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The influence of different ages of suckers on the survival of Tiger grass *(Thysanoleana maxima)*

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Abstract

The study examined the impact of different sucker ages on the survival of Tiger Grass (*Thysanoleana maxima*) in Flourishing, Gonzaga, Cagayan, Philippines from July 2021 to December 2021. The study aimed to determine which planting material can gain the highest percentage of survival. In addition, it also aimed to determine the influence of different ages of suckers on the average number of roots, average length (cm) of roots, average number of leaves and average number of suckers after 3 months. The study was conducted in a single factor experiment under Completely Randomized Design (CRD). There were three (3) treatments used in the study which include: T_1, suckers propagated with one leaf, T_2, suckers propagated with two leaves and T_3, suckers propagated with three leaves. A total number of 180 propagules were used. 20 propagules were used in every treatment replicated three (3) times. T_1, suckers propagated with one (1) leaf shows 53.33% survival. T2, propagated with two (2) leaves shows 65.55% survival and T_3, suckers propagated with three leaves garnered the highest percentage of survival having a 90.00 %. It is concluded that employing suckers with three leaves while growing tiger grass has a greater impact on sustaining plant metabolism. Therefore, from the gathered data as to the findings and conclusion made, it is recommended that after suckers are harvested for multiplication, we need to keep enough leaves to sustain the regrowth and recovery of disturbed roots and leaves.

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Introduction

Tiger grass is widely distributed in almost all regions in the Philippines. It is locally known as boi-boi (Ilocano) and tambo (Tagalog). This grass grows abundantly in the highland areas of Cagayan Province but farmers from Gonzaga, Cagayan did not pay attention in producing soft-brooms. They do not recognize the benefits it may provide for their future well-being despite its considerable ecological and economic significance.

In the mountainous areas of Gonzaga Cagayan and its neighboring towns, slash and burn agriculture is practiced. There are naturally growing Tiger grass in few clusters in the second growth forest. With this, some upland dwellers are benefited from it by harvesting the panicles which they make into soft brooms that they sell in households and in the market place. Sometimes stray cattle used to feed on the grass that eventually caused the destruction of the plants. This is further aggravated by the illegal activities of kaingineros as they inhabit the second growth forest for crop production.

Tiger grass cultivation is seen as a feasible source of revenue due to the possibility of earning money from the plant's harvested panicles when it is managed properly (Fetalvero). The panicle stalks, which are used to make the soft broom handle, can also be utilized to make large or little gift boxes when they are damaged. It is a versatile species with great soil conservation value that produces brooms, fuel, and feedstock (Sespene, 2011). The plant functions as a cover crop and aids in water conservation while reducing erosion. It is beneficial for restoring degraded regions because it keeps the ground moist and encourages soil fertility. This plant is also raised for decoration. The farmers can utilize the roots to encourage soil conservation, the dried stems as stakes to stimulate the growth of vegetables like tomatoes, and the leaves as green feed for livestock. Additionally, the grass has a variety of therapeutic qualities that are vital in societies that live off the land. Many different types of soil, including clay, sandy clay loam, and sandy loam, can be used to grow it.

The Cagayan State University at Gonzaga is doing its best to help rehabilitate the degraded land caused by illegal activities by propagating and planting different bamboo species which will help respond to the need of propagules to reforest areas by concerned agencies and non-government organizations.

To maximize the rehabilitation and utilization of the improperly managed land resource, a companion crop that suit into the farming system is important and tiger grass seem to fit into it by planting in between the rows of bamboos.

There were two ways to multiply tiger grass, by seeds and by rootstocks. Because it will take longer for the plant to mature and generate panicles, seed propagation is uncommon. Because of this, farmers in Gonzaga, Cagayan frequently use root-stock propagation, which is frequently planted directly in the field but gives very low survival. Tiger grass clumps are uprooted, and the top portion of the grass is chopped off, leaving 10-15 cm of the culm as measured from the rootstock. Thus, a more reliable strategy in the propagation of tiger grass is by propagating individual suckers in a nursery for the production of more propagules and higher survivability when transplanted in the field. The variables measured are the average number of roots, length of roots, number of leaves and percentage of survival after three (3) months. This method should be practiced for easier management while the plants are still young and susceptible to unfavorable weather conditions.

Materials and methods

Locale of the Study

The greenhouse at the back of Administrative building of Cagayan State University Gonzaga Campus was prepared and used as nursery.

