



**Government of the Union of Myanmar
Ministry of Forestry
Forest Department**



**A Survey on Cane Utilization in Burma and
Testing the Methods of Propagation.**

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ကြိမ်အသုံးချရေးနှင့် စိုက်ပျိုးရေး

ဦးဌေးအောင်၊ B.Sc, (Bot.) (Mdy.), ဒု-သုတေသနမှူး

ဝိသိသ

ဒေါက်တာဉာဏ်ထွန်း? B.Sc., (Hons.) (Rgn), M.Sc. (MLU), PhD. (TUD), ဌာနမှူး
သစ်တောသုတေသနဌာန

စာတမ်းအကျဉ်းချုပ်

ဤစာတမ်းသည် ကြားဖြတ်အစီရင်ခံစာသာဖြစ်ပြီး မြန်မာနိုင်ငံတွင် ကြိမ်များအသုံးချခြင်းကို လေ့လာထားခြင်း ဖြစ်ပါသည်။ သို့သော် အိမ်နီးချင်းနိုင်ငံများ၏ စီးပွားရေးကဏ္ဍတွင် ကြိမ်သည် အရေးပါ အရာရောက်ပုံကို တတ်နိုင်သမျှ ဖော်ပြထားပါသည်။

မြန်မာနိုင်ငံတွင် ကြိမ်အမျိုးမျိုးပေါက်ရောက်သော်လည်း၊ ဒေသအခေါ်အဝေါ်များဖြင့်သာ စာရင်းပြု ရေးထားကြောင်း တွေ့ရှိရ၍၊ စာတမ်း၏ ရည်ရွယ်ချက် (၂) ခုမှာ၊ (၁) မြန်မာနိုင်ငံရှိ ကြိမ်အမျိုးမျိုးကို စုဆောင်းပြီး သိပ္ပံနည်းအရ အမျိုးခွဲခြားခြင်း သတ်မှတ်ရန်နှင့် (၂) စီးပွားရေးရှုထောင့်မှ အရေးကြီးသော ကြိမ်အမျိုးမျိုးကို စိုက်ခင်းအနေဖြင့် စိုက်ပျိုးနိုင်ရန်၊ စိုက်ပျိုးနည်းများ၊ မျိုးပွားနည်းများကို စမ်းသပ်ရန် ဖြစ်ပါသည်။

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Abstracts

This paper is an interim report on a survey of cane utilization in Burma. It also deals with the cane industries in our neighboring countries and a role played by cane in the economy of the countries. Burma has different species of cane which, up to now, are only listed with their local name. The objectives of this paper are of twofold, (1) to make a systematic collection, classification and identification and (2) to find ways and means of propagating cane which would lead to the development of proper method of plantation.

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1. Introduction

All climbing palms are collectively named Rattan. The word " Rattan" has its origin from Malaysian word "Rotan". Botanically rattan belongs to the family "Palmae" (Manckaran and Wong, 1983), (Watt, G. 1889).

Rattan have been exploited and utilized for centuries in the South East Asian countries including Burma. Corner (1966) in his National History of Palms stated, " The rattan were so invaluable to village-life that one can speak of the rattan civilization of the South East Asia as one can speak of the rattan civilization of India and the Bamboo civilization of Indo-China, China and Japan.

Rattan (cane) is grouped with the minor forest products of Burma and has high commercial potential. Studies of rattan have been made intermittently, during the last decade. Little has been done, on surveying can areas in Burma or systematic collection, identification and classification of rattan species. Burma is rich in natural resources which are more continuously exploited than, scientifically studied.

The most important use of rattan is in making furnitures through out the world. Other uses are production of walking sticks, baskets, mats, chair seats and handicrafts. In Burma cane is used as above (See Fig. 1a. 1b) but also as rope in rafting of timber and construction of bridges.

There are increases in demand for rattan furniture in the local as well as international markets. So systematic studies of cane, embracing its Botany (taxonomy, physiology) and Ecology should be made. The knowledge of propagation methods, nursery practices and plantation techniques should be acquired to insure a supply of rattans for domestic use and export to earn foreign currency.

