

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



Nursery Practice of Some Species of Rattan (1)

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ကြိမ်မျိုးများကို ပျိုးဥယျာဉ်တွင် ပျိုးထောင်နည်းစမ်းသပ်ခြင်း (၁)

ဦးမောင်မောင်လေး (၂)၊ B.Sc. (For.) သုတေသနမှူး
ဦးဌေးအောင်၊ B.Sc. (Bot.) ဒု-သုတေသနမှူး
ဒေါက်တာဉာဏ်ထွန်း၊ B.Sc (Hons.), M.Sc. (MLU), Ph.D. (TUD) ဌာနမှူး
သစ်တောသုတေသနဌာန

စာတမ်းအကျဉ်းချုပ်

မြန်မာနိုင်ငံတွင် ပေါက်ရောက်လျက်ရှိသော ကြိမ်မျိုးများအချို့မှာ ရေကြိမ် (*Calamus floribundus* Griff.) ကြိမ်ခါး (*Calamus vaminalis* Willd.) နှင့် တုတ်ကြိမ် (*Calamus* sp.?) တို့မှ အစေ့များကို စုဆောင်းပြီး ၊ အလေးချိန်နှင့် တစ်ပြည်လျှင် ပါဝင်နှုန်းများ သတ်မှတ်ခြင်း ၊ ပျိုးဥယျာဉ်တွင် ပျိုးသေတ္တာများ၌ ပျိုး၍ ပေါက်ရောက်နှုန်း လေ့လာခြင်း၊ ပျိုးသေတ္တာမှ ပလပ်စတစ်အိတ်များသို့ ပြောင်းရွှေ့စိုက်ပျိုးခြင်းနှင့် စိုက်ခင်းတွင် စမ်းသပ်စိုက်ပျိုးခြင်းများကို လေ့လာထားပါသည်။ ကြိမ်ခါးမျိုးမှာ အပင်တွင် အသီးများစွာ သီးသော်လည်း၊ ပေါက်ရောက်နှုန်းမှာ လွန်စွာ ကောင်းမွန်ခြင်းမရှိလှဘဲ ရေကြိမ်နှင့် တုတ်ကြိမ် ပေါက်ရောက်နှုန်းမှာ ၄၀ - ၆၀ ရာခိုင်နှုန်းခြားတွင် ရှိပါသည်။ ကြိမ်ပျိုးပင်ငယ်များကို အမြစ်မှ ဆွဲနှုတ်၍ (မြေဆိုင်ခဲမပါ) ပလပ်စတစ်အိတ်များသို့ပြောင်းရွှေ့ စိုက်ပျိုးနိုင်ကြောင်း တွေ့ရှိရပြီး ၊ စမ်းသပ်ကွက်တွင် မြေပေါ်၌ချ၍ စိုက်ရာတွင် ဤစာတမ်း တင်သွင်းချိန်အထိ ရှင်ပင်နှုန်းမှာ ကောင်းမွန်ကြောင်း တွေ့ရှိရပါသည်။

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Abatracts

Seed of three species of rattan, viz. Ye-Kyein (*Calamus floribundus* (Griff.), Kyein-Kha (*Calamus vaminalis* Willd.) and Toke-Kyain (*Calamus* sp.?) were collected and their weight/pyi, number per pyi, etc. were recorded. Germination tests, transfer method into plastic bags and outplanting in field, were tested. Germination rate of Kyain-Kha was not so high although the plant fruited abundantly but the other two species showed germination of 40 - 60 %. The germinated seedling could be transferred bare rooted to plastic bags. Outplanted seedlings in the field showed good survival up to the time of submitting this paper.

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1. Introduction

All climbing palms are collectively named Rattan. Rattan (cane) is grouped with the minor forest products of Burma and has a high commercial potential. Rattans have been exploited and utilized for centuries in the South East Asian countries including Burma. Although cane is considered a minor forest product, trade in rattan has become a multi-million dollar business. In his report to International Development Research Centre (IDRC), Menon (1980) assessed the value of finished products using rattan to be US \$ 1.2 billion, and raw rattan trade value at US \$ 50 million (Manakoran and Wong, 1983).

There are increase 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 (Htun and Aung, 1986). The knowledge of propagation methods, nursery practices and plantation techniques should be acquired to insure the supply of rattans for domestic use, and export to earn foreign currency.

This paper is intended to be the beginning of a series of studies on nursery practices and plantation techniques of different species of rattan in Burma. The studies were conducted in the Forest Research Institute (FRI) Nursery and the recently started Cane Nursery at Kyauk Hpya. (See Appendix I)

2. Materials and Methods

2.1 Materials

The seeds of the following three species of rattan were collected, for testing.

