International Journal of Agriculture Innovations and Research
Volume 7, Issue 5, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy):
Received: 10/04/2019 | Accepted on: 28/04/2019 | Published: 05/05/2019

Study of the Shading Level and Potting Component's Effect on the Rate of Survival and Growth of Abelmoschus Sagittifolius in the Nursery Stage at Tue Lam High Technology Agriculture Company Ltd

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Abstract – **Abelmoschus sagittifolius belongs to the familia of Malvaceae, which is a perennial herbaceous plant with medicinal value. The study assesses the effects of the shading rate and the potting component on the rate of survival and growth of Abelmoschus sagittifolius in the nursery. The experiment was implemented in random blocks in three iterations. The result of the experiment shows that different shading levels do not affect the survival rate and height growth. However, the potting component does have an effect. The component yielding the highest survival rate (93.2%) was composed of feralit soil, 5% coconut fiber, and 15% cattle manure. The potting component yielding the greatest height growth (16.6cm) in the nursery stage was composed of sandy soil, 5% coconut fiber, and 15% cattle manure.**

Keywords – **The Potting Component, Survival Rate and Abelmoschus Sagittifolius.**

I. Introduction

Abelmoschus sagittifolius belongs to the familia of Malvaceae. It is one of the medicinal plants with the additional value of treating diseases and enhancing health [1]. Root tubers are the main part of the Abelmoschus sagittifolius used [1], [2]. This species is indigenous to the communes of Bo Trach district and South of Ngang Mountain Pass in Quang Binh province. Currently, the quantity of Abelmoschus sagittifolius seedlings is in danger of decreasing due to bad conservation practices. [4]. Therefore, it is very important to study the successful propagation and cultivation of Abelmoschus sagittifolius as a medicinal source, to conserve genetic resources, and to raise awareness about the safe use of natural medicinal herbs. In addition, this could create jobs and increase local people's income.

II. Materials and Methods

A. *Materials*

Abelmoschus sagittifolius' seeds were collected in Quang Luu, Quang Thach and Quang Hop communes, Quang Trach district, Quang Binh province.

Polietylene potting, sized from 15cm x 25 cm with components of feralit soil, sandy soil, manure and coconut fiber.

B. *Methods*

+ After germination the abelmoschus sagittifolius' seed was transplanted into the pottings and monitored at four levels of shading as follows: control (no light, 0%), 25% shading, 50% shading, and 75% shading. Pergolas were made from bamboo with a width of 2 cm, and a height of 1.2 m from the bed surface. The shading level (CS%) is determined by the formula of Nguyen Huu Thuoc (1964) as follows:

CS% = (X+a) 2 -X2 (X+a) 2 x 100
In which:
CS: Coefficient shading (%)
X: Distance of the bamboo laths (cm)
a: Width of the bamboo laths (cm)
$(X+a)^2$: Area need to be shaded

+ The experiment studied the potting component's effect on the survival and growth rate. The experiment was arranged in random blocks with three iterations. Each iteration consisted of 300 pottings. The potting component follows the following formulas:

Formula S1: 90% Feralit soil + 5% coconut fiber + 5% manure.

Formula S2: 80% Feralit soil + 5% coconut fiber + 15% manure.

Formula S3: 90% s and + 5% coconut fiber + 5% manure.

Formula S4: 80% s and + 5% coconut fiber + 15% manure.

The method of caring for the seedlings in the nursery was the same in all iterations. The experiment lasted 45 days.

The survival rate of the seedling is calculated according to the formula:

Survival rate (%) = [Number of alive seedlings]/300x100

Height growth is measured by a ruler.

+ *Methods of Data Processing:*

The data was aggregated and recorded in Excel.

III. Results and Discussion

A. *Effect of the Shading Rate on the Survival Rate of Abelmoschus sagittifolius*

The survival rate of Abelmoschus sagittifolius reached its highest (90.4%) when the CS was at 25% and the lowest when the CS was at 82.1%. Variance analysis was used to determine the effect of shading on the survival rate. The result of F <Fcrit shows that shading rates do not significantly affect the survival rate of Abelmoschus sagittifolius in the nursery stage. (Table I).

B. *Effect of the Shading Rate on the Height Growth of Abelmoschus sagittifolius*

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The highest average height growth when shaded are 14.1 cm (without shading), 16.1cm (25% shading), 15.1 cm (50% shading) and 14.8 cm (75% shading). The formula shows that the highest height growth (16.1 cm) is achieved with 25% shading. The formula shows that zero shading results in the lowest height growth (14.1 cm). Variance analysis was used to identify the effect of shading on height growth. The result shows that F <Fcrit means that shade rates do not significantly affect height growth of Abelmoschus sagittifolius in the nursery stage (Table II).

