

SHADE REQUIREMENT OF *ALBIZIA LEBBECK* AT NURSERY STAGE

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ABSTRACT

The objective of this work was to evaluate the effect of two treatments "partial shade (T₁)" and "no shade (T₂)" on *Albizia lebeck* during nursery stage, in research nursery of Punjab Forestry Research Institute, Faisalabad. *Albizia lebeck* is a deciduous light demander tree which needs no shade at nursery stage. Diameter at root collar (DRC) and height was in-significant under partial shade and no shade treatments during the course of study. Fresh and dry weight of plant was adversely affected by partial shade. Similarly the root-shoot ratio was not found to be affected by partial and no shade treatments. It was statistically confirmed that the *Albizia lebeck* should be raised under full sunlight for better results.

INTRODUCTION

Shading definitely affects the morphological and physiological performance of developing plants. Some degree of shade is usually considered as advantageous for nursery sites of different tropical tree species. Green sheet nursery sheds are gaining popularity in all kind of nurseries. This sheet blocks about 70% of sunlight from reaching the plants (Champion and Trevor, 1987). This shed was erected at research nursery, Punjab Forestry Research Institute, Faisalabad for the said experiment. Shaded environment at nursery stage affects morphological and physiological features of plants including height, diameter at root collar, fresh and dry weights. Shaded conditions at nursery stage increases shoot growth at the expense of root growth, hence decreasing the extent of absorption surface relative to transpiration surface i.e. root shoot ratio (Kramer and Kozlowski, 1979). There exists smaller number of stomata and lower mesophyll resistance to CO₂ diffusion in leaves of plants grown under the sun (Boardman, 1977). Shaded plants leaves also have fewer carbohydrates reserves which could be used to fuel root generation immediately after out planting when seedling's photosynthesis mechanism is less active due to the shortage of water. The overall affect of heavy shading is to reduce seedlings ability to withstand high temperature and water stress, there by decreasing survival rate (Kramer and Kozlowski, 1979). The present study was carried out to test the effect of green sheet shade on seedling growth of *Albizia lebeck*. Sharma (1996) explained that they have planted the 6 months old seedlings of *Albizia lebeck* in the month of August, which performed really well in the prevalent field conditions.

Albizia lebeck is a medium sized fast growing tree native in Asia, which was named after Albizzi, an Italian naturalist of 18th century (Parker, 1921). Its natural range extends from latitude 8°N to 32°N through eastern Pakistan, India, Afghanistan, Iran and Iraq. Siris is characterized by a spreading umbrella shaped crown of thin foliage.

MATERIALS AND METHODS

This study was conducted at research nursery of Punjab Forestry Research Institute, Faisalabad, from February to September 2004. Using paired plot design with

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thirty replications and two plants per replication. There was two treatments first one with partial shade (T_1) and other with no shade (T_2). The partial shade was established by placing polythene bag plants under green sheet shed and no shade means under direct sunlight. Seedlings of *Albizia lebbeck* were raised in polythene tubes of size 2X15 cm, with 40 perforations and filled thoroughly with mixed medium of sand (33%) and soil (66%). Seeds were sown directly in polythene tubes at the rate of 2 seeds per tube. Totally 490 tubes were placed in direct sunlight and 490 tubes under green sheet shed. All tubes were watered as per requirement of the plants. After germination, 30 plants were selected from each treatment for diameter at root collar (DRC) and height measurements. DRC and height data was collected at the age of 6 months. Five plants were taken randomly from each treatment for measurement of fresh and dry weights and root-shoot ratio. DRC was measured with vernier caliper, height and root/shoot ratios were measured with measuring tape. Fresh and dry weight was taken with Digital weight meter in laboratory.

Statistical analysis of the data was made by using T-test for paired observations and Least Significant Difference (LSD). Significant difference between the mean values was obtained through t-test. LSD was further used to find out the difference between these significant mean values.

RESULTS AND DISCUSSION

Table 1. Germination Percentage

Parameters	Treatments	
	Partial Shade (T_1)	No shade (T_2)
Germination percentage	38a	79b

*Mean values having similar letters are not significant from each other.

Table 2. Height, and diameter at root collar, fresh and dry weights and root-shoot ratios of *Albizia lebbeck* under shade and no shade treatments after 6 months

Parameters	Treatments	
	Partial Shade (T_1)	No shade (T_2)
Height (cm)	34.46a	33.15a
Diameter at root collar DRC (cm)	0.45a	0.48a
Fresh weight (gms)	12.95a	20.32b
Dry weight (gms)	4.40a	8.46b
Root/shoot ratio	1