- (1) Kyain-Kha (*Calamus vaminalis* Willd.)
- (2) Ye-Kyain (*Calamus floribundus* Griff.)
- (3) Toke-Kyain (*Calamus* sp.)

All the above species were collected from Yezin Forest Reserve, Pyinmana Township.

2.2 Methods

The seeds were collected, cleaned and measurements for sizes and number per pyi were taken.

2.3 Germination Tests

Germination tests were conducted in the nursery where the seeds were sown in sand boxes. Where 100 x 4 seeds of each species were sown. (See Fig.2.)

2.4 Test where pericarp and part of sarcotesta were removed

The pericarp and part of sarcotesta (partially) were removed by rubbing on the stone. The seeds were sown by pushing each seed to just below the sand in the

germination box. They were sown 3 inches apart. The boxes were placed under partial shade in the nursery shed and watered twice daily.

The test was conducted for all the 3 species.

2.5 Test where pericarp and sarcotesta were not removed

In this test the seeds were sown in the germination boxes with pericarp and sarcotesta intact.

All conditions were the same as in 2.2.2.1.

2.6 Transplanting

All the sprouted seedlings were transplanted into plastic bags or pots. They were transplanted when (1) the first foliage emerged as a cylindrical form and (2) when the leaves were starting to spread out. (Fig.3)

The transplanting was done (1) with a ball of sand and (2) bare-rooted with seedling first putting into the bucket filled with water and then planting it.

2.7 Outplanting

The seedlings were outplanted in the field near the Cane Nursery in Kyauk-Hpya. (See Appendix III) The number of seedling outplanted were as follow:-

1. Kyain-Kha - 50 Seedlings
2. Ye-Kyain - 50 Seedlings
3. Toke-Kyaing - 50 Seedlings

The survival counting was done in November, 1987.

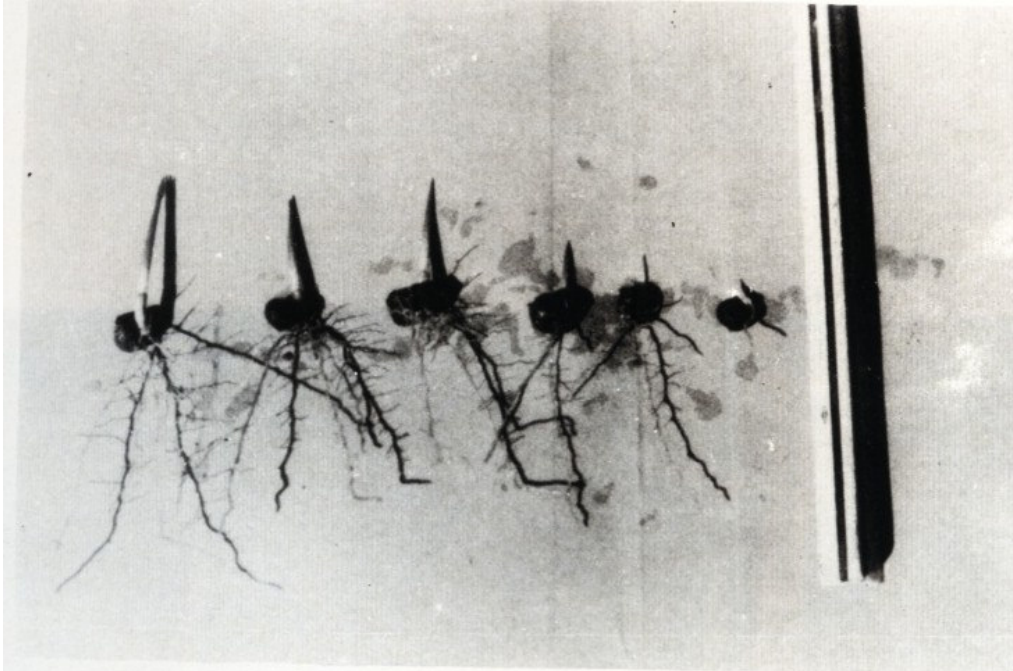


Fig: 1- Stages of Germination in rattan
(Ye - Kyain)