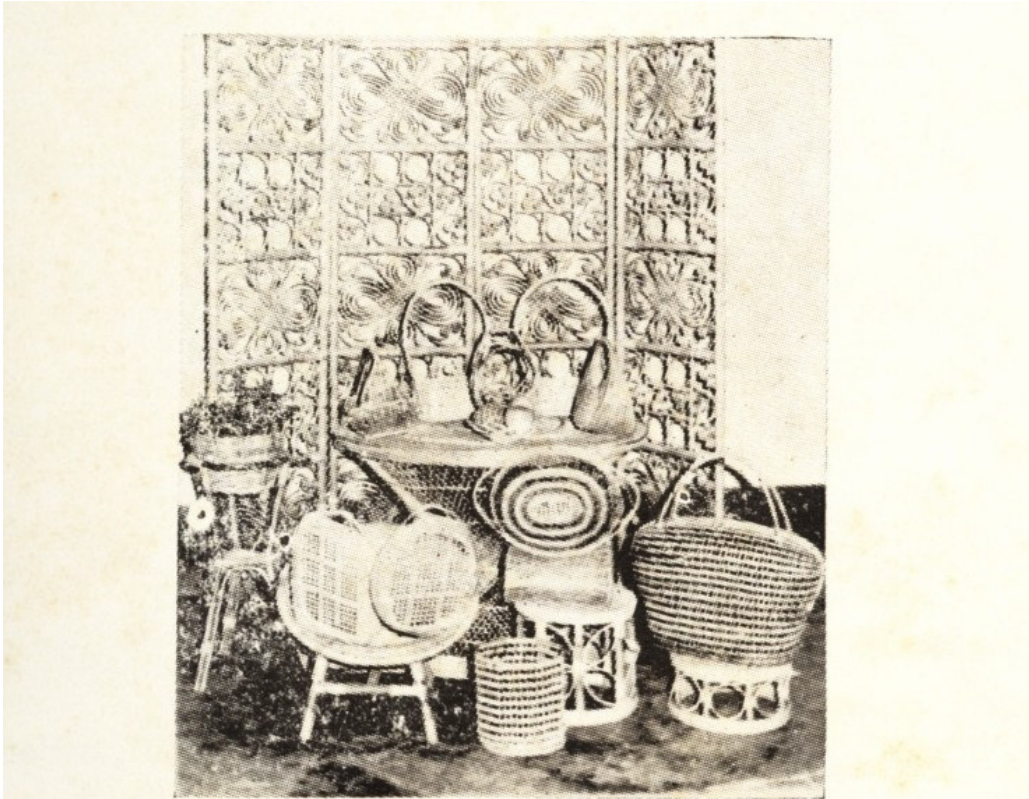


Fig. 1 a. Decorative household products from Cane.



Fig. 1 b. Furniture from Cane.

2. Literature Review

2.1 Distribution

The genus *Calamus* is widespread from West Africa to Fiji and from South China to Queensland (FAO, 1978).

A report from Bangladesh stated of 9 genera which 104 species of rattans in the Malay Peninsular (Manokaran and Wong 1983). An FAO report listed 9 genera and 316 species as follows:

Calamus (133 spp.)

Daemonorops (122 spp.)

Korthalsia (30 spp.)

Plectocomia (10 spp.)

Ceratolobus (6 spp.)

Plectocomiopsis (10 spp.)

Myrialepsis (2 spp.)

Calospatha (2 spp.)

Blejjandia (1 spp.). (FAO, 1978)

In West Africa the genera *Eremospatha*, *Ancistrophyllum* and *Oncocalamus* are also found. The genus *Calospatha* is found only in Malay Peninsular which is the centre of diversity and in other regions the number of genera decreases, eg. Borneo 6, Fiji 1, Sudia (North/East) 3, Java 5, New Guinea 3, Philippines 3, Sumatra 7 and Thailand 6 (FAO, 1978). Dransfield reported that there are 13 genera and approximately 600 species in the world (Manokaran and Wong, 1983). Regarding rattan in Burma, U Sein Maung Wint, the former Director of FRI, Yezin, in 1978 indicated 30 species in Burma (FAO, 1978).

According to later reports by the Forest Department, Burma (unpublished) and in the "Burmese Cane" (U Thein Aung-1, 1972 State Timber Corporation) there are atleast 4 genera and 32 species of rattans in Burma. These are *Calamus*, *Korthalsia*, *Plectocomic* and *Robertsoniamus*. According to the local names more than 40 species are said to occur in Burma (See Appendix I). Hundley and Chit Ko Ko listed 5 genera and 28 species (genera: *Korthalsia*, *Plectocomia*, *Plectocomiopsis*, *Calamus* and *Daemonerops*) (Hundley and Chit Ko Ko 1961).

