FURTHER WORK ON DEVELOPMENT OF BASIC STRESS FOR LOCAL TIMBER SPECIES

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Synopsis

Determination of basic stresses, on local species of timber, is one of the essential primary needs required for the use of local timber in laminated roof trusses, formwork structures with confidence and economy.

The investigation report deals with the development of basic stresses for fifteen species of timber as well as a review of all previous work to develop basic stresses for fiftyfive species of timber.

1. Introduction

Timber engineering is defined as the design, manufacture and erection of timber and timber based components for which it is required to make calculations of stress under load, to use graded material and to employ quality control during manufacture. Without development of timber engineering timber structures such as laminated roof trusses, timber formwork and timber false work cannot be designed and constructed with any degree of confidence or with economy. Although it is possible to "guess" basic stresses by comparing values of density and modulus of elasticity with those of the species given in CP 112(1), this is not a very commendable practice and some dramatic failures of timber roof trusses that took place in the recent past are well known to structural designers. One of the first steps in development of timber engineering is the development of basic stresses for local timber species. Some work is already done towards this end (2,3,4,5,6) but there is considerable scope for more work. This paper reports results of such an investigation conducted recently.

All the previous research work so far on development of basic stresses for local timber was done at Forest Department by Jayanetti (2) and at University of Moratuwa by Anketell and Hensman (4), Dr. Fernando and Perera (3), Somaskandan and Sooriyakumaran (5) and Maduranayagam and Sriyanandarajah (6). Only Jayanetti and Dr. Fernando and Perera here published their results. In this paper all the previous results as well as those of this investigation are reduced to one table for green stresses and one table for dry stresses, on the same lines as in CP112, for easy reference by designers.

2. Experimental Programme

Experimental programme consist of conducting tests on small clear specimens of timber as specified in B.S.373(7) to determine important strength properties of fifteen species of timber. Species of timber considered were:— HALMILLA, BURUTHA, PALU, KIRIKON, WEWARANA, E.SELIGNA, E.MICROCORYS, KEERIYA, KEMPUS (imported timber) KAPUR (imported timber), HELENBA, THIMBIRI, ETA-THIMBIRI, TEAK and MADAN.

Strength properties considered were Bending, Compression parallel to grain, Compression perpendicular to grain, Shear parallel to grain, Mean modulus of elasticity and Minimum modulus of elasticity.

Main objectives of this investigation were as follows :

(a) To obtain strength properties of fifteen species of timber mentioned above;

(b) To review previous work done in Sri Lanka to evaluate strength properties and develop basic stresses for green and dry conditions for timbers tested so far;

(c) To give necessary statistical data so that further test results can be incorporated with the previous work to generate more reliable values for basic stresses.

3. Analysis of Experimental Results

Process of reduction of raw results from tests obtain basic stresses is well documented (2,8) hence it is only briefly explained here.

Characteristic value of any strength property is obtained by using the formula,

$f_c = f_m - x6 -$ where f_m = mean value;
f_c = characteristic value;
6 = standard deviation.

Values of x is given below.

Property	Probability determining minimum	x(computed using statistical techniques)
1. Bending	1 in 100	2.33
2. Compression parallel to grain	1 in 100	2.33
3. Compression perpendicular to grain	1 in 40	1.96
5. Mean modulus of elasticity	—	—
6. Minimum modulus of elasticity	1 in 100	2.33

Since the changes in moisture content result in change in strength properties to compare the strength properties of different species it is necessary that their strength values should be given at equilibrium moisture content which varies from 12% to 18%. In Sri Lanka 15% can be taken as the standard value (2). A mathematical relationship has been derived by Wilvan (8) to determine the strength values at various moisture contents below fibre saturation point, expressed as :

$$\text{Log } S = \text{Log } S_p + K(M_p - M)$$

when S = strength property corresponding to m.c. of M;

S_p & M_p = strength property and moisture content respectively of fibre saturation point.