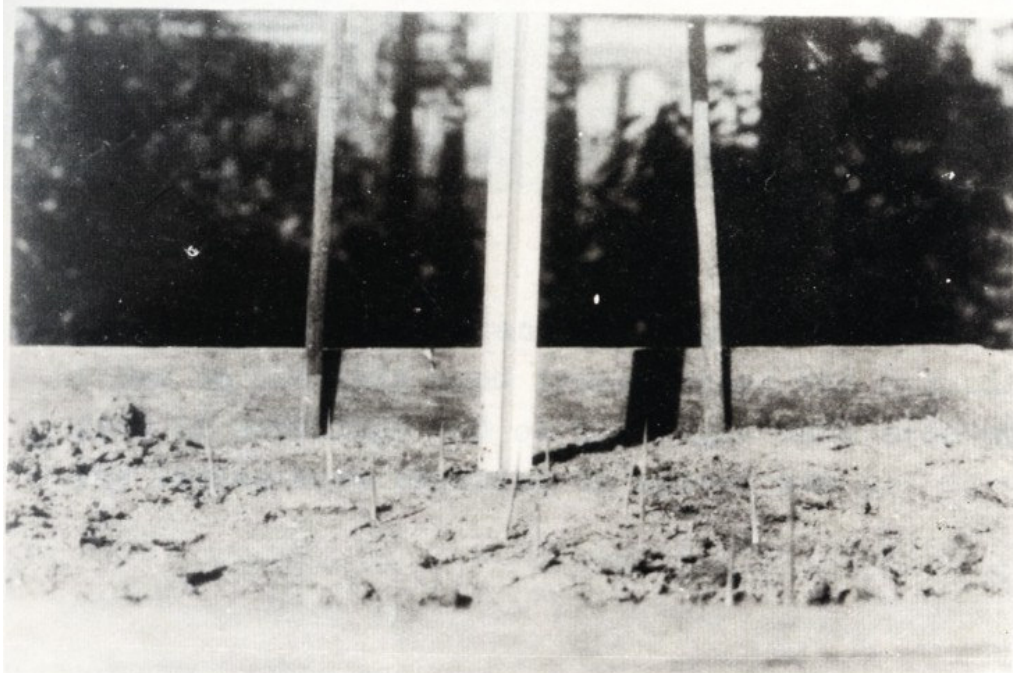


Fig: 2- Germination of Ye - Kyain
in a germination box filled
with sand.



Fig.No.3 Stages where the rattan seedlings were transplanted.
(See on the left hand lower corner the cylindrical
form of seedlings and on the right hand side where
the leaves were starting to spread out).

3. Results

3.1 Sizes of fruits and seeds

The following average sizes of fruits and seeds were recorded.

Species	Sizes in mm	
	Fruit	Seeds
1. Kyain – Kha	8.5 mm	5.3 mm
2. Ye – Kyain	17.85 mm	12.4 mm
3. Toke – Kyain	19.3 mm	11.13 mm

3.2 Number of Fruits and Seeds per pyi.

The following average number of fruits and seeds are recorded.

Species	number	pyi
	Fruit	Seeds
3. Kyain – Kha	3952	13040
4. Ye – Kyain	221	850
3. Toke – Kyain	285	624

Results of the germination test where seeds were sown with pericarp and sarcotesta (partially) removed.

For Kyain-Kha, the first seed to germinate was after 90 days and the total number germinated was 112 with a percentage of germination of 28%. (See Table below)

For Ye-Kyain, the first seed to germinate was after 60 days and the total number germinated was 190.0 with a percentage of germination of 47.5 %. (See Fig.1 for stage of germination)

For Toke-Kyain, the first seed to germinate was after 21 days and total number germinated was 243 with a percentage of germination of 60 %.

No.	Species	Total Number of Seeds		
		sown : germinated : %		
1.	Kyain-Kha	400	112	28
2.	Ye-Kyain	400	190	47.5
3.	Toke-Kyain	400	243	60

Table No. 1. Germination of rattan species. Pericarp and sarcotesta (partially) removed.

3.3 Separate Tests of Germination in the Seed Section.

The results of the germination tests conducted separately in the seed section are as follows:

- (1) Kyain-Kha 3.0 %
- (2) Ye-Kyain 37.25 %
- (3) Toke-Kyain 71 %

Tested where pericarp and sacotesta (Partially) were not removed showed the following results :

- 1. Kyain-Kha 10 out of 100 had germinated
- 2. Ye-Kyain 25 out of 100 had germinated
- 3. Toke-Kyain 40 out of 100 had germinated

The first germination took 95 days, 70 days, 30 days for Kyain-Kha, Ye-Kyain, and Toke-Kyain, respectively.

3.4 Transplanting

All the sprouted seedlings which were transplanted at the stage with the first foliage emerged in a cylindrical form and at the stage when the leaves spread-out, survived very well with insignificant mortality. Transplanting with a ball of sand is effective only when the seedlings were very small as the root-growth is faster in the first weeks. The survival of transplanting with bare roots was also good.