C. *Effect of the Potting Component on the Survival Rate of Abelmoschus sagittifolius*

Formula S2 yielded the highest average survival rate (93.2%). Formula S3 yielded the lowest survival rate (72.7%). The result of variance analysis showing possible effect of potting component on the survival rate of Abelmoschus sagittifolius in the nursery stage (F> Fcrit) is recorded in Table III. From the Student standard, the result shows that t = 2, 9199 < t_{05} = 4, 3026. This means that there is no discernible difference between the two formulas. In other words, either one of the formulas or both formulas with the highest average values can be used.

D. *Effect of the Potting Component on the Height Growth of Abelmoschus sagittifolius*

The experiment shows that formula S4 yields the highest height growth (16.6 cm) and formula S1 yields the lowest (14.6 cm). Variance analysis showing the potting component's effect on height growth of Abelmoschus sagittifolius in the nursery stage (F> Fcrit) is recorded in Table IV. The best formula given by the Student standard yields the result of t = 2,9199 < t_{05} = 4,3026. This indicates that there is no difference between the two formulas. In other words, either one of the two formulas or both formulas with the highest average values can be used for incubation.

IV. Conclusion

The shading rate does not affect the rate of survival and growth of Abelmoschus sagittifolius in the nursery stage. The potting component consisting of feralit soil, 5% coconut fiber, and 15% manure gives the highest survival rate at 93.2%. The potting component consisting of sandy soil, 5% coconut fiber, and 15% manure gives the best height growth (16.6 cm). The study result is proposed as the scientific basis for breeding and conservation of Abelmoschus sagittifolius in Quang Binh province.

References

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Table I. Effect of the shading rate on the survival rate of Abelmoschus sagittifolius

Iteration	The survival rate				F	Fcrit
	Formula 0%	Formula 25%	Formula 50%	Formula 75%		
Iteration 1	82.3	94.3	88.6	88.6	0.2929	4.2564
Iteration 2	80.0	91.4	91.4	85.7		
Iteration3	85.7	88.5	88.5	82.8		
Average	82.1	90.4	88.5	85.7		

Table II. Effect of the shading rate on the height growth of Abelmoschus sagittifolius.

Iteration	The shading rate (%)				F	Fcrit
	Formula 0%	Formula 25%	Formula 50%	Formula 75%		
Iteration 1	13.4	16.4	15.2	14.5	0.2929	4.2564
Iteration 2	14.2	15.7	15.3	15.1		
Iteration 3	14.6	16.3	14.9	14.8		
Average	14.1	16.1	15.1	14.8		

Table III. Effect of the potting component on the survival rate of Abelmoschus sagittifolius

Iteration	The survival rate				F	Fcrit
	Formula S1	Formula S2	Formula S3	Formula S4		
Iteration 1	88.2	95.3	76.3	92.3	21.9473	4.0661
Iteration 2	82.6	92.1	73.2	89.4		
Iteration 3	79.3	92.1	68.7	87.5		
Average	83.4	93.2	72.7	89.7		

Table IV. Effect of the potting component on the height growth of Abelmoschus sagittifolius

Iteration	The height growth (cm)				F	Fcrit
	Formula S1	Formula S2	Formula S3	Formula S4		
Iteration 1	14.2	15.6	15.7	16.6	8.6933	4.0661
Iteration 2	14.3	15.4	16.3	17.1		
Iteration 3	15.3	14.3	16.2	16.2		
Average	14.6	15.1	16.1	16.6		

AUTHOR'S PROFILE

MSc. Nguyen Phuong Van, Quang Binh University, Quang Binh Province, Viet Nam, Van's educational background is listed as follows: Degree of Engineer, majoring Forestry, Hue University of Agriculture and Forestry (HUAF), Hue, Viet Nam (2005), Master's Degree, majoring Forestry, Hue University of Agricul--ture and Forestry (HUAF), Hue, Viet Nam (2012). His major fields of study are Botany, Seed management, Forest protection and management. He is now a lecturer of Quang Binh University with fourteen years of working experience in forestry. His eighteen-eight articles were published on the domestic journals. Also, his three theses of science and technology at the University level were made. The three articles were published are as follows:

1. Study of growth regulators concentration's effects on rooting percentages of gynostemma pentaphyllum at the experimental garden in Quang Binh University, Journal of Science and Technology, Hung Vuong University, Vietnam, 2016.
2. Study forest cover and substratums' effects on growth and development of homalium hainanense at nursery stage in Quang Binh University, Journal of Science and Technology, Quang Binh University, 2017.
3. Study of propagation techniques, growth of some medicinal plant species to create seed sources and materials as herbal medicines at the experimental garden in Quang Binh University, thesis of science and technology, 2017.