This relationship is confirmed by Somaskandan and Sooriyakumaran (5) in their investigation using 200 specimens of HORA, timber; and K values were found to be:

Bending -3.5
Compression parallel to grain -5.0
Compression perpendicular to grain -1.2
Shear parallel to grain -2·5
Modulus of elasticity -1.7

Wherever appropriate density correction was also done.

Basic stress is obtained by dividing the corrected characteristic strength by a reduction factor (8) given below :—

	Property	*Reduction Factor*
1.	Bending	2.25
2.	Compression parallel to grain ..	1.40
3.	Compression perpendicular to grain ..	1.20
4.	Shear parallel to grain	2.25
5.	Mean modulus of elasticity ..	1.00
6.	Minimum modulus of elasticity ..	1.00

Dry stresses refer to stresses at 15% m.c. while green stresses refer to stresses at fibre saturation point.

Basic stresses derived so far in Sri Lanka do not comply strictly with accepted international practice (8) and only limited amount of tests were done. Large number of tests are required to cover the influence of variables like conditions of growth, age, heredity, and region where trees are found. It is the usual practice to obtain specimens from various locations of the tree from several trees of different age, and from trees in different zones in the country. Although it is not possible to conduct tests in such an extensive manner in Sri Lanka we should not resort to the convenient way of testing only a few specimens. Hence we should publish data in such a way, so that later investigations can develop a better value for basic stress using this result as well as previous results. To facilitate this process, along with the basic stresses obtained, the corresponding corrected values of fc, o and n (number for tests) are also given in Table 1 and 2.

4. Review of Previous Work on Strength Properties of Local Timber

In some of the previous investigations(4,5,6) basic stresses have not been found. Using their test results basic stresses were derived here.

Some of the species tested by Jayanetti [3] were also tested by Anketell & Hensman [4] and in the present investigation(9). Unfortunately results do not show close agreement. As standard deviation, mean value and number of specimens were not given in Jayanetti's paper [3], it is not possible to incorporate those values to evolve new values for basic stresses. Generally stresses obtained were higher than those recommended by Jayanetti. In such cases, Jayanetti's values were recommended since any error is on the conservative side. In species where only Jayanetti's values are available, those were recommended.

It is not possible to use the results published by Dr. Fernando and Perera as moisture content values are not available.

Table 3 gives the dry basic stresses of timber tested so far while Table 4 gives the corresponding green basic stresses.

5. Conclusions

Following conclusions can be drawn from this investigation :—

(a) Basic stresses were derived for further species and those values can be used as in CP112;

(b) Basic stresses were derived for further species, fifty-five in all, by reduction of the results of previous investigations.

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TABLE I

DRY BASIC STRESSES OF TIMBER

(ALL UNITS IN N/mm²)