2.2 Economic and Commercial Aspects

Although cane is considered a minor forest products, trade in rattan has become a multi-million dollar business. In his report to International Development Research Centre, Menon (1980) assessed the value of finished products using rattan to be US\$ 1.2 billion and raw rattan trade valued at US\$ 50 million.

Singapore, Hong Kong and Taiwan have dominated processing, conversion, manufacture and trade in rattan and rattan products for over a century. A report from Thailand (Asian Timber, 1984) indicated that cane furniture export had tremendous potential because of high demand from foreign countries. And another report form Philippines (Asian Timber, 1985) stated that it led the world with US \$ 90 million of rattan furniture exports in 1984. Processed cane command almost double the price than when it is sold in raw form (FAO, 1978). The main supplier in the world is Indonesia accounting for about 90% of the trade where as Malay Peninsular contributed only 4%.

Singapore alone exported 5992 tones of rattan in 1978 at a value of over nine hundred thousand Malaysian dollars. Export of rattan from Malaysia is about 40,000-60,000 tons annually. Not only are revenues collected on export and import of rattan, but also royalties are imposed on extraction. At present the main importers of cane for manufacturing and manufactured items are Japan, Europe and the U.S.A. (Manokaran and Wong 1983).

2.3 History of Rattan silviculture

Earliest record on cultivation of rattan goes back to 1850 in Kalimantan, Indonesia. The species planted were *Calamus caesius* and later *C. trychycoleus* which were a success and now exist on thousand of hectares (Heyne. 1950).

An attempt was made in Peninsular, Malaysia at the end of 19th Century to establish plantation of *Calamus caesius* without success. In Sabah and Sarawak areas some areas of the same was planted. Early trial plantations of rattan in Indian (1957), Philippines (1973) and Thailand (1950) were a failure (Manokaran & Wong, 1983).

2.4 Recent Trials

In the following countries and institutes concerned have stated research on rattan silviculture seed biology and physiology other research.

India (F.R.I. Dehra Dun and Kerala. The forest department of Coorg Karnataka).

Indonesia (BIOTROP and the Forest Research Institute at Bagor).

Philippines (Forest Research Institute at Los Banos).

Thailand (Forest Department) and

Malaysia (Forest Research Institute, Kepong: Saba Forest Authority and a private plantation concern). (Manokaran & Wong, 1983).

Most of the research is concentrated on taxonomy, identification and uses, methods of propagation, seed and seed handling, nursery practices and establishment techniques for plantations. (Manokaran, 1977, Dransfield, 1977) (Manokaran, 1981,1991,1992) Mori and Tan, 1980 Weinstock, 1981, 1983) (Madulid 1980).

3. Burmese Cane

3.1 Botany

Rattans belong to the major group of *Lepidocaryoidae* of the family *Palmae*. They are very spiny plams usually with feather leaves. (See Fig. 2). Although they are called climbing palms, a few species of the genera *Calamus Cornera* and *Daemonorope* never develop climbing stems. The main distinctions between genera are the position and structure of the inflorescence (White more, 1973).

The 32 species in Burma belong to genera: *Calamus* (27 spp), *Plectocomic* (1 spp), *Korthalsia* (3 spp) and *Daemenorops* (1 spp). (See Appendix I). Hundely and Chit Ko Ko added one more genera, *Plectocomiopsis* with 2 species.

The leaves of some rattans bear an extended whip-like structure, the flagellum, and some have cirrus which is extension of leaf-sheath (See Fig 3). The flagellum and cirrus can be found in *Calamus* sp. The flagella and cirri enable the plant to cling to and climb adjacent trees for support (Generalao 1980).

The stems: The stalks of rattans are covered with leaf-sheaths which bear flattened, needle-like, long or short spines. In some species the sheath shed off as the plant matures (See Fig. 4) (Holttum, 1954). Rattans are single stem or cluster with diameter 3 mm to 2 cm and extending to a length more than 150 maters (*Calamus caesius*),(Burkill 1935). In Burma a 170 m long stalk was reported (FAO, 1978).



