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Testing the Method of Germination of Rattan Species

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ကြိမ်များကို ပျိုးထောင်နည်း စမ်းသပ်ခြင်း

ဦးဌေးအောင်၊ B.Sc. (Bot.) (Mdy.) ၊ သုတေသနလက်ထောက်၊ သစ်တောသုတေသန၊
ဦးစိန်ထွန်း၊ B.Sc. (For.) (Rgn.) ၊ လက်ထောက်ညွှန်ကြားရေးမှူး၊ သာယာဝတီခရိုင်၊
ဒေါက်တာဉာဏ်ထွန်း၊ B.Sc. (Hons.) , M.Sc. (MLU), Ph.D. (TUD) ၊
ပါမောက္ခ၊ သစ်တောတက္ကသိုလ်၊ ရေဆင်း။

စာတမ်းအကျဉ်းချုပ်

ရွေးချယ်ထားသည့် ကြိမ်မျိုး ဝါးမျိုးဖြစ်ကြသော လက်မဲကြိမ် (*Calamus sp.*) ၊ သိုင်းကြိမ် (*Calamus erectus* Roxb.) ၊ ဒန့်ကြိမ် (*Calamus arborescens* Griff.) ၊ ကြိမ်ခါး (*Calamus vaminalis* Willd.) နှင့် ရေကြိမ် (*Calamus foloribundus* Griff.) မျိုးများကို စုဆောင်း၍ တစ်ပြည်တွင် ရှိသည့် အစေ့တို့၏ အလေးချိန်နှင့် တစ်ပြည်တွင် အစေ့ အရေအတွက် ပါဝင်နှုန်းများ သတ်မှတ်ခြင်းတို့ကို လေ့လာ ထားပါသည်။ စမ်းသပ်နည်း သုံးမျိုး ဖြစ်ကြသော လွှစာမှဲ့ပျိုးဘောင်တွင် ပျိုးထောင်စမ်းသပ်နည်း၊ စပါးခွံဖွဲ့ပြာတွင် ပျိုးထောင် စမ်းသပ် နည်းနှင့် သဲပျိုးဘောင်တွင် ပျိုးထောင် စမ်းသပ်နည်း တို့ဖြင့် စမ်းသပ်နည်းတို့ဖြင့် စမ်းသပ် လေ့လာ ထားပါသည်။ ကြိမ်မျိုးစပ် (၅) မျိုးတို့၏ ပျိုးထောင်နည်းများတွင် လွှစာမှဲ့ ပျိုးဘောင်တွင် ပျိုးထောင်ခြင်းသည် ပေါက်ရောက်မှုနှုန်း အကောင်းဆုံး အခြေအနေ ဖြစ်ပါသည်။ ကြိမ် (၅) မျိုးတွင် လက်မဲကြိမ်သည် ပေါက်ရောက်မှုနှုန်း အကောင်းဆုံး ဖြစ်ပြီး ကြိမ်ခါးမှာ အနည်းဆုံးဖြစ်သည့် အပြင် ပေါက်ရောက်မှု မှာလည်း နောက်အကျဆုံး ဖြစ်ကြောင်း တွေ့ရှိ ရပါသည်။

Testing the Methods of Germination of Rattan Species

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Abstracts

Five commercially important species of rattan were selected for testing their germination rate, weight measurements of fruits and seeds and the number of fruits and seeds were calculated. For germination tests three different media, viz. Saw-dust, Rice-Husk-ask and Sand. The selected species of rattan are Letme Kyein (*Calamus sp.*), Thaing Kyein (*Calamus erectus Roxb.*), Danon Kyein (*Calamus arborescens Griff.*), Kyein khar (*Calamus vaminalis Willd.*) and Ye Kyein (*Calamus floribundus Griff.*). Germination rate of all the five species are found to be the best in Saw-dust Medium. Among the species Letme Kyain has the highest germination per cent and Kyein Khar the poorest.

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1. Introduction

Rattans are spiny climbing plants which belong to *Palmae*. Rattan is in origin a Malay word which is now internationally used. Rattans grow abundantly in the evergreen forests of the Tropics. Some species are found in semi-evergreen and moist deciduous forests. There are 13 genera with 600 species found in the world. In Myanmar, 7 genera and 38 species are reported. Many of the species are yet to be systematically identified. (See Appendix I).

In the minor forest products the rattans, together with bamboo play an important role. The demand for rattan products is increasing locally as well as internationally, and so they are exploited increasingly also. Uses of rattan are of multiple nature from making baskets and household utensils to high grade furnitures, and as binders for rafting timber and even use in building of bridges.

