Leaf No .4/ 93-94

Government of the Union of Myanmar
Ministry of Forestry
Forest Department

Vegetative Propagation of Teak [*Tectona Grandis*] by Branch Cuttings

U Saw Yan Aung C. Doo, B.Sc.(For.) (Rgn.), M.S [Hawaii]
Director,
and
Daw Thida Mundt, B.Sc. [Bot.] [Mdy.], Research Assistant,
Forest Research Institute
1993

ကျွန်းကိုင်းဖြတ်များမှ အပင်များ ပေါက်ပွားမှုကို စမ်းသပ်လေ့လာခြင်း

ဦးစောရန်အောင်စီဒူး (B.Sc.(For.) (Rgn.), M.S (Hawii))
ညွှန်ကြားရေးမှူး
နှင့်
ဒေါ်သီတာမန်း (B.Sc. (Bot.) (Mdy.)) သုတေသနလက်ထောက်
သစ်တောသုတေသနဌာန

စာတမ်းအကျဉ်းချုပ်

ယခုစမ်းသပ်မှုသည် စျေးနှုန်းချိုသာပြီး အလွယ်ကူဆုံး နည်းပညာများဖြင့် Clonal Orchard များ တည်ထောင်နိုင်ရန် ရည်ရွယ်ပြီး ဆောင်ရွက်ထားခြင်း ဖြစ်ပါသည်။ စမ်းသပ်မှုတွင် နှစ်(၁၀၀) ခန့်ရှိ ကျွန်းကိုင်းဖြတ်များမှ အပင်များရှင်သန်ပေါက်ပွါးနိုင်ကြောင်း တွေ့ရှိရပါသည်။ ယင်းကိုင်းဖြတ်များ စုဆောင်း စိုက်ပျိုးရာ၌ မတ်လ၊ ဧပြီလ နှင့် မေလများတွင် အကောင်းဆုံး ဖြစ်သည်။ အပူချိန်နှင့် စိုထိုင်းဆ တို့သည် အညွှန့်၊ အဖူး နှင့် အမြစ်တို့၏ တိုးတက်မှုအတွက် အရေးကြီးဆုံးသော အဓိက အချက်ဖြစ်သည်။

Vegetative Propagation of Teak (*Tectona Grandis)* by Branch Cuttings

U Saw Yan Aung C. Doo, B.Sc.(For.) (Rgn.), M.S [Hawaii], Director,
and
Daw Thida Mundt, B.Sc. [Bot.] [Mdy.], Research Assistant,
Forest Research Institute

Abstract

The experiment conducted was aimed to investigate the cheapest and easiest method for the establishment of clonal orchard. It was found that teak branch cuttings as old as (100) years can be successfully propagated. The best season to collect and propagate the teak cuttings are in the month of March, April and May. It was also found out that temperature and high humidity are the most important factors in the development of shoots and roots.

Contents

1. Introduction

Forest trees are usually propagated by seed, seed-lings and stumps. But vegetative propagation is a very useful tool which has been practiced since ages in replicating clonal material.

A modern technique of vegetative propagation by budding and grafting is also being used for the establishment of clonal orchard. However, which in the process of grafting and budding, wounds are made, which in turn encourage the infection of virulent pathogens. Consequently after years of establishment of seed orchard, diseased trees are frequently found in seed orchard. By taking advantages of the post experience, this experiment is to use branch cutting for the clonal orchard which comperatively is much cheaper and involve less work.

Since the post decade, Myanmar forestry has put strong emphasis on plantation forestry without seed orchard. It is time that the Myanmar Forestry Department has its own seed orchard in the vacinity of plantations. A few seed orchards and seed source area has been established here and there, which is not adequate for the thousand areas of plantations that will be established in year to come. This experiment aim at investigating the most cheapest and easiest method for the establishment of clonal orchard around the country.

2. Materials and Methods

Through the experience from the previous experiment, a mist chamber was established having control of light intensity, temperature and relative humidity.

Materials for the experiment were collected from Katha Reserve, Chat thin Reserve, Naung Cho Reserve, Pin long Reserve, Ngalaik Reserve and Palwe Reserve Forests.

Materials collected included branches from the best tree of the region which has an average age of 90-100 years old. The branches were excised on both ends. Each excised branch measured 20-25 cm long and 5-8 mm in diameter.

A mixture of 1:1:2 sand, manure and soil were used as media in the polyethylene plastic bags. The cuttings were dipped into the bags and transferred to the mist chamber for the development of shoot and roots.

The temperature and relative humidity were maintained at 25^0C -30^0C and 70-90% through out the experiments. The experiments conducted included Hormone treatment of the cuttings.

1000 ppm of 1BA (Indole Butyric Acid), NAA (Nephathalene Acetic Acid) and IAA (Indole Acetic Acid) were used.

3. Result

3.1. Shoot development

In all the experiments, it was observed that the buds of the cutting appeared on the first week of the experiments. There was an average of (10) percent shoot development in the first week followed by an average of (63) percent after the third week. However, most of the cuttings did not produce shoots after the fourth week (Table. 1)

3.2. Hormone treatment

Observation of hormone treatment after (8) weeks indicated the cuttings produced shoots with an average of (48) percent in NAA, (57) percent in IBA, (34) percent in IAA and (33) percent in not treated cuttings (Table 2).