Fig. 2, Kyain-Hpan (*Plectocomia macrostachya*)
Note feather leaves and spiny stems.



Fig. 3. Kyain-Hkar (*Calamus vaminalis*). Note leaves with extended whip-like structures called cirri.



Fig. 4. Shedding of spiny sheath from Kyain-Hpan (*Plectocomia macrostachya*)

3.2 Habitat and Distribution

Rattans may be found from the sea level up to about 2,900 meters on large mountains. Most species have quite a wide altitudinal range.

Rattan is found widespread in Bumea at Lower levels and in the hills and in the evergreen type of forest, but little or none is to be found in dry areas (Unpublished Report of F. D. Burma).

The following areas in Burma are abundant with rattans:

- (1) Kachin State,
- (2) Upper Chindwin Myitha Forest Reserve and West Katha Forest Reserve of the Sagaing Forest Division,
- (3) Momeik Forest Reserve and Shweli River Valley in Shan State and
- (4) Tenneserim Division.

Except Cane Brakes in the high forest there is no pure rattan forest to be found. Rattans are usually found as understory forests in moist well drained terrains of the evergreen forest types mixed with large trees. Unpublished F. D data indicates that cane resources occupy 16 % of the forest area in Burma.

3.3 Phenology

Rattans flower in July-August and green fruits can be found on the climbing stems in October (See Fig. 5 & 6). The fruits ripe somewhere around March/April. In the northern areas flowering and fruiting come later. In Fig. 5 the fruits are from Kyein-Hka (*Calamus vaminalis*) and Fig. 6 from Kyein-Hpan (*Plectcomia macrostachya*). Different in sizes indicates only of different timber of flowering.

Rattans are prolific seeders. A single stem can produce cluster of fruits up to a thousand individuals. Mature fruits are brown in colour and have high lustre. A fruit usually has one seed, rarely two to three seeds. (Manokaran, 1979 and Generalao, 1980).

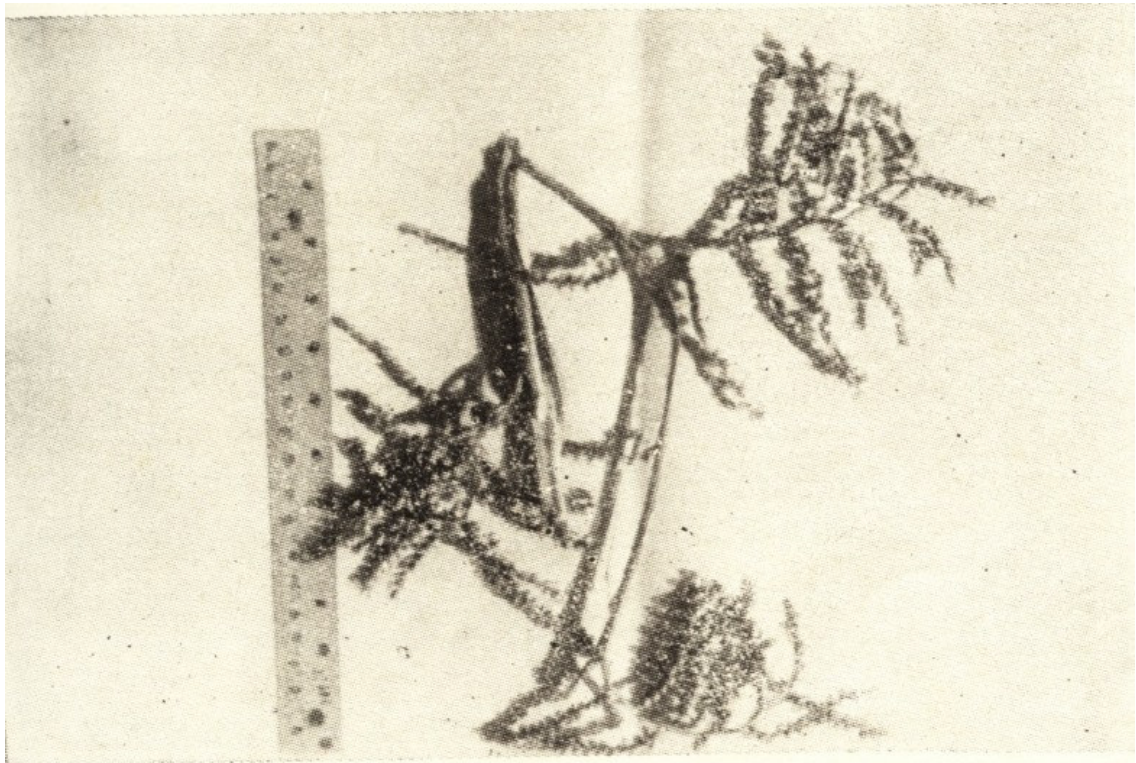


Fig. 5. Fruits of Kyain-Hkar (*Calamus vaminalis*)

