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Propagation Techniques of Endangered Sablot *(Litsea glutinosa)* Lour. C.B. Rob.

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Abstract - Sablot known as Litsea glutinosa Lour. C. Rob., also known as Litsea sebifera is a medium sized woody tree, evergreen, 20-25 meters high with cream flowers usually blooming on January to February with fruit diameter of 10-15 mm. It reaches 20-30 cm in diameter. It has round stem, straight, small branch position. Outer bark is slight yellow with aroma. Simple leaf is found in Litsea. The leaf is 12-18 cm long, 3-4 cm wide, sharp head, leaf stem is wedged-shaped, two flat faces. It thrives on lateritic and basaltic soil. This research aimed to determine the growth of Litsea glutinosa using different types of planting stocks. It was also geared towards the determination of the early growth performance of the different planting stocks potted in four (4) soil media. And finally, it aimed to recommend the most appropriate nursery propagation techniques for the conservation of Litsea glutinosa. Seed germination was earliest after planting in a clay loam type of soil at 60% germination viability. Propagating the stems directly into the soil did not grow buds. Soaking them for two days and

transferring them into the soil gave growth but unable to sustain the buds. No roots appeared. It took lesser number of days to propagate the basal cuttings than the apical stem cuttings under the sun. There were more buds grown in the basal stem cuttings. The growth of sablot in terms of height was highest using the clay loam type of soil. Only clay loam and sandy loam were significantly different from each other in the sablot height. Among the four soil types, clay loam showed the most number of leaves, and there were no significant differences on the number of leaves grown in all the soil types. The growth of sablot in terms of length of leaves was longest using clay loam. There was a significant difference in the length of leaves to the different soil types. The growth of sablot in terms of width of young leaves was widest in clay loam but shortest in sandy loam. The lowest length of old leaves, which were located at the lower portion of the plant was measured in sandy loam . There was no significant differences on the width of sablot young leaves in different soil types. Although there was a significant difference in the width of old leaves planted in four soil types. Leaves grew almost constant by its width but grew fast by its length.

Keyword - propagation, techniques, sablot, Litsea glutinosa

INTRODUCTION

Vigan City is a fifth class city located in the province of Ilocos Sur and is famous for its Castillian houses built during the Spanish Era. It is a World Heritage Site, thus its name Heritage City of Vigan, which is administered by UNESCO. The Spanish colonial town is still distinct in the area with a defined architectural design with cobblestone street and brick houses which is believed to be a combination of Philippine and European building design.

The preservation of the old houses is very essential to attract more tourists and create more jobs. During the Spanish era, the houses were built with mixture of sand and a plastering substance. A famous plastering substance used was sablot (Litsea glutinosa). The leaves were crushed and added to the mixture for binding bricks. Thus, it is an important component for making the building sturdy and well-built.

Sablot, scientifically known as Litsea glutinosa has been reportedly decreasing in the province of Ilocos Sur despite its significant role in the conservation and preservation of old houses in Vigan City. Parts of the tree are used as firewood. The increasing demand in the use of the tree requires an increase in the number of standing trees available thus avoiding it to become endangered or at extreme extinct. Moreover, producing more sablot trees will be a good starting point to bring back the use of plastering substance in building houses, roads and pavements making it more lasts long.

The research focused to study the propagation of Litsea glutinosa using different types of planting stocks. It is also geared towards the determination of the early growth performance of the different planting stocks potted in four (4) soil media. And finally, it is aimed to recommend most appropriate nursery propagation techniques for the conservation of Litsea glutinosa.

REVIEW OF LITERATURE

Botany. Sablot is a medium woody tree, evergreen, 20-25 meters high with cream flowers usually on January to February. The young parts usually more or less pubescent. Flowers are yellow in October to November (Huy, 2007) while it is from March to May (Merrill, 1911) with fruit diameter of 10-15 mm (Huy, 2007) while others are 8 mm or less in diameters (Merrill, 1911). Umbels in the upper axils, solitary or umbellate, 1 to 1.5 cm in diameter ther peduncles above 1 cm long containing many small crowded yellowish flowers. One kg of sablot fruits contains 3,200 to 3,400 seeds. It reaches 20-30 cm in diameter, possible reaching 40 cm in some cases. It has round stem, straight, small branch position. Outer bark is slight yellow with aroma. Simple leaf is found in Litsea. The leaf is 12-20 cm long, 3-4 cm wide, sharp