Table (1) Percent shoot development of Teak Branch cuttings without Hormone treatment.

Code No.	1st week	2nd week	3rd week	4th week
01	9.6	34.5	54.5	83.6
02	3.8	24.0	49.0	59.6
03	15.0	68.0	81.6	-
04	16.6	50.0	74.6	-
05	10.6	40.0	56.0	-
06	27.0	58.5	79.0	-
07	3.3	27.1	54.2	-

Table (2) Percent shoot development of Teak Branch cuttings after (8) weeks of planting.

Code No.	Hormone Treatment			
	NAA	IBA	IAA	Control
011	32	48	32	16
022	52	60	76	28
033	60	64	56	56

NAA - 1000 ppm of Nephthalene Acetic Acid.
IBA - 1000 ppm of Indole Butyric Acid.
IAA - 1000 pmm of Indole Acetic Acid.

3.3. Root development

Root development of teak branch cuttings initiate with callus formation. As the cambium activated the callus, root developed after (8) weeks of planting. However, abundant growth of adventitions root was formed only after (16) weeks of planting. Only then these plants were safe for transfer for hardening.

Table (3) Percent root development of teak branch cuttings after (16) weeks of planting.

Code No.	(%)
01	39
02	38
03	11
04	34
05	18
06	69
07	15

4. Seasonal variation of the development of shoot from Teak branch cuttings.

4.1. Material and Methods

The experiment was conducted in a mist chamber having a dimension of 22' length x 10' wide and 8' high (Fig .1). The maximum temperature in the mist chamber reach as high as 40^0C and the lowest 31^0C during the month of March, April and May. The humidity runs at 78% - 90%, the mist chamber was constructed with visible plain plastic sheet. To retain the moisture the chamber was tightly closed.

The teak branches were collected monthly form January through December. At least (100) branch cutting were used each time for testing the development of shoots and roots. The cuttings were obtained from the Ngalaik Reserve. Temperature recorded in the mist chamber throughout the years was as follows;

Month	Maximum ^{o} C	Minimum ^{o} C
January	28	16
February	30	17
March	32	18
April	38	22
May	40	23
June	40	23
July	39	23
August	38	19
September	34	20
October	31	18
November	29	16
December	28	16

<u>March</u>
- One week - 43 %
- Two week - 50 %
- Three week - 90 %

<u>April</u>
- One week - 25 %
- Two week - 52 %
- Three week - 92 %

<u>May</u>
- One week - 29 %
- Two week - 62 %
- Three week - 95 %

4.2. Result

There was seasonal variation in the development of shoots of teak branch cutting. With temperature of 40^0C Max and 23^0C Min, there was a vigorous growth of shoots. In the first week, the growth reach as high as 48% development followed by 50% in the second week and 90% in the third week. (See record of variation of

temperature in the chamber). When the temperature dropped to below 34^0C Max and 20^0C Min, there was only 29% of the development of shoots in (4) weeks. Hence it can be concluded that temperature and high humidity are the paramount important factors in the development of shoot in the branch cuttings of teak. It may also be that during March and April the bud of Teak start to develop and break the dormancy period. The bud usually developed at the first shower of the monsoon usually in May.

Survival of teak branch cutting planted in the field was 95%. (See fig .2). Average height reach (15) feets after 2 years of planting.

5. Discussion

Although bud grafting become popular, branch cutting can also be put into used in the development of clonal orchard. It is suggested the good Teak trees that still remain in the forest be selected for clonal orchard. This can best be done during the month of February and March after girdling operations. Every forest division should own an orchard about 20 to 30 acres size. This is the only and best possible way to conserve and maintain our best genetic characteristics of Myanmar teak.

References

1. Doo, Y.A.C & Thida Mundt, 1991. Vegetative propagation of Forest trees species from seedlings and branch cutting. Forestry Science Research Paper, F. R .I, Yezin, Myanmar.
2. Florida, L.V., 1979. Vegetative propagation by cuttings of Yemne (*Gmelina arbore* Roxb.) using growth regulators. Sylvatrop Phillip. For. Res. Jour. 3(2), 115-122.
3. Gupta and J.P Chandra, 1979. Vegetative propagation if coniferous forest trees species from branch cuttings with the help of Mist Chamber. The indian Forester, 1979. Vol . 105, No. 6.
4. Lahiri, A.K. (1979). Vegetative propagation of Forest trees. The Indian Forester, 1979. Vol. 105, No. 2.
5. Mersink, W.A. and V.G. Smith, 1979. Root and shoot development of cuttings of Base Wood (*Tillia americana*) Can. Jour. Res. 4. 246-49
6. Sami and Srivastara, P.B.L. (1985. Trial on rooting of cuttings of (*Gmelina arborea* Roxb.) roots. The Indian Forester, Vol. 48, No. 3.
7. Sing, T. K. Srivastava, R.B.C (1985). Trial on rooting of cuttings of (*Gmelina arborea*) the Malaysian.
8. Srivastawa, P.B.L and Penguang Maggil (1981). Vegetative propagation of some Dipterocarpus by cuttings. Mal. For. 44 (223) 301- 313.