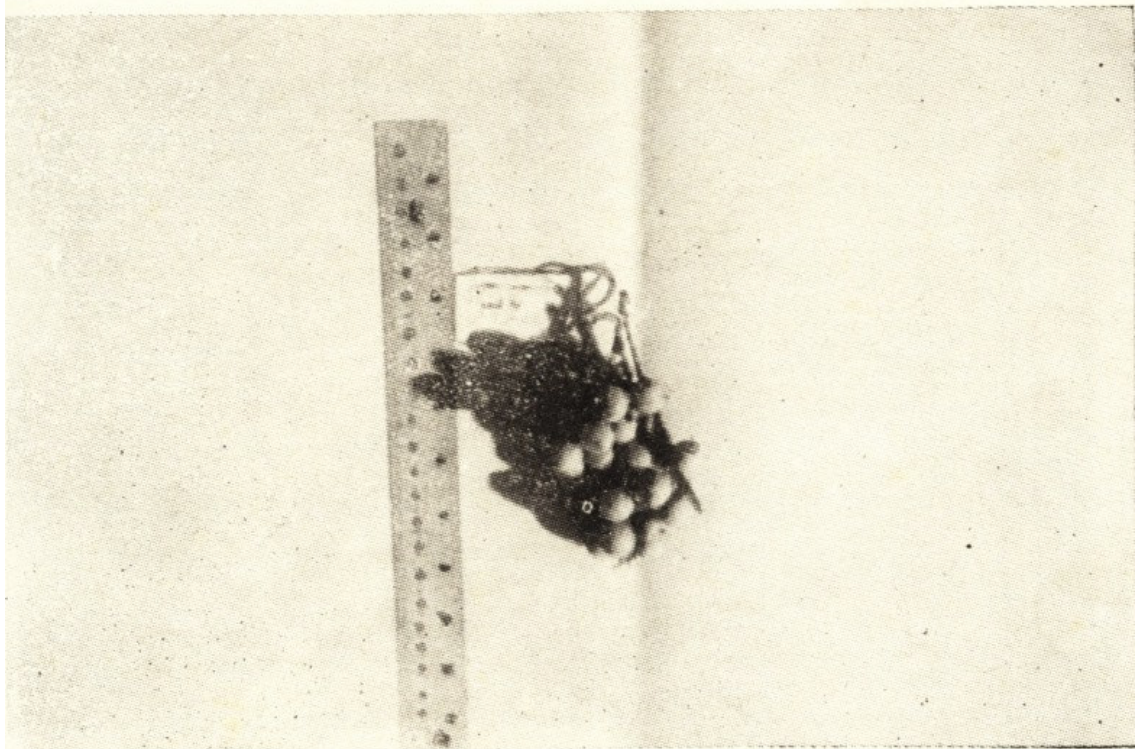


Fig. 6. Fruits of Kyain-Hpan (*Plectocomia macrostachya*)

4. Testing Some Methods Of Propagation

In the neighboring countries where research on rattan is underway, the following methods of propagation were tested:

- (i) Collecting and replanting of wild seedlings,
- (ii) Cuttings,
- (iii) Seed Sowing (Direct or transplant of nursery stocks)

At F.R.I. Yezin tests of methods for collecting and planting of wild seedlings in big baskets, and planting of cuttings have been started. Seed trees are already marked for collection of seeds in the coming season.

4.1 Material

There species of rattan namely, (i) Kyein-Hpan (*Plectocomia macrostachya* Kurz), (ii) Ye-Kyein (*Calamus floribundus* Grif.) and (iii) Kyein-Hkar (*C. vaminalis*) have been tested.

The 3 species were classified according to their sizes as large, medium and small, respectively. (See Appendix II). They are collected from Yezin Forest Reserve and Byin-Gye Forest Reserve Pyinmana and Takkone Township respectively.