head, leaf stem is wedged-shaped, two flat faces. The leaves are elliptic to oblong-elliptic . It thrives on lateritic and basaltic soil (Huy, 2007). It is widely distributed in the Philippines at low altitudes and in the Indo-Malayan Region. Philippine National Oil Company (PNOC) EDC's Biodiversity Project found endangered species of almaciga, bakan, tirono, white lauan, nato, baugit, Philippine maple and sablot in the 24,557-hectare Mount Kanlaon (Bolinas, 2008).

Construction Material. Sablot is used by artisans, masons and builders and is an important ingredient in the formation of plastering mixture. As early as 19th century, the old Ciudad Fernandina de Bigan now Heritage City of Vigan started to build its thick-walled houses using bricks. The bricks were cooked in original dragon kilns and put together using a plastering substance (Msgr. Mercado, 2004). The plaster is a mixture of sand and lime to form a binding mixture called "argamasa". But when there was no cement yet, to make it more durable leaves of sablot (Litsea glutinosa) were chopped and soaked in water for 2-3 days. The water containing the extract is mixed with other materials like egg white, molasses (sugar cane juice) together with Litsea liquid to make it waterproof. Msgr. Reyes (2001) demonstrated the use of "argamasa" in repairing old walls of the UNESCO World Heritage Site-inscribed Sta. Maria Church in Sta. Maria, Ilocos Sur. He insisted that restoring walls of old churches be done in consonance to their original form and consistency of materials to bring back their authenticity as plasters.

Other Uses. Cabarloc (2005) recalled that sablot leaves are soaked in water and the mixture is combined to stone to form hard and heavy stone mortars called "alsong". The "alsong" goes with the "al-o". They resemble to that of the mortar ("almiris") and pestle. This hollow mortar is essential in households and small business enterprise in making raw ingredients for delicacies which require heavy and sticky mixing. Rabena (2003) reminisced that during the pre-World War II era, sablot leaves extract combined with water is poured unto a flat earth surface and dried for days before they use it as "taltagan" in lieu of the mortar for palay processing in the countryside. Villanueva revealed that sablot is one of the raw materials in his product lines lauat hair shampoo and conditioner where he mixed with virgin coconut oil (VCO).

Chemical components of sablot. Sablot roots, branches and barks contain medicinal compounds which are usually formulated at 9%. This includes the 2, 9 dihydroxy 1,10 dimethoxyaporphine 6-methoxyphenanthrene. However, Jing-Hua Yang et al disclosed two new aporphine alkaloids from sablot. Its fruit is 45% fat in wax contains laurin and olein, a wax used in candle and soap production. However, the stem and bark have a glue substance that is important in the glue and paper industry. Its additive matter is used in the concrete industry and it is utilized in incense production. The bark when soaked in water is excellent hair oil (Huy, 2007). Herath et al were able to characterize the mucilage as arabinoxylan (D-xylose and L-arabinose) with a molar ratio of 1.0:3.4). The backbone is 1- 4 linked beta - D xylospranosyl residues having alpha-L and beta-L arabinofuranosyl residues at 0-2 of xylosyl residues.

Medicinal Uses. Rabena, Esguerra and Guzman (2004) determined the phytochemicals present in the leaves. Its leaves contain moderate amounts of alkaloids and tannins, traces of flavonoids and sterols and no glycosides and triterpenes. Leaves extracts can cure nasal congestion, cough, malaria, and stops hemorrhage. Because of its tannins, it can eliminate sore throat and stomatitis. It can be a remedy for menstrual disorder and rickets due to its flavonoids. It is a good antifungal, anti-inflammatory as well as cytotoxic agent. Rabena (2004) found the bark paste as a perfect cure for wounds as an antiseptic with antimicrobial indices against Escherichia coli and Staphylococcus aureus at 0.073 and 0.033 , respectively. In Thailand, Chomkamon, Nongluksna, Wanchai and Nijsiri isolated a novel chemical (E) -(-ocimene) from the oil of sablot fruits. They further subjected them to antimicrobial assay against yeast, Candida albicans ATCC 10023 and found effective in inhibiting the fungi.