Even though much exploitation and commercial trade activities are in full-swing but the study on cane (rattans) is going at a slow pace in Myanmar. Therefore, the studies on rattans, embracing its Botany and Ecology should be made. The knowledge of propagation methods, nursery practices and plantation techniques should be acquired to insure the stability of rattan supply and export in the future.

This paper is concerned with testing the methods of germination and nursery practices of some rattan species which are of commercially important, which the methods found out would be in support of future plantation establishment.

2. Materials and Methods

2.1. Materials

The following 5 species of rattan which are commercially important are chosen for testing. They are:

- (i) Letme Kyein (*Calamus* sp.)
- (ii) Thaing Kyein (*Calamus erectus* Roxb.)
- (iii) Danon Kyein (*C. arborescens* Griff.)
- (iv) Kyein Khar (*C. vaminalis* Willd.)
- (v) Ye Kyein (*C. floribundus* Griff.)

From the above mentioned species the first 3 species (i) to (ii) are from Chaung-Tha Forest Reserve, Patheingyi Township and last 2. (iv) and (v) are from Yezin Forest Reserve, Pyin Odon Township.

2.2. Methods

2.2.1. Collection of Fruits (Seeds)

The fruits (seeds) are collected in various time of the year. Letme Kyein, Thaing Kyein and Danon Kyein are collected in June and July whereas Kyein Khar and Ye Kyein are collected in October and November. The variation of ripening time may be due to localities or may be due to species differences.

For identification of ripeness the fruits must have the yellowish brown or dark brown pericarps but for Kyein Khar which has the yellowish green pericarp.

The fruits are collected, dried, cleaned and put in gunny bags for transportation.

2.2.2. Measurements

The collected fruits (seeds) were measured for their sizes, weight and number per pyi.

2.2.3. Preparation of seeds for germination

The outer scaly cover (the pericarp) and the inner fleshy layer(the sarcotesta) are removed from the seeds. The removal of the outer layers was done by pounding with the wooden mallet. And the seeds are soaked in water for 48 hours. After that the fleshy-layer were removed by rubbing the soaked seeds by which settled are then put into water again and collected those seeds only which settled to the bottom of the water.

2.2.4. Germination Tests

The seeds were sown in three different media for testing their germination.

They are:

- (i) In the saw dust.
- (ii) In the rice-husk-ash, and
- (iii) In the sand.

The containers used for different media are wooden boxes.

300 seeds of each species were sown in three different media. The tests were done in the nursery under partial shade condition.

They are watered twice daily with sprayers.

3. Results

3.1. The sizes of the fruits

The sizes of the fruits for the five different species are found to be

for Letme Kyein	23.6 mm	to	28.1 mm,
for Thaing Kyein	15.9 mm	to	17.1 mm,
for Danon Kyein	21.0 mm	to	23.0 mm,
for Kyein Khar	7.9 mm	to	8.5 mm,
for Ye Kyein	16.8 mm	to	17.85 mm. (See Table 1 also).

3.2. The sizes of the seeds

The sizes of the seeds for 5 tested species are found to be;

for for Letme Kyein	12.4 mm	to	14.3 mm,
for Thaing Kyein	9.1 mm	to	11.6 mm,
for Danon Kyein	10.5 mm	to	11.9 mm,
for Kyein Khar	4.9 mm	to	5.3 mm,
for Ye Kyein	11.2 mm	to	12.4 mm. (See Table 2 also).

3.3. The weight of the fruits

The weight of the fruits of the five different species are found to be,

for for Letme Kyain	8.7 mm	to	9.2 gm,
for Thaing Kyain	3.9 mm	to	4.8 gm,
for Kyain Khar	4.3 mm	to	5.0 gm (See table 3 also).

3.4 The weight of seeds

The weight of seed of the five species selected for testing are found to be for Letme Kyein 4.4 gm to 5.4 gm, for Thaing Kyein 2.0 gm to 2.6 gm, for Danon Kyain 2.8 gm to 3.6 gm for Kyein Khar 1.2 gm to 1.54 gm and for Ye Kyein 1.9 gm to 2.8 gm. (See table 4 also)

3.5. Number of fruits and seeds per Pyi

The number of fruits per Pyi for the 5 species are found to be for Letme Kyein 420±, Thaing Kyein 604±, Danon Kyein 480±, for Kyein Khar 3860±, for Ye Kyein 624±. (See Table 5 also)

The number of seeds per Pyi for the five different species are found to be for Letme Kyein 1684±, Thaing Kyein 2216±, Danon Kyein 1822±, Kyein Khar 12872± and for Ye Kyein 2530±. (See Table 5 also)

3.6. Germination of seeds

3.6.1. In Saw-Dust Medium

Out of 300 seeds sown for each species Letme Kyein has a percentage of 69.0 per cent, Thaing Kyein has 67.3 per cent, Danon Kyein 54.0 per cent, Kyein Khar 38.0 per cent and Ye Kyein has 64.0 per cent. (See table 6 also)

Germination started for Letme Kyein after (30) days, for Thaing Kyein (30) days, for Danon Kyein (35) days, for Kyein Khar (75) days and yet Kyein Khar (48) days.