Species	Bending Modulus of Rupture				Compression Parallel to Grain				Compression Perpendicular to Grain				Shear Parallel to Grain				Modulus of Elasticity	
	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Mean $\times 10^3$	Minimum $\times 10^3$
1. Halmilla ...	60.81	136.82	3.165	10	32.19	45.67	4.11	10	4.91	5.89	0.872	10	4.99	11.23	1.31	10	28.08	16.52
2. Madan ...	21.09	47.47	17.49	10	22.34	51.28	4.82	10	4.82	5.79	1.034	10	5.21	11.72	1.05	10	33.86	13.72
3. Timbiri ...	30.54	68.72	12.40	10	32.22	45.12	2.31	10	5.03	6.04	1.592	10	6.09	13.70	0.97	10	19.76	13.08
4. Eta-Timbiri	52.19	117.43	11.65	10	20.80	29.12	2.03	10	4.28	5.14	1.074	10	3.88	8.73	2.08	10	32.50	21.44
5. Kirikon ...	41.99	94.47	15.99	10	29.75	41.93	3.48	10	4.02	4.82	0.687	10	7.45	16.76	0.36	10	23.94	12.82
6. Teak ...	35.92	80.82	6.84	10	28.77	40.27	1.57	10	4.25	5.10	0.619	10	4.47	10.05	0.63	10	16.11	12.38
7. E. Microcorys	63.72	143.36	18.49	10	48.04	67.25	6.65	10	—	—	—	—	6.50	14.62	2.14	10	42.62	25.17
8. Helemba ...	28.49	64.11	18.61	10	19.41	27.18	8.11	10	—	—	—	—	4.68	10.54	1.97	10	19.63	8.66
9. Keeriya ...	70.92	159.58	14.92	10	62.66	87.72	2.12	10	—	—	—	—	7.46	16.78	1.66	10	24.78	18.92
10. Palu ...	69.32	155.96	28.18	10	62.19	87.07	4.65	10	18.28	21.93	3.29	10	9.94	22.37	2.95	10	29.72	20.44
11. Burutha ...	23.54	52.97	40.14	10	39.97	55.96	3.97	10	7.28	8.73	1.88	10	7.82	17.59	1.10	10	34.04	8.93
12. Seligna ...	34.59	77.83	23.83	10	26.19	36.67	8.47	10	—	—	—	—	3.54	7.97	2.40	10	24.50	15.89
13. Wewarana ...	48.14	108.33	8.58	10	38.62	58.22	2.74	10	5.5	6.60	0.38	10	4.71	10.59	0.69	10	25.54	17.10
14. Kapur ...	41.48	93.34	4.62	10	34.96	48.93	1.73	10	3.48	4.17	0.21	10	4.34	9.77	0.58	10	71.1	26.28
15. Kempus ...	56.48	127.08	17.90	10	52.05	72.86	4.0	10	6.83	8.20	0.62	10	4.81	10.83	1.47	10	36.27	8.14

TABLE 2

GREEN BASIC STRESSES OF TIMBER

(ALL UNITS IN N/mm²)

Species	Bending Modulus of Rupture				Compression Parallel to Grain				Compression Perpendicular to Grain				Shear Parallel to Grain				Modulus of Elasticity	
	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Basic Stress	f_c	σ	n	Mean $\times 10^3$	Minimum $\times 10^3$
1. Halmilla ...	40.32	90.72	2. 1	10	16.94	23.72	2.13	10	4.33	5.19	0.77	10	3.78	8.5	0.99	10	23.59	13.76
2. Madan ...	15.63	35.16	12.96	10	14.89	20.85	.21	10	4.31	5.17	0.92	10	4.17	9.38	0.84	10	26.58	11.75
3. Timbiri ...	22.62	50.90	9.19	10	21.49	30.08	1.54	10	4.49	5.39	1.78	10	4.87	10.96	0.79	10	15.45	11.18
4. Eta-Timbiri ...	35.14	79.06	7.85	10	11.36	15.90	1.11	10	3.78	4.54	0.95	10	2.96	6.65	1.58	10	27.16	17.91
5. Kirikon ...	28.32	63.72	10.79	10	16.43	23.0	1.91	10	3.55	4.26	0.56	10	5.68	12.79	0.28	10	20.02	10.72
6. Teak ...	24.02	54.05	4.58	10	15.46	21.65	0.84	10	3.75	4.50	0.55	10	3.40	7.64	0.48	10	13.45	10.33
7. E. Microlorys ...	44.65	100.47	12.96	10	28.71	40.19	3.97	10	—	—	—	—	5.05	11.36	0.95	10	40.14	21.21
8. Helemba ...	20.72	46.61	13.53	10	12.49	17.49	5.22	10	—	—	—	—	3.71	8.34	1.56	10	16.7	7.37
9. Keeriya ...	50.95	114.63	10.72	10	39.39	55.15	1.33	10	—	—	—	—	5.87	13.2	1.30	10	21.01	16.05
10. Palu ...	40.43	90.96	16.43	10	40.03	56.04	2.99	10	16.27	19.53	2.93	10	7.88	17.72	2.34	10	25.28	17.39
11. Burutha ...	15.47	34.81	16.38	10	20.56	28.78	2.04	10	6.41	7.69	1.66	10	5.89	13.25	0.83	10	28.31	7.43
12. Seligna ...	23.44	52.74	16.15	10	14.53	20.34	4.70	10	—	—	—	—	2.71	6.09	1.83	10	20.5	13.29
13. Wewarana ...	37.93	85.35	6.76	10	27.72	38.81	1.82	10	4.91	5.89	0·34	10	4.16	9.37	0.61	10	20.16	14.02
14. Kapur ...	29.0	65.25	3.23	10	20.78	29.09	1.03	10	3.08	3.70	0.19	10	3.37	7.58	0.42	10	59.9	22.14
15. Kempus ...	37.90	85.27	12.01	10	28.19	39.47	2.17	10	6.03	7.23	0.54	10	3.66	8.24	1.12	10	30.29	6.80