MATERIALS AND METHODS

1. Survey and Ocular Inspection. A survey on the location of Litsea glutinosa was conducted in Vigan City and the coastal plains of the towns of the First District of Ilocos Sur. Ocular inspections were conducted on the exact places to examine their existence. The number of standing trees were counted in each Village. The number of trees

in the soil type cluster were summed up. A similar survey was also conducted in the coastal plains of the towns of the First District of Ilocos Sur.

2. Seed germination. Forty seeds were collected from a mother sablot tree (approximately 40 years old) and were planted in a seed box having different soil types. The soil types were clay loam, clay loam with sand (1:1), compost and compost with manure (1:1). The number of germinants were counted and the number of days for the seeds to germinate were recorded.

3. Stem Cuttings. Sablot stems were cut with a maximum of three internodes including those with apical portions. The basal part of stems were soaked overnight and planted in polyethylene potting medium with different soil types. Ten stem cuttings were planted in each treatment, thus, a total of 40 stems were planted.

3.a. Innovation. Sablot stems were cut from a mother tree. Ten (10) cuttings were taken from the apical portion and were equally soaked in water placed under sunlight and shady areas, while ten (10) were also taken from basal portion and equally soaked and also placed in two areas. The number of days needed to show buds or shoots and the number of buds that grow were recorded and analyzed statistically using the t-test.

4. Transplanting. Five (5) seedlings were found growing under a 40-year old mother tree and were transplanted in polyethylene bags with a clay loam soil. The transplanted seedlings recovered after five (5) days.

The grown seedlings were transplanted further in polyethylene bags at different treatments in order to measure their growths. The early growth performance of the seedlings were measured and statistically analyzed using Analysis of Variance (ANOVA) and further subjected to t-test.

5. Marcotting/ Air Layering. The stem of a 5-year old standing tree sablot was wounded and then wrapped with a moisture-retaining wrapper with clay loam soil. This was further covered with

polyethylene bag, a moisture barrier. The stem from the parent plant was removed and planted on polyethylene bags with clay loam soil. The air-layered wrapped stems were examined. The stems were cut and were transplanted into different media.

RESULTS AND DISCUSSION

Sablot (Litsea glutinosa) Lour. C.B. Rob. known also as Litsea sebifera is a tree 10-meters high or less is a dicotyledonous plant of the laurel family, Lauracea. It is commonly known as lauat and known in other countries as balongai, methaluang, thang-buan, malek, malih, lanica, boi loin hot, huru tangkalak, wuru lilin, mimen, purikit and Indian laurel.

Present Status of Litsea glutinosa propagation.

Sablot (Litsea glutinosa) is a versatile plant. It is used as a fodder for cattle and goats and as an antiseptic in traditional medicine. It is used as a structural support in vanilla agroforestry and it is used in the charcoal industry (Vos, 2004). According to Pascal (1997) Litsea glutinosa, Lantana camara , and Albizzia lebbeck are the most important species in terms of their dispersal and the extent of the coverage. Baguinon et al mentioned in their country report that ocular observations show that where paper mulberry forms pure stand thickets, the usual indigenous pioneer tree species such as anabiong (Trema orientalis), binunga (Macaranga tanarius), tibig (Ficus nota) and sablot (Litsea sebifera) are not present.

In Polillo Islands, the growth rate of sablot (Litsea glutinosa) is fast similarly compared to puso-puso (Neolitsea vidalii), sablot-linis (Litsea baractanensis) and batikuling (Litsea leytensis). It is a small tree and has high invasion potential and displaces regenerating native plant species in disturbed environment (Pagad, 2008).

Vigan City, Ilocos Sur. A survey on the exact locations of sablot trees were conducted. Vigan City is the core site of the study and all its Villages were considered. A total of 128 standing trees were identified and counted. The trees were found as solitary in inhabited areas in the Villages and found as clusters in small forests usually at the

peripheries of agricultural lands. Sablot seedlings are also growing invasively around mother trees in Nagsangalan and San Julian Norte, Vigan City. The eastern Villages comprising Raois to Ayusan Norte, having a sandy-loam type of soil has 82 trees. Village Tamag to Ayusan Sur having generally a clay-loam type has 19 trees while the coastal Villages, characteristically sand has 27 trees.