3.6.2. In Rice-Husk-Ash-Medium

Out of 300 seeds sown for each species Letme Kyein has a percentage of 60.3 per cent, Thaing Kyein 53.8 per cent, Danon Kyein 49.7 per cent, Kyein Khar 34.0 per cent and Ye Kyein has 57.0 per cent (See Table 7 also)

3.6.3. In sand Medium

Out of 300 seeds sown for each species Letme Kyein has a percentage of 42.0 per cent, Thaing Kyein 39.7 per cent, Danon Kyein 41.0 per cent, Kyein Khar 29.3 per cent and Ye Kyein 39.0 per cent. (See Table 8 also)

4. Discussion and Conclusion

4.1. Discussion

Flowering biology of the rattans in various localities of various species should be studied.

Specimens and seed samples should be collected and their storage problems solved. The study of literatures showed that the viability of seeds (fruits) is very short.

Using of different media whether optimum or economic is also a good question when considering a large scale plantation programme.

In considering the loss of material, time and money, number of seed required and germination rate and use of correct medium must be exact.

Other genera and species of commercial importance, their seed biology, methods of nursery practices and plantation techniques should also be studied.

4.2. Conclusion

For conclusion the following points should be made.

- (1) Out of the 5 species of rattan tested Letme Kyein (*Calamus* sp.) showed the highest germination rate in all the three media, while Kyein Khar (*Calamus vaminalis*) the lowest.
- (2) Germination started in a short time with seeds of Letme Kyein and Thaing Kyein (*Calamus erectus*) compared to other 3 species.
- (3) The best germination percentage was found in using the saw-dust medium, and the poorest in sand medium. The cost of using saw-dust and sand should be considered.
- (4) Using the number of seeds per pyi and the germination rate, how many pyi of seeds are required to be sown in the nursery for one acre of plantation can be calculated.

Table No. 1 The sizes of fruits

No.	Species	mm
1.	Letme Kyein	23.6-28.1
2.	Thaing Kyein	15.9-17.1
3.	Danon Kyein	21.0-23.0
4.	Kyein Khar	7.9-8.5
5.	Ye Kyein	16.8-17.9

Table No. 2 The sizes of fruits

No.	Species	mm
1.	Letme Kyein	12.4-14.3
2.	Thaing Kyein	9.1-11.6
3.	Danon Kyein	10.5-11.9
4.	Kyein Khar	4.9-5.3
5.	Ye Kyein	11.2-12.4

Table No. 3 The weight of the fruits

No.	Species	Weight in gram
1.	Letme Kyein	8.7-9.2
2.	Thaing Kyein	3.9-4.8
3.	Danon Kyein	4.3-5.0
4.	Kyein Khar	1.9-2.6
5.	Ye Kyein	3.8-4.1

Table No. 4 The weight of the Seeds

No.	Species	mm
1.	Letme Kyein	4.4--5.4
2.	Thaing Kyein	2.0-2.6
3.	Danon Kyein	2.8-3.6
4.	Kyein Khar	1.2-1.5
5.	Ye Kyein	1.9-2.8

Table No. 5 Number of Fruits and Seeds

No.	Species	Number per pyi	
		Fruit	Seed
1.	Letme Kyein	420	1684
2.	Thaing Kyein	604	2216
3.	Danon Kyein	480	1822
4.	Kyein Khar	3860	12872
5.	Ye Kyein	624	2530

Table No. 6 Germination percent in Saw-Dust Medium

No.	Species	Sown	Germinated	Percentage
1.	Letme Kyein	300	207	69.0
2.	Thaing Kyein	300	202	63.3
3.	Danon Kyein	300	169	54.0
4.	Kyein Khar	300	114	38.0
5.	Ye Kyein	300	192	64.0

Table No. 7 Germination percent in Rice-husk-Ash Medium

No.	Species	Sown	Germinated	Percentage
1.	Letme Kyein	300	181	60.3
2.	Thaing Kyein	300	175	58.3
3.	Danon Kyein	300	149	49.7
4.	Kyein Khar	300	171	34.0
5.	Ye Kyein	300	102	57.0

Table No. 8 Germination percent in Sand Medium

No.	Species	Sown	Germinated	Percentage
1.	Letme Kyein	300	126	42.0
2.	Thaing Kyein	300	119	39.7
3.	Danon Kyein	300	123	41.0
4.	Kyein Khar	300	117	29.3
5.	Ye Kyein	300	88	39.0