TABLE 3

DRY STRESSES OF TIMBER AT 15% MOISTURE CONTENT

(Units are in N/mm^2)

	Species	Bending	Comp. Parallel to Grain	Comp. Perpend. to Grain	Shear Parallel to Grain	Modulus of Elasticity Mean $x10^3$	Modulus of Elasticity Mini. $x10^3$
1.	ARIDDA Campnosperma zeylanica	15.19	13.12	2.62	1.726	8.28	4.49
2.	BURUTHA Chloroxylon swietenia	28.99	22.09	6.56	4.49	13.81	8.63
3.	ETAMBA Mangifera zeylanica	20.09	17.95	5.18	3.45	12.08	7.94
4.	HORA Diptero carpus zeylanicus	22.09	17.26	4.83	3.45	20.02	8.28
5.	KATABODA Cullenia ceylanica	19.83	14.84	3.80	1.52	9.66	6.21
6.	KOS Artocarp s heterophyllus	22.78	19.83	6.21	2.62	11.73	6.90
7.	RUBBER WOOD Hevea brasiliensis	20.71	16.57	5.87	4.14	8.63	6.21
8.	TEAK Tectona brandis	26.92	22.09	5.52	2.62	12.43	7.94
9.	TIMBIRI Diospyros enbryopteris	20.71	16.57	4.14	2.76	10.01	6.90
10.	WELANG Pterospermum canascens	23.47	20.71	6.21	4.28	12.43	7.59
11.	KITHUL Garyota urens	71.33	70.28	43.17	10.27	29.16	22.80
12.	KAHATA Careya arborea	50.00	45.50	12.92	6.22	17.67	10.20
13.	COCONUT Cocus nucifera	38.93	65.42	19.33	6.80	19.98	11.42
14.	KOHOMBA Azadirachta indica	25.77	30.00	6.32	4.84	12.37	9.08
15.	PANAKKA Pleurostylia opposita	33.64	34.43	16.50	4.97	13.05	9.57
16.	LIYAN Homalium zeylanicum	46.22	31.92	13.08	6.71	17.29	11.36
17.	DAWATA Carallia brachiata	40.00	33.90	13.16	4.98	25.08	12.25
18.	GURENDA Celtis cinnamomea	44.66	35.36	8.58	5.73	16.39	11.98
19.	DAWAL KURUNDU Neolitsea cassia	46.22	31.64	8.167	5.60	15.28	12.95
20.	SURIYA MARA Albizzia odoratissima	29.15	35.71	10.91	6.22	18.36	10.20
21.	DOMBA Caoiphyllum inophyllum	26.84	38.57	8.67	5.20	19.03	8.50
22.	KOLON Adina cordifolia	46.02	40.71	12.67	6.44	13.10	6.45
23.	MANGO Mangifera indica	30.93	21.57	6.58	4.12	11.62	4.42
24.	GINISAPU Michaelia champaca	27.68	17.5	3.08	2.58		11.67
25.	Alastoniya	37.11	20.27	5.49	5.24	15.60	7.4
26.	GODAPARA Dillenia Retusa	21.35	40.06	10.14	6.34	17.00	8.76
27.	KETAKELLA Brideiia moon	51.24	37.90	9.56	5.89	18.90	13.92
28.	KOSGONNA Artocardus nobilis	27.23	25.49	6.93	5.49	9.81	5.47