Table 1. Number of standing sablot trees in Vigan City

Village	No. of Standing Trees	Total No of trees per soil cluster
Sandy-Loam		**82**
Raois	9	
Rugsuanan	6	
Puroc a Dackel	9	
Puroc a Bassit	6	
Nagsangalan	12	
San Jose	2	
San Julian Norte	14	
San Julian Sur	4	
Capangpangan	2	
Cabaroan Daya	2	
Cabaroan Laud	2	
Bongtolan	2	
Camangaan	2	
Cabalangegan	2	
Bedden Laud	2	
Beddeng Daya	2	
Ayusan Norte	4	
Clay - Loam		**19**
Tamag	3	
Ayusan Sur	3	
Salindeg	5	
Barraca	3	
Paratong	3	
Bulala	2	
Sandy Loam (coastal)		**27**
Pantay Laud	2	

San Pedro	2	
Mindoro	5	
Pantay Fatima	12	
Pantay Daya	6	
TOTAL	**128**	**128**

First District of Ilocos Sur. A survey of locations where sablot are located were also made in the coastal plains of the towns in the First District of Ilocos Sur. Field visits and ocular inspections showed that the species is located in the uncultivated lands (rural areas) in Sitio Gongogong, Pagsanaan, Magsingal, Ilocos Sur. They are abundant in the bamboo areas and ridges in Sto. Domingo, Ilocos Sur and Cabugao, Ilocos Sur. The undulating hills of Ora East and West, Bantay , Ilocos Sur are grown sparsely with sablot. In the coastal plains in between vast agricultural lands in Sta. Catalina, Ilocos Sur and the long creeks delta of San San Sebastian, San Vicente, Ilocos Sur, the vast agricultural lands of San Ildefonso, Ilocos Sur, stands of sablot are intergrown with other lesser known species (LKS) but economically important trees.

Seed Germination. Germination is an important aspect in the production of quality abundant seedlings. Seeds of sablot were obtained from different mother trees identified in the area. A floatation method was used to remove non-quality seeds. The seeds were soaked overnight to hasten its viability. Ten (10) seeds were planted in a seed box with varied soil types. There were forty (40) seeds planted.

T1 - clay loam soil
T2 - loam and sand (1:1)
T3 - compost soil
T4 - manure

Table 2. Total number of seeds germinated (cumulative).

Days after Planting	T1	T2	T3	T4
6	1	0	0	0
7	1	1	1	1

8	2	1	2	2
9	3	2	2	3
10	5	2	3	3
11	5	3	3	4
12	5	3	3	4
13	6	4	4	5
14	6	4	4	5
15	6	4	4	5
16	6	4	4	5
17	6	4	4	5

The start of germination occurred on the 6th day after planting in a clay-loam soil with one (1) seed germinated followed by the other soil types. Peak of germination was observed on the 14th day after planting with a total of 19 seeds germinated for all treatments. As to the treatment used, a clay-loam soil (T1) produces more germinants (6 seeds) followed by the 5 day continuous non germination. The seedlings were transplanted after a maximum vigor of the seedlings were produced.

Stem Cuttings. Sablot stems were cut, with a maximum of three internodes including those with apical portions. The basal part of stems were soaked overnight and planted in polyethylene bag with different soil types. Ten stem cuttings were planted in each treatment, thus, a total of 40 stems were planted.

Table 3. The total number of stems that produced buds (cumulative).

Days of Planting	TI	T2	T3	T4
9	1	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0

13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
Total	1	0	0	0

Growth of buds occurred on the 9th day after planting with one (1) on a clay–loam soil. However, a non-occurrence of buds was observed even after the 9th day until the 30th day after planting thus, the experiment was terminated. Analysis were made on the non-occurrence of buds.

The earlier propagation process involves the direct contact of the sablot stem cuttings to the soil. No roots developed from the soaked stem. There were young green buds that came out from stem above the water level after 7 to 9 days of soaking (see Table 3) but unable to continue their growth.