Data Gathered

The study examined the average number of roots after 3 month, average length (cm) of roots after 3 months, average number of leaves after 3 months and percentage of survival after 3 months.

Research Design

Tiger grass was the subject of this study. Tiger grass suckers were classified into three (3) different ages basing on the number of leaves which comprise the treatments. Only those leaves that have opened were considered in each treatment of the study. Three (3) treatments were reproduced three (3) times in a single factor experiment using a Completely Randomized Design (CRD). The experimental treatments were T1- suckers with one (1) leaf; T2- suckers with two (2) leaves; and T3- suckers with three (3) leaves

Statistical Tool for Agricultural Research version 2.0.1 was used to analyze the data gathered.

Preparation of soil medium and potting

The soil medium that was used is a mixture of two (2) parts of Carbonized Rice Hull (CRH), one (1) part alluvial soil, one (1) part of organic fertilizer making a ratio of 2:1:1. The soil medium was mixed thoroughly and packed in a 5' x 9" polyethylene bags.

Selection and gathering of suckers

Selection of suckers that were used was based on its age that can be a key to higher survivability. Age of the suckers can be identified by the number of leaves present in the suckers. Tiger grass clumps were procured from farmers in Gonzaga, Cagayan which was propagated to serve as source of suckers of different ages. One hundred eighty (180) Tiger grass suckers were collected and were used as propagules for the study. The suckers were categorized basing from the number of leaves as one leaf, two leaves and three leaves having 60 pieces each category.

Planting

Suckers were planted in readily mixed potting media packed in polyethylene bags. They were planted vertically to 5-10 cm deep. The soil was pressed gently around the base of the propagules in order to hold the plants in place.

Care and Maintenance

Suckers will grow well in either full sunlight or partly shaded area. It likes moist soils rich in organic matter. The propagules were watered once a day or as the need arise to provide the amount of moisture needed for higher percentage survival.

Weeds that grow with the propagules were removed to prevent competition for space, water, sunlight, nutrients and reduce harborage of pests.

Results and discussions

Table 1. Parameters obtained on the influence of different number of leaves on the growth and survival of tiger grass after three (3) months).

Treatments	Parameters				
	Average Survival rate (%)	Average number of suckers	Average number of leaves	Average number of roots	Average root length (cm)
T1-one leaf	53.33	2.03	9.87	46.92	77.79
T2-*two leaves*	65.00	2.60	9.86	68.75	74.72
T3-*three leaves*	90.00	3.09	10.77	79.08	72.25
ANOVA Results					
	Three*	ns	ns	Three**	ns
C.V. (%)	19.64	17.31	6.95	9.25	17.44

Ns-not significant

*- significant

**- highly significant

Average survival rate (%)

Table 1 shows the average survival rate of tiger grass suckers based on the different number of leaves. The result revealed that T_3, suckers with three (3) leaves obtained the highest with a mean of 90%. This was followed by T_2, suckers propagated with two (2) leaves with a mean of 65%. The survivability of T_1, suckers propagated with one (1) leaf is 53.33% which garnered the lowest among the treatments observed.

On the survival rate, the treatment mean variation is sufficiently larger than the experimental error and it yielded a significant difference. The result proves that the more number of leaves up to three when the suckers are propagated is better than less than three suckers. Higher percentage of survival means more propagules to plant. The treatment mean comparison shows that the difference between T_3 and T_1 is 36.67 which are larger than the LSD value at 0.01 so it is highly significant and the difference between T_3 and T_2 exceeds LSD value at 0.05 but not LSD value at 0.01 so it is just significant.

The mean difference between T_2 and T_1 is 11.67 which were found smaller than the LSD value at 0.05 so they are not significantly different with each other. Treatment 1 represents younger suckers while Treatment 3 represents mature suckers. This analysis means that mature suckers tend to survive more, than younger suckers. Additionally, it has been noted that it would generally take three months after planting for a single tiger grass sucker to survive (Fredelino, 2011).

Following the trial, it was continually monitored once it was planted in the field. It was discovered that tiger grass suckers would have higher survival rates and suckering potential if they were first grown in a nursery before being released into the field.

Average number of suckers

As shown in Table1, T_3, suckers propagated with three (3) leaves produced the most number of suckers after three months with a mean of 3.09. This was followed by T_2, propagated suckers with (2) leaves that produced a mean of 2.60 suckers while T_1, propagated suckers with one (1) leaf obtained the least number of suckers produced with a mean of 2.03. The experiment failed to detect any difference among the treatments tested which could be due to a very small treatment difference.