TABLE 3

DRY STRESSES OF TIMBER AT 15% MOISTURE CONTENT

(ALL UNITS ARE IN N/mm^2)

	Specie)	Bending	Comp. Parallel to Grain	Comp. Perpend. to Grain	Shear Parallel to Grain	Modul of Elasticity Mean x10²	Minimum x10³
29.	GONNA	12.59	10.81	5.26	3.09	4.76	1.29
30.	MIHIRIYA ... ... Bordonia ceylanica	27.69	25.49	6.20	5.26	16.80	12.10
31.	THALANG ... ... Litsea gardneri	39.09	28.31	4.55	3.43	14.50	8.93
32.	PELAN ... ... Kurrimia zeylanica	31.04	32.61	10.09	5.12	26.70	12.05
33.	LUNUMIDELLA ... ... Melia dubia	14.61	15.60	4.05	2.84	6.40	4.92
34.	THITHA-ETA	41.35	25.52	13.80	3.56	17.10	13.20
35.	DUN ... ... Dona Congestiflora	40.54	29.37	6.56	4.56	22.665	11.715
36.	HANA PALANDE ... ... Termi alia paruiflora	38.68	36.03	12.28	5.18	21.1	12.1
37.	MILLA ... ... Vitex pinnata	12.82	23.55	7.96	5.83	38.66	18.58
38.	DYAPARA	28.81	31.17	19.64	8.13	19.92	10.10
39.	BLACK WOOD ... ... Acacia malanxylon	42.50	33.16	—	5.49	23.65	14.15
40.	CYPRUS	25.00	19.52	—	3.88	9.34	5.66
41.	ETA TH MB RI ... ... Diospyros cocarpa	47.655	19.90	4.28	5.06	28.76	22.95
42.	HALAMBA ... ... Hitragyna Tubulosa	22.03	12.07	—	2.36	11.30	13.19
43.	HALMILLA ... ... Berrya cordifolia	57.53	29.90	4.91	5.33	27.42	23.33
44.	HELAMBA ... ... Mitragyna Tubulosa	37.20	22.0	—	5.29	17.39	9.16
45.	KEERIYA ... ... Acacia ceucophloea	54.39	44.62	—	6.68	20.90	14.66
46.	KIRIKON ... ... Aglaia roxburgehiana	44.97	28.93	4.02	8.21	19.54	10.94
47.	MADAN ... ... Syzygium cumini	22.7	19.12	4.825	4.48	24.78	11.47
48.	MAHOGANY ... ... Swietenia macrophylla	—	17.08	—	4.8	15.81	10.88
49.	MICROCORYS	48.45	35.74		5.71	32.36	26.32
50.	PALU ... ... Manikkara vexandra	62.62	50.60	18.28	9.13	26.68	17.50
51.	SELIGNA	35.17	24.12	—	4.09	22.85	14.29
52.	UBBERIYA ... ... Carallia calycina	60.73	37.02	—	6.37	26.97	16.16
53.	WEWARANA ... ... Alseodaphne semecarpifolia	40.64	29.66	5.50	4.89	25.22	16.01
54.	KAPUR	41.48	34.96	3.48	4.34	71.10	26.28
55.	KEMPUS	56.48	52.05	6.83	4.81	36.27	8.14

TABLE 4

GREEN STRESSES OF TIMBER AT 25% MOISTURE CONTENT

(ALL UNITS IN N/mm^2)