Table 3. Budding (A). The growth of sablot cuttings soaked in water with enough sunlight.

Sablot Cuttings	No of days	No of buds
1 a	9	2
2 b	7	3
3 b	7	3
4 a	8	1
5 a	8	2
6 a	8	4
7 a	8	2
8 b	8	2
9 b	7	2
10 b	8	3

Legend: a- apical cutting b- basal cutting

An innovative process was made to find solutions to the non-occurrence of roots that could sustain the growth of buds in sablot cuttings. Apical cuttings and basal cuttings were soaked in a shallow

pail containing water and 7 to 9 days were needed before buds grow. Mostly 2 to 3, and even 4 buds developed after 7 to 9 days. Observations were made and continued to 6 weeks but the shoots did not increase in length. The soaked portion especially the base did show any growth of roots in water.

Another group was soaked in water but was placed under a shady area and showed lesser number of shoots/buds from stems. There were no roots developed from the base in water.

Table 4. Budding (Innovation B). The growth of sablot stem cuttings soaked in water under a shady area.

Stem cutting	Number of Days to Budding	Number of Bud/Shoot	Other Observations
1 a	10	1	No roots emerged
2 a	9	2	No roots emerged
3 a	10	0	No roots emerged
4 a	11	1	No roots emerged
5 a	11	2	No roots emerged
6 b	8	2	No roots emerged
7 b	9	2	No roots emerged
8 b	9	1	No roots emerged
9 b	8	2	No roots emerged
10 b	7	2	No roots emerged

a – apical cutting b – basal cutting

The data were analyzed using the t-test to test their significant differences (Table 4). Using the t-test, it was found out that there was a very significant difference on the number of days in propagating the apical and basal stem cuttings grown under the sun. **It took lesser number of days to propagate the basal cuttings than the apical stem cuttings under the sun.** However, there wass a significant difference in the number of buds placed under the shady area. There were more buds grown in the basal stem cuttings.

Table 4. Comparison between apical and basal types of cutting sablot (*Litsea glutinosa).*

Type	No. of Days				No. of Buds			
	Sun		Shady		Sun		Shady	
	x	SD	x	SD	x	SD	x	SD
Apical Basal	8.2 7.6	0.45 0.14	10.2 8.6	0.84 0.14	2.2 2.6	1.1 0.55	1.2 1.8	0.58 0.4
Value of t	23.81	**VS**	2.66	S	0.73	NS	1.905	S

Legend: VS-very significant S-significant NS- not significant

Transplanting /Wildlings. There were seeds that fell from the standing mother tree by the action of gravity, moved by wind or transported by insects . They readily germinate in the soil and grew vigorously, and is known as natural regeneration, a technique of seedling production. Five (5) seedlings were found under a 40-year old mother tree and were transplanted in polyethylene bags containing clay loam soil. The transplanted seedlings recovered after five (5) days.

The grown seedlings were transplanted further in polyethylene bags at different treatments in order to measure their growths. In table 5, the highest growth in terms of height was observed in clay loam soil having an average of 9.8 inches while sandy loam gave the slowest growth at 6.56 inches. Analysis of variance (ANOVA) on the height of sablot plants compared in four soil media showed that there was a significant difference in their heights (Table 6). Comparing their heights of each soil type to the heights of other soil type, using the Scheffe Test, clay loam soil showed a significant difference to that of the sandy loam soil type at 5% level of significance. All the rests did not differ significantly.

Table 5. The growth of sablot (height and no. of leaves) in a year period from wildling

Parameter	Replicate	T1	T2	T3	T4
Total Height (in inches)	R1 R2 R3	11 9.5 10.2	6.5 6.2 6.1	7.0 7.0 7.2	10.2 10.4 10
Total No. of Leaves	R1 R2 R3	9 (5/4) 8 (4/4) 9 (5/4)	11 (8/3) 7 (3/4) 7 (4/3)	8 (4/4) 7 (4/3) 8 (4/4)	8 (3/5) 8 (4/4) 8 (4/4)

Legend : (5/4) – 5:top, young leaves 4:low, old leaves

Table 6. ANOVA table for sablot growth (heights)