Choosing mature suckers with three leaves would be able to create more suckers, according to the data acquired. This will guarantee the continued production of panicles, which will be converted into soft-broom, the crop's final byproduct. The results indicate that T1, one leaf, which was thought to be a juvenile sucker, will have a very poor suckering potential. Additionally, it was shown that older suckers, which have more distinct roots than juvenile suckers, will more readily recuperate and absorb nutrients to prolong their growth.

Average number of leaves

Table 1 shows T_3, suckers propagated with three leaves obtained the most number of leaves after three months with a mean of 10.77. This was followed by T_1, suckers propagated with one (1) leaf with a mean of 9.87 while T_2 suckers propagated with two leaves obtained the least number of leaves produced after three months with a mean of 9.86.

Based on the study's findings, tiger grass will vigorously create leaves if it has enough leaves (3) to support its growth in various tiger grass parts. Again, suckers with three leaves yield the most leaves. Suckers with three leaves appeared to recover more quickly than T1s with only one leaf.

This study supplements the information of Goi Lita (2021) in her journal entitled: Do plants grow faster with more leaves. According to her, leaves are very important to plants in the manufacture of plant food by photosynthesis. Chlorophyll, the substance that gives plants their characteristics green color absorbs light energy; the reason why the leaves are very important to plants. More leaves will help a plant grow faster provided there is enough light and water available for it to produce enough food to sustain overall growth.

Average number of roots

Table 1 shows T_3, suckers propagated with three (3) leaves produced the most number of roots with a mean of 79.08. T_2, suckers propagated with two (2) leaves follows with a mean of 68. T_1, suckers propagated with one (1) leaf produced the least number of roots with a mean of 46.92.

Based on the study, T3 suckers developed the most roots when they had three leaves. With enough leaves, mature suckers will also develop more roots.

This study supplements the information given by Charles Stichler (2002) that the fewer the leaves were, it also devotes little energy to the root system to regrow more roots. Carbohydrates are not created and transferred to the roots if the leaf area is too small to carry out enough photosynthesis. More roots produced are beneficial since the roots are responsible in anchoring the plant in its place and could absorb more nutrients and moisture from the soil for its use (CK-12, 2015). Moreover, more roots tend to have a better hold in the soil thus better prevention of soil erosion.

Average length of roots

Treatment 1, suckers propagated with one (1) leaf had the longest average roots with a mean of 77.79. T_2, suckers propagated with two (2) leaves had 74.72 leaves while T_3, suckers propagated with three (3) leaves had the shortest average root with a mean of 72.25. The ANOVA failed to detect sufficient difference, thus it is not significant.

In this investigation, it was discovered that the quantity of roots is inversely correlated with all of the treatments seen. The length of the roots would decrease as more were created. While tiger grass suckers with fewer roots concentrate primarily on those roots to maintain their length as they get taller. It's possible that plants with longer roots are more common. Longer roots can reach deeper into the earth, providing essential services for individual plants like nutrition and water absorption.

Conclusions and recommendations

This study proves the findings of Adams III and Ichiro Terashima that plants with more leaves will have the higher contributions in terms of its support to the metabolic processes of the plant. In all the parameters observed, after thorough analysis and interpretation of the data gathered it was found out that T_3, the suckers that were planted with three (3) leaves out performed the other two treatments. Nevertheless, the number of suckers, number of leaves and length of roots failed to show significant differences. The length of roots in centimeters exhibited highly significant differences in favor of T_1. While the percentage of survival demonstrated significant differences in favor of T_3. It is therefore concluded that T_3 is the best when compared to the other treatments.

In addition, Charles Stichler (2002) noted that all grasses should adhere to one particular management strategy. While gathering suckers as planting materials, we need to save enough leaves to feed the regrowth and recovery of roots and leaves, to replenish organic matter in the soil, and to cover the soil to reduce runoff and enhance water absorption into the soil.

Based from all observation made and analysis of the data gathered it is recommended that tiger grass suckers to be propagated should have three (3) leaves in order to attain higher percentage of survival, more suckers and more roots at transplanting time.

After harvesting suckers for propagation, it is advised that we keep a sufficient number of leaves to give energy for the regrowth and recovery of disturbed roots and leaves. This is based on the data acquired as well as the results and conclusion reached.

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