4.2 Methods

(i) One hundred wild seedlings of the three species from each area were dug up with a ball of earth and planted in large baskets filled with forest soil. They are placed in 50 % shade up to noon and in total shade in the afternoon, everyday. (See Fig. 7).

(ii) Another one hundred wild seedlings of the three species from each area were dug up as before and planted in large baskets but kept under 50 % shade the whole day in the nursery.

(iii) Suckers are cut up and also planted in large baskets. (See Fig. 8).

4.3 Results

(i) The one hundred wild seedlings under 50 % shade until noon and in total shade in the afternoon showed 45 % survival. (Table 1).

(ii) One hundred of the wild seedlings dug up and planted in baskets under 50 % sunlight the whole day showed 26 % survival.

(iii) The suckers separated and planted in baskets has less than 10 % survival.

(iv) Observations made after three months time showed survival of Ye-Kyein decline more than Kyein-Hpan and Kyein-Hkar. (See Table 2).



Fig. 7. Rattan Nursery at Yezin (Note the wild seedlings are under shade in the afternoon).



Fig. 8. Suckers from rattan were planted in big baskets in the Nursery at Yezin

5. Conclusion / Recommendations

The results obtained are by no means conclusive, but are indicators and illustrates the status of on going cane research at Yezin.

- (a) The tests indicated dug-up wild seedlings preferred more shade for survival.
- (b) Kyein-Hkar showed a slight more tolerance to transplanting than the other two but may not be significant.
- (c) Cuttings of suckers should be tested further as only a few survived.
- (d) Material collected from the two different places seemed to tolerate transplanting equally well, but again may have no significance. Further tests are imperative.
- (e) As wild seedlings are usually readily available in the forests, they can be for plantation establishment when ripe seed is not available.

Additional research is suggested in the following areas:-

- (a) Systematic surveys should be conducted to determine if the resource of the wild cane is diminishing due to exploitation.
- (b) Methods to increase export of raw cane and particularly manufactured cane products should be studied.
- (c) Research on rattan in the following fields should be started: -
 - Collection, identification and classification of the rattan of Burma.
 - propagation methods
 - seed and seed handling
 - nursery practices and
 - techniques for establishment of plantations.

APPENDIX I

List of Rattan in Burma.

	Species (and Local name)	Distribution	Type of Forest
1.	<i>Calamus Longisetus</i> (Kabaung Kyein)	Karen, Mon States, Tenasserim, Sagaing, Pegu, Ragoon, Irrawaddy Divs.	Evergreen mixed Deciduous.
2.	<i>Calamus sp.</i> (Hsin-Kyein)	West Katha, F.R. Sagaing Div.	Evergreen
3.	<i>Calamus erectus</i> (Thaing-Kyein)	Pyinmana Forest Reserve, Pegu, Irrawaddy Divs. East Pegu Yoma.	Evergreen
4.	<i>Calamus sp.</i> (Wa-U-Kyein)	Yamethin Forest Reserve	Evergreen Upper mixed Deciduous
5.	<i>Plectocomia macrostachya</i> (Kyein-Hpan)	Eastern Aspects of Pegu Yoma	Evergreen
6.	<i>Calamus sp.</i> (Ye-Thain-Kyein)	Tenasserim	Evergreen
7.	<i>Korthalsia lacinosa</i> (Wa-Po-Kyein)	Tenasserim	Evergreen Upper mixed Deciduous Moist Forest
8.	<i>Korthalsia sp.</i> (Myauk-ta-lwe Kyein)	Karen State	"

Table No. 1- Survival of Wild-seedlings Transplanted.

No.	Species	No. Tested	Survival	
			Test 1	Test 2
1.	Kyein-Hker	1. 100	48	27
		2. 100		
2.	Kyein-Hpan	1. 100	44	27
		2. 100		
3.	Ye-Kyein	1. 100	42	25
		2. 100		
			44.6	26.3

Test 1. Seedlings Planted | day 50% shade & | day total shade.

Test 2. Seedlings Planted whole day under 50% shade.