SV	df	SS	MS	Fc	Ftab(.05)
Block	2	0.9	0.45		
Soil Type	3	23.40	7.8	**8.04***	4.76
Error	6	5.81	0.97		

The number of leaves in sablot trees were also counted and statistically analyzed. Clay loam soil type showed also the highest number of leaves while compost manifested the lowest count. ANOVA test confirmed that there were no significant differences on the different soil types in terms of the number of leaves present in the sablot plant. The size of leaves (in inches) were measured in terms of length and width. The standing sablot had growth portions as shown distinctively by the characteristics of the leaves, the upper portion was composed of young and big leaves while the lower growth portion was composed of old but small leaves. The length of the young leaves was longest in clay loam (6.94 inches) . Average length of young leaves was 6.68 inches. Old leaves was longest at 4.93 inches in clay loam compared to the average, 4.77 inches. Sandy loam manifested the shortest length at 2.6 inches for young leaves. Although for length of the young leaves, there was a very significant difference in the their lengths using different

soil types. Similarly, there was a significant difference in the length of old leaves using four different soil types (Table 7, 8, 9 & 10).

Table 7. Length of leaves (younger) (in inches) in a year period

Type of Soil	Replicate1	Replicate2	Replicate 3	Total	Average
Clay loam	6.84	6.25	6.94	20.03	6.68
Sandy loam	3.38	2.6	3.57	9.55	3.18
Compost	5.94	5.7	6.0	17.64	5.88
Manure	5.8	4.58	5.37	15.75	5.28
	21.96	19.13	21.88	62.97	

Table 8. ANOVA table for length of leaves (younger)

SV	df	SS	MS	Fc	Ftab(.05)
Block	2	1.29	0.645		
Soil Type	3	20.10	6.7	**111.67***	4.76
Error	6	0.33	0.06		

**significant at 5% level*

Table 9. Length of leaves (old – lower portion) (in inches) in a year period

Type of Soil	Replicate1	Replicate2	Replicate 3	Total	Average
Clay loam	4.72	4.65	4.93	14.3	4.77
Sandy loam	2.53	2.85	4.87	10.25	3.42
Compost	3.1	2.87	3.18	9.15	3.05
Manure	5.2	3.7	5.28	14.18	4.73
	15.55	14.07	18.26	47.88	

Table 10. ANOVA table for length of leaves (old)

SV	**df**	**SS**	**MS**	**Fc**	**Ftab(.05)**
Block	2	2.26	1.13		
Soil Type	3	7.07	2.36	**5.36***	4.76
Error	6	2.64	0.44		

**significant at 5% level*

The growth of sablot in terms of width of young leaves was widest in clay loam (2.08 inches) but shortest in sandy loam (1.09 inches) compared to the highest average width of 1.9 inches. For old leaves located at the lower portion of the plant, the lowest was measured in sandy loam which was 0.9 inches. There was no significant differences on the width of sablot young leaves in different soil types. Although there was a significant difference in the width of old leaves planted in four soil types (Table 11, 12, 13 & 14).

Table 11. Width of leaves (young)
(in inches) in a year period

Type of Soil	Replicate1	Replicate2	Replicate 3	Total	Average
Clay loam	2.08	1.9	1.72	5.7	1.9
Sandy loam	1.09	1.33	1.18	3.6	1.2
Compost	1.83	0.63	1.83	4.29	1.43
Manure	1.93	1.60	1.73	5.26	1.75
	6.93	5.46	6.46	18.85	

Table 12. ANOVA table for width of leaves (young)

SV	df	SS	MS	Fc	Ftab(.05)
Block	2	0.28	0.14		
Soil Type	3	0.9	0.3	2.14*	4.76

Error	6	0.83	0.14		
Total	11				

**Not significant at 5% level*

Table 13. Width of leaves (old)
(in inches) in a year period

Type of Soil	Replicate1	Replicate2	Replicate 3	Total	Average
Clay loam	1.75	1.7	1.15	4.6	1.53
Sandy loam	0.9	0.93	1.03	2.86	0.95
Compost	1.4	1.33	1.4	4.13	1.38
Manure	1.75	1.68	1.7	5.13	1.71
	5.8	5.64	5.28	16.72	