	Species	Bending	Comp. Parallel to Grain	Comp. Perpend. to Grain	Shear Parallel to Grain	Modulus of Elasticity Mean x10^2	Modulus of Elasticity Minimum x 10^3
1.	ARIDDA ... ... Campnosperma zeylanica	12.43	9.66	1.726	1.52	7.25	4.14
2.	BURUTHA ... ... Chloroxylon swietenia	22.78	16.57	4.14	3.45	12.08	7.59
3.	ETAMBA ... ... Mangifera zeylanica	17.95	13.12	3.45	2.42	10.35	6.90
4.	HORA ... ... Diptero carpus zeylanicus	17.60	12.08	3.45	2.48	11.39	7.25
5.	KATABODA ... ... Cullenia ceylanica	19.83	14.84	3.80	1.52	9.66	6.21
6.	KOS ... ... Artocarpus Heterophyllus	18.64	13.81	3.80	2.21	10.85	6.56
7.	RUBBER WOOD ... ... Hevea brasiliensis	16.57	11.74	4.14	3.45	7.59	5.52
8.	TEAK ... ... Tectona brandis	22.09	15.19	3.80	2.14	10.35	6.90
9.	TIMBIRI ... ... Diospyros embryopteris	16.57	11.39	3.45	2.28	8.28	5.87
10.	WELANG ... ... Pterospermum canascens	18.64	14.5	4.14	3.45	10.35	6.56
11.	KITHUL ... ... Garyota urens	47.11	36.43	38.11	7.77	24.27	19.80
12.	KAHATA ... ... Careya arborea	38.00	31.36	20.67	5.07	14.60	8.85
13.	COCONUT ... ... Cocus nucifera	29.02	39.11	17.13	5.27	16.84	9.62
14.	KOHOMBA ... ... Azazirachta indica	19.29	15.44	5.62	3.67	10.29	7.55
15.	PANAKKA ... ... Pleurostylia opposita	25.07	20.55	14.62	3.87	11.00	8.09
16.	LIYAN ... ... Homalium zeylanicum	35.63	20.46	11.62	5.31	14.75	9.66
17.	DAWATA ... ... Carallia brachiata	30.11	17.35	11.57	3.75	12.71	10.20
18.	GURENDA ... ... Celtis cinnamomea	33.22	21.80	7.63	4.50	13.92	10.14
19.	DAWAL KURUNDU ... ... Neolitsea cassia	34.42	20.12	7.03	4.42	12.94	10.98
20.	SURIYA MARA ... ... Albizzia odoratissima	21.86	19.85	9.63	4.77	15.41	8.97
21.	DOMBA ... ... Calophyllum inophyllum	20.4	26.57	7.5	4.22	15.10	7.35
22.	KOLON ... ... Adina cordifolia	34.32	26.51	11.32	5.11	11.14	5.49
23.	MANGO ... ... Mangifera indica	23.10	12.52	5.79	3.2	9.77	3.72
24.	GINISAPU ... ... Michaelia champaca	20.59	10.16	2.71	2.0	11.89	9.78
25.	ALASTONIYA	25.97	12.15	4.87	4.07	12.18	6.24
26.	GODAPARA ... ... Dillenia retusa	15.82	26.71	9.06	5.07	12.60	7.49
27.	KETAKELLA ... ... Bridelia Moon	37.88	25.17	8.53	4.71	16.14	11.89
28.	KOSGONNA ... ... Artocarpus nobilis	20.17	16.99	6.19	4.4	7.27	4.68

TABLE 4

GREEN STRESSES OF TIMBER AT 25% MOISTURE CONTENT

(ALL UNITS ARE IN N/mm2)