Table No 2 - Results of Test 1 after 3 months

<u>No</u>	<u>Species</u>	<u>Survival</u>
1.	Kyein - Hker	35
2.	Kyein - Hpan	34
3.	Ye-Kyein	20

	Species (and Local name)	Distribution	Type of Forest
9.	<i>Korthalsia lacinosa</i> (Hkar-set Kyein)	Karen, States,	Evergreen upper mixed Deciduous Moist Forest
10	<i>Calamus latifoliuj</i> (Ya-ma-ta Kyein)	Karen, Kachin States, Sagaing Pegu, Irrawaddy Divisions.	Evergreen
11	<i>Calamus doriaii</i>	Upper Sagaing Division & Bhamo For. Res., Kachin State.	Evergreen UMDF
12	<i>Calamus sp.</i>	West Katha For. Reserve	Evergreen
13	<i>Calamus sp.</i> (Naukche-Kyein)	Momeik For. Reserve	Evergreen
14	<i>Calamus sp.</i> (Netkyaw-Kyein)	West Katha For. Reserve	Evergreen
15	<i>Calamus sp.</i> (Toke-Kyein)	Yemethin For. Reserve	Mixed Decidous
16	<i>Calamus floribundus</i> (Ye Kyein)	Kachin, Karen, Shan States, Sagaing, Arakan, Irrawady Divisions.	Riverside Evergreen.
17	<i>Calamus sp.</i> (Wun-thaw-Kyein)	Tenesserrim	"
18	<i>Calamus sp.</i> (U-Pwa-Kyein)	Karen State	"
19	<i>Calamus viminalis</i>	Sagaing, Mandalay, Pegu. Rangoon, Irrawaddy Divs. Karen, Rakkine States.	Riverside Evergreen
20	<i>Calamus sp.</i> (Myauk-che-Kyein)	West Katha For. Reserve	Evergreen
21	<i>Calamus sp.</i> (Kyein-Sein)	Katha State	Mountain Evergreen
22	<i>Calamus sp.</i> (Kyein-Ni-Gyi)	Karen State Tenesserim Div.	Evergreen
23	<i>Dracacna sp.</i> (Myauk Kyein)	Tenesserrim	Riverside Evergreen
24	<i>Calamus guruba</i> (Kyein Ni)	Wide spred	"
25	<i>Calamus platyspatus</i> (Kyet-U-Kyein)	Kachin, Karen, Chin, Rakkine, States, Sagaing Division	"
26	<i>Calamus helferianus</i> (Kyein-pyu-gale)	Tenesserrim Div. Rakkine State	"
27	<i>Calamus sp.</i> (Kyein-Pyu)	Chin Hills	"
28	<i>Calamus myrianthus</i> (Kyein-Boke)	Tenesserrim Div. Rakkine State.	"

	Species (and Local name)	Distribution	Type of Forest
2 9	<i>Calamus nitidus</i> (Mya-Sein-Kyein)	Tenesserrim Div.	"
3 0	<i>Calamus sp.</i> (Kyein Namoung)	Tenesserrim Division	Riverside Evergreen
3 1	<i>Calamus sp.</i> (Kyein-Tet)	Tenesserrim Division	"
3 2	<i>Calamus sp.</i>	Tenesserrim Division	Evergreen

From unpublished F. D. Document (1983)

Appendix II

Classification of Burmese Rattans According to Their Sizes.

(A) <u>Large</u>	(B) <u>Medium</u>	(C) <u>Small</u>
1. Kabaung Kyein	1. Yamata	1. Kyet-U-Kyein
2. Kyein-Namoung	2. Taung Kyein	2. Kyein-Pyu-Gale
3. Thien-Kyein	3. Net-Kyaw	3. Mya-Sain-Kyein
4. Kyein-Hpan	4. Let-War	4. Kyein Boke
5. Hsin-Kyein	5. Wa-Po-Gyi	5. Ye-Kyein
6. Wa-U-Kyein	6. Kyein-Ni-Gyi	6. Kyein-Ni
	7. Ye-Thwun Kyein	7. Wun-Thaw
	8. Myak-Talwe	8. Kala-Kyein
	9. Hkar-Set-Kyein	9. Myain-Che
Kyein	10. Toke-kyein	10. Kyein-Tet
	11. U-Pwa-Kyein	11. Myauk Kyein
	12. Kyein-Sein	
	13. Kyein-Hpyu	
	14. Naukcho-Kyein	
	15. Kyein-Hkar	

From Unpublished F. D. Document (1983).

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