3.5 Out-planting Survival

All the out planted seedlings in the field survived as follows:-

- (1) Kyain-Kha - 42 out of 50 seedlings
- (2) Ye-Kyain - 45 out of 50 seedlings
- (3) Toke-Kyain - 49 out of 50 seedlings

4. Discussion

Discussion should be made on the following topics:

- (1) Seed Collection and Ripeness
- (2) Germination
- (3) Method of Sowing
- (4) Method of Transplanting
- (5) Outplanting and Survival

4.1 Seed Collection and Ripeness

Time of collecting seeds (fruits) varies with locality. Some seeds are collected in October (Generalao, 1980), in February and also in July (Mori et. al 1980). For the experiments here, the fruits are collected in September-December.

For identification of ripeness of fruit, the color of fruit must be yellowish (Generalao, 1980) or the seeds are thought to be ripened when they are dark in color and hard (Dransfield, 1979), the ones collected here in Yezin had all their pericarp yellowish brown or dark brown except for Kyain-Kha which had yellowish green pericarp.

4.2 Germination

Type of germination found in almost all rattan species are said to be “ adjacent ligular “ (Dransfield, 1979). (See Appendix II)

Manokaran (1979) found that the germination period of various rattan species varied from 4 to 41 weeks.

The generally slow rate of germination may be due to slow development of the embryo, and not due to any inherent dormancy (Mori et. al, 1980).

Manokaran (1978) stated that the removal of the sarcotesta was a necessary pretreatment in order to shorten the germination period and obtained good levels of success.

In Yezin the period of germination for the 3 tested species was 3 – 12 weeks. The situation may perhaps due to germination test conducted in sand boxes in the nursery but elsewhere when germination tests were conducted in petridishes with cover and moistened filter paper showed faster germination and better germination rate. (Mori et. al. , 1980) And the difference may also due to difference of species.

4.3 Method of Sowing

The seeds were sown in beds where the medium consists of equal amounts of forest top soil and river sand. (Manokaran and Wong, 1983) The seeds are buried just below the soil surface and bed is covered with saw dust. Experiments at Yezin were at the moment limited and only done in sand boxes. The species are also different from the experiments elsewhere.

4.4 Method of Transplanting

Seedlings at 2 – leaf stage were transferred to polythene bags (Manokaran and Wong, 1983) and the seedlings were potted with the ball of earth. (Generalao, 1980). The seedlings are transferred or transplanted in plastic bags or earthen pots by pricking the seedlings from germination box bare-rooted.

4.5 Outplanting and Survival

The seedling needs a hardening period of one year (Generalao, 1980) 12 – 18 months (Manokaran, 1980; 1981 a) for other species. The species tested here were outplanted after 6 months, and the survival were good.

5. Conclusions

For the 3 tested species, collection of seeds (fruits) could be made during September and December, when the color of the fruit turned yellowish green, yellowish brown or dark brown.

Germination percentage was better if the pericarp and sarcotesta were removed before sowing.

The seeds could be sown in germination boxes filled with river sand and placed under partial shade of nursery shed and watered twice a day.

Transplant or transfer into plastic bags could be done when the foliage is in the cylindrical shape up to the stage of 2-4 leaf stage.

The seedlings could be transferred bare-rooted if they were transferred in the same day, under the shade and in moist condition.

The seedlings could be outplanted in the forest after 6 months.

Appendix I



Cane Nursery at Kyauk-Hpya

The Cane (rattan) Nursery was started in 1985 near the 11th. mile post on the Pyinmana-Pinlaung Road. The elevation is 1320 feet above sea level. The forest type of the locality is evergreen with round about 60 inches of annual rainfall. The Nursery is located in the compartment No.22 of the Yezin Forest Reserve, Pyinmana Township, and also on the western fringe of the Shan Plateau about 9 miles, east of FRI, Yezin.

The place is a natural habitat of Kyain-Kha, Ye-Kyain and Kyain-Hpan (*Plectocomia macrostachya*).

Appendix II

Type of Germination in Rattan

Tomlinson (1960) termed the type of germination in almost all the species of rattan as “ adjacent ligular “. In this germination type a short plug emerges from the seed; from the plug, emerge roots and eventually an erect swelling through which emerge the first foliar organs. The plug represent part of the single cotyledon; the blade of the cotyledon remains within the seed as an absorptive organ which absorbs nutrients from the endosperm; the plug itself represents the petiole of the cotyledon and the erect swelling through which the first leaves emerge, represents the ligule of the cotyledon. This germination type which appears rather complex, is a relatively simple type of germination and is the commonest type found within the palms.

(Excerpt from “ A Manual of the Rattans of the Malay Peninsula by J. Dransfield.)

APPENDIX III



Fig.No.4 Outplanted rattan seedling Toke-Kyain (Calamus sp) near the Rattan Research Nursery at kyauk-Hypa.
Note: It was planted near the base of the Danyin tree (Pithecellobium Benth).

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