	Species	Bending	Comp Parallel to Grain	Comp. Perpend. to Grain	Shear Parallel to Grain	Modulus of Elasticity	
						Mean x10^3	Mini. x10^3
29.	GONNA	3.73	6.31	4.74	2.39	3.75	1.09
30.	MIHIRIYA ... ... Gordonia ceylanica	17.07	10.93	5.43	3.86	14.54	10.00
31.	THALANG ... ... Litsea gardneri	23.90	17.50	4.04	2.69	11.13	7.56
32.	PELAN ... ... Kurrimia zeylanica	21.40	18.81	8.53	3.94	21.13	10.12
33.	LUNUMIDELLA ... ... Melia Dubia	9.72	8.28	3.57	2.15	5.20	4.10
34.	THITHA-ETA	24.37	9.35	12.06	2.57	15.24	10.77
35.	DUN ... ... Dona congestiflora	30.03	19.58	5.86	3.65	17.99	10.03
36.	HANAPALANDE ... ... Terminalia paruiflora	27.28	21.81	10.90	3.96	16.38	10.20
37.	MILLA ... ... Hitex pinnata	8.62	12.00	7.02	4.00	31.66	15.21
38.	DYAPARA	19.06	16.31	16.78	6.15	16.31	8.37
39.	BLACK WOOD ... ... Acacia malanxylon	31.48	22.11	—	4.39	20.21	12.10
40.	CYPRUS	18.51	13.01	—	3.10	7.98	4.79
41.	ETA THIMBIRI ... ... Diospyros cocarpa	32.67	11.35	3.78	3.90	23.33	19.26
42.	HALAMBA ... ... Mitragyna Turlosa	16.31	8.05	—	1.89	9.66	1.27
43.	HALMILLA ... ... Berrya cordifolia	40.26	17.68	4.32	4.16	23.12	19.76
44.	HELAMBA ... ... Mitragyna tubulosa	27.36	14.45	—	4.21	14.82	7.56
45.	KEERIYA ... ... Acci aceucophlosa	38.58	27.43	—	5.21	17.80	12.40
46.	KIRIKON ... ... Aglaia roxburghiana	31.92	17.52	3.55	6.42	16.48	9.23
47.	MADAN ... ... Syzygium cumini	16.28	12.14	4.31	3.54	21.08	9.83
48.	MAHOGANY ... ... Swietenia macrophylla	—	8.93	—	3.63	13.24	9.12
49.	MICROCORYS	34.61	22.17	—	4.49	27.38	22.35
50.	PALU ... ... Manikkara vexandra	40.93	33.02	16.27	7.26	22.74	14.74
51.	SELIGNA	24.42	14.05	—	3.17	19.48	12.17
52.	UBBEKIYA ... ... Carallia calycina	44.99	24.69	—	5.09	23.05	13.82
53.	WEWARANA ... ... Alsoddaphne semechapifolia	51.24	20.76	4.91	4.11	21.56	18.69
54.	KAPUR	29.0	20.78	3.08	3.87	59.9	22.14
55.	KEMPUS	37.90	28.19	6.02	3.66	50.29	5.80

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දේශීය දැව වර්ගවල මූලික ප්‍රත්‍යාබල නිර්ණය කිරීම, ඒ දැව වර්ග විශ්වාසයෙන් යුතුව හා අරපිරිමැස්මෙන් යුතුව ආස්තෘත වහල තාප්ප, හැඩයම් ව්‍යුහ සහ බොල් වැඩ ව්‍යුහ පිණිස පාවිච්චි කිරීම සඳහා අත්‍යවශ්‍ය මූලික අවශ්‍යතාවලින් එකකි.

දැව වර්ග පනස් පහක මූලික ප්‍රත්‍යාබල නිර්ණය කිරීම සම්බන්ධයෙන් කලින් කරණ ලද සියළු කාර්ය සමාලෝචනය කිරීම මෙන්ම දැව වර්ග පහළොවක මූලික ප්‍රත්‍යාබල නිර්ණය කිරීම, මෙම විමර්ශන වාර්තාවෙන් දැක්වේ.

உள்நாட்டு மரங்கள் அடர் கொண்ட கூரைச் சட்டகம், உருவவேலை அமைப்புக்கள், பொய்வேலை அமைப்புக்கள் போன்றவற்றிற்கு உறுதியுடனும் சிக்கனத்துடனும் பாவிப்பதற்கு இம் மர இனங்களின் மூலத் தகைப்புக்களைத் துணிதல் அத்தியாவசியமான தொருதேவையாகும்.

இந்த ஆராய்ச்சிக் கட்டுரை பதினைந்து மர வகைகளின் மூலத் தகைப்புக்களின் உருவாக்கத்தில் ஈடுபடுவதுடன் ஐம்பத்தைந்து மர இனங்களின் மூலத்தகைப்புகளின் உருவாக்கத்தில் முன்பு நடாத்திய எல்லா ஆராய்ச்சிகளையும் மீளாய்வு செய்கிறது.