List of RATTAN Species in Myanmar

Serial No.	Botanical Name	Myanmar Name	Others name	Distribution	Remark
1.	<i>Calamus andamanicus</i> Kurz				
2.	<i>C.arborescens</i> Griff.	Danon		Bago Yoma, Taninthayi, Mergui	
3.	<i>C. concinnus</i> Mart.				
4.	<i>C.doriacle</i> Becc.	Taung Kyain			
5.	<i>C.erectus</i> Roxb.	Thaing Kyain		The Whole Myanmar	
6.	<i>C.feanus</i> Becc.			Taninthayi	
7.	<i>C.floribundus</i> Griff.	Ye Kyain		Kachin, Karen, Sagaing, Mon, Manadalay, Rakhine, Taninthayi, Bago, Shan, Yangon.	
8.	<i>C.guruba</i> Ham.	Kyain-ni		Myanmar, Kachin, Kayha, Chin, Magwe, Manadalay, Mon, Taninthayi, Rakhine, Bago, Shan, Yangon.	
9.	<i>C.gregisectus</i> Burret.			Taninthayi	
10.	<i>C.helferianus</i> Kurz	Kyain-Pyu		Taninthayi, Mon, Rakhine, Shan, Yangon.	
11.	<i>C.hypoleucus</i> Kurz	galay		Thaung yin, Taninthayi, Myitkyina	
12.	<i>C.latifolius</i> Roxb.			Lower Myanmar, Kachin, Kayah, Karen, Sagaing, Mon, Taninthayi, Rakhine, Bago, Shan, Yangon.	
13.	<i>C. leucotes</i> Becc.			Yunzalin	
14.	<i>C.longissitus</i> Griff.			Myanmar, Kachin, Taninthayi, Rakhine, Bago, Shan, Rangon, Bago, Yoma.	
15.	<i>C.melanacanthus</i> Mart.	Kabaung		Taninthayi, Martaban.	
16.	<i>C.myrianthus</i> Becc.			Taninthayi, Mergui, Karen, Mon.	
17.	<i>C.nitidus</i> Mart.	Kyain bok		Taninthayi, Karen, Mon.	
18.	<i>C.palustris</i> Griff.	Myasein Kyain		Taninthayi, Martaban.	

Serial No.	Botanical Name	Myanmar Name	Others name	Distribution	Remark
19.	<i>C. platyspathus</i> Mart.	Kyet U Kyain		Taninthayi, Tavoy, Kachin, Kayah, Karen, Chin, Sagaing, Magwe, Mandalay, Mon, Rakhine, Bago.	
20.	<i>C. polydesma</i> Becc.			Central Myanmar	
21.	<i>C. Pseudo-ravilis</i> Becc.	Kyain Phu		Myanmar, Shan, Yangon	
22.	<i>C. robinsonianus</i> Becc.	Kyain Khar	Kyain Kha (shan)	Shan States.	
23.	<i>C. tenuis</i> Roxb.	Taye Li Kyain		Bago, Kachin, Kayah, Chin, Sagaing, Mandalay,	
24.	<i>C. tenuis</i> Roxb.	Kyain Khar	Kyain Kha (shan)	Lower Myanmar, Kachin, Karen, Sagaing, Mandalay, Mon, Taninthayi, Bago, Taninthayi,	
25.	<i>C. aggregatus</i> Burret.			Margui,	
26.	<i>C. Kurzianus</i> Becc.			Myanmar	
27.	<i>Dacmouorops kurzianus</i> Hk. f.			Taninthayi, Karen, Mon, Shan, Yangon,	
28.	<i>D. jenkinsianus</i> Mart.			Lower Myanmar, Salween, Mergui,	
29.	<i>Korthalsia lacinasa</i> Mart.	Wapo Kyain		Myanmar	
30.	<i>K. polystachya</i> Mart.			Kachin, Upper Myanmar,	
31.	<i>K. opunita</i> (Thunb) Merr.			Taninthayi, Karen, Mandalay, Mon, Bago, Shan, Yangon,	
32.	<i>Plectocomia assamica</i> Griff.			Taungoo, Thaukyoghat forests, Martaban,	
33.	<i>P. maerostachya</i> Kurz.	Kyain Fan		Taninthayi,	
34.	<i>Plectocomiopsis paradoxus</i> Becc.				
35.	<i>P. gemniflora</i> Becc.				
36.	<i>Salacca beccarii</i> Hook.f.	Yin ngan			
37.	<i>S. wallichinana</i> Mart.	Yin ngan			
38.	<i>Flagellaria indica</i> L.	Myauk Kyain		Yangon, Bago, Taninthayi,	

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