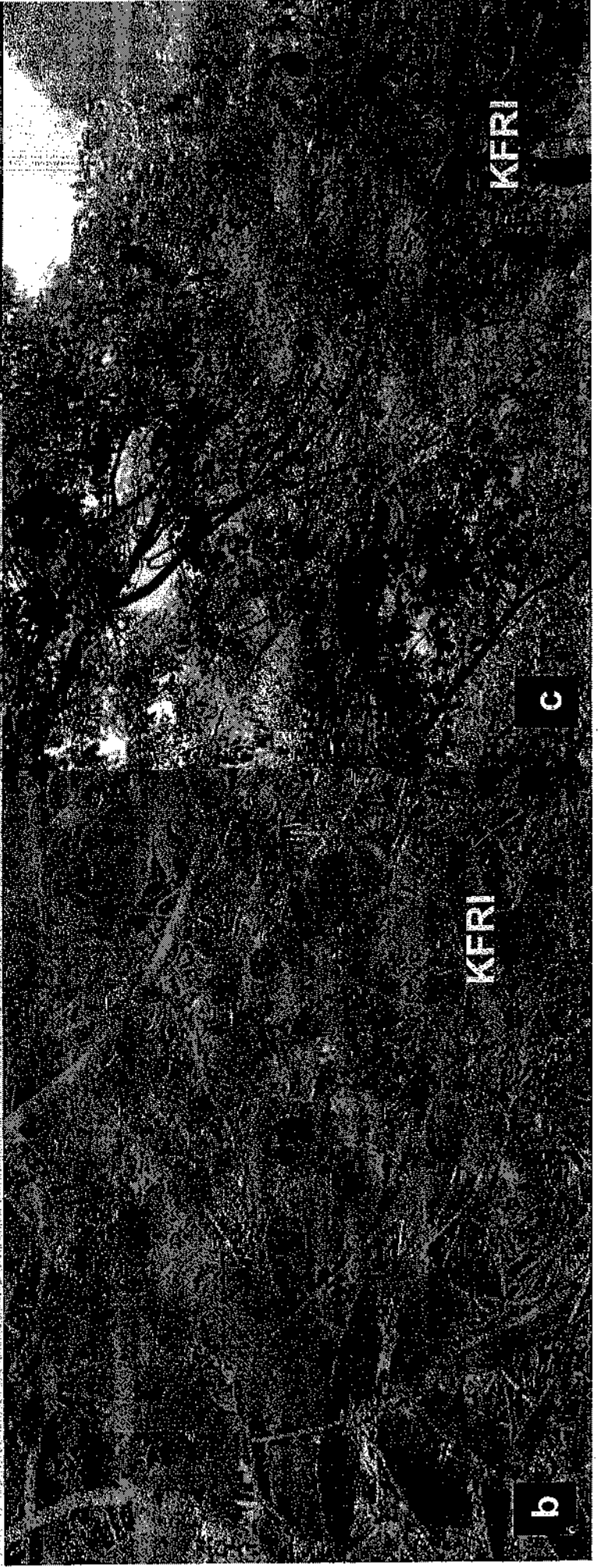
b. Leaves

c. Twig with fruits



KFRI

a



KFRI

b

KFRI

c



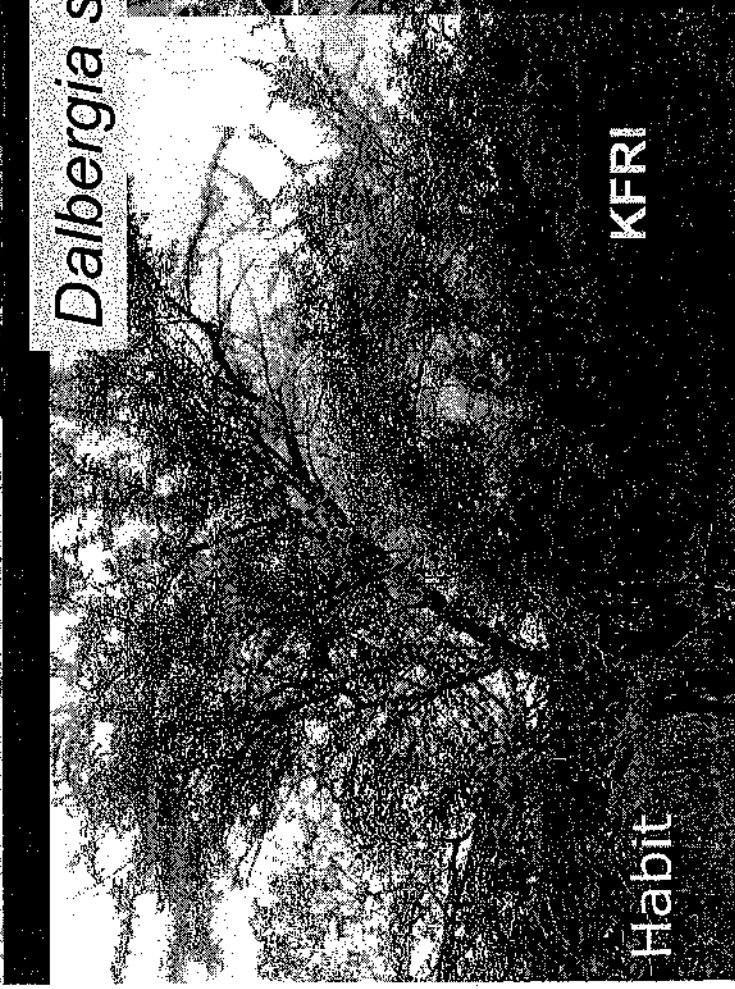
Habit

KFRI



Leaves

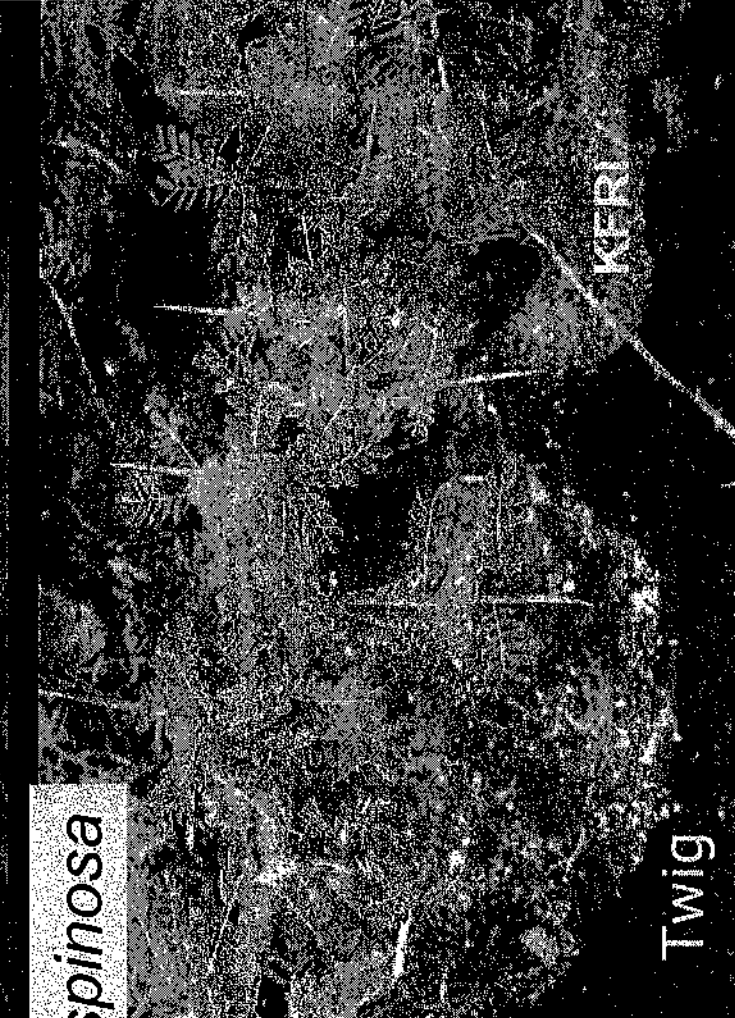
KFRI



Habit

KFRI

Dalbergia spinosa



Twig

KFRI

Dalbergia candenatensis

a. Twig with inflorescence

b. Flowers