Table 14. ANOVA table for width of leaves (old)

SV	df	SS	MS	Fc	Ftab(.05)
Block	2	0.03	0.015		
Soil Type	3	0.94	0.31	**10.33***	4.76
Error	6	0.19	0.03		
Total	11				

**Significant at 5% level*

Marcotting/ Air Layering. The stem of a 4-year old standing tree sablot was wounded and then wrapped with a moisture-retaining wrapper with clay loam soil, which was further covered with polyethylene bag. A sufficient root that have grown from the wound was observed on the 10th day after layering. The stem from the parent plant was separated and planted on polyethylene bags with clay loam soil.

The air-layered wrapped stems were examined on the appearance of true roots. The young roots turned into hardened 'callus' after

two months. The stems were separated and were transplanted into different treatments. The growth were not sustained by the conditions of 'callus' after a month of survival.

CONCLUSIONS

The following are the conclusions of the study:

1. Seed germination was earliest after planting in a clay loam type of soil at 60% germination viability.
2. Propagating the stems directly into the soil did not grow buds. Soaking them for two days and transfer them into the soil gave growth but unable to sustain the buds. No roots appeared. It took lesser number of days to propagate the basal cuttings than the apical stem cuttings under the sun. There were more buds grown in the basal stem cuttings.
3. The growth of sablot in terms of height was highest using the clay loam type of soil. Only clay loam and sandy loam are significantly different from each other in the sablot height. Among the four soil types, clay loam showed the most number of leaves. And there were no significant differences on the number of leaves grown in all the soil types.
4. The growth of sablot in terms of length of leaves was longest using clay loam. There was a very significant difference in the length of leaves to the different soil types. The growth of sablot in terms of width of young leaves was widest in clay loam but shortest in sandy loam. For old leaves located at the lower portion of the plant, the lowest was measured in sandy loam. There was no significant differences on the width of sablot young leaves in different soil types. Although there was a significant difference in the width of old leaves planted in four soil types.
   Leaves grew almost constant by its width but grew fast by its length.

5. Marcotting the stem from a standing sablot tree will give rise to roots but turned to hardened callus-like formations which can not germinate true and permanent roots needed to sustain the growth and survival when they were separated from the mother tree.

RECOMMENDATIONS

1. Studies must be conducted on the determination of the number of days sablot seeds may stay in natural habitats, i.e. they fall on the ground under the tree before they manifest germination.
2. There is a need to study in detail the propagation of stem containing sticky substance like sablot.
3. More number of replications must be done in order to validate the parameters being studied.
4. Sablot stems propagation using marcotting/air layering, upon reaching a desired maturation of roots or callus-like formations, the prospective stem/branch must be cut to a reduced size ready for separation from its mother tree in order to provide a greater opportunity to develop roots when transplanted.
5. Growth hormones be tested to support the growth of roots during the process of marcotting.

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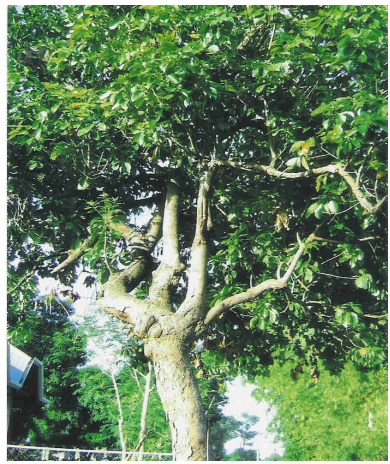

A sablot tree (approx. 50 yrs old)
growing at a backyard in Village Puroc a Bassit, Vigan City

Sablot trees growing in uncultivated lands of
Sitio Gongogong, Pagsanaan, Magsingal, Ilocos Sur

Seedlings from sablot seeds

Cuttings of sablot planted in different media

Cuttings from sablot stems and branches of sablot were soaked in water to allow rooting.

A marcotting process is tried on a young standing sablot tree .

A young mother sablot tree used in marcotting stems.

A young mother sablot tree used in marcotting stems.

Seedlings of sablot transplanted into plastic bags.

Sablot seedlings are planted into a manure type of soil.

Sablot seedlings are planted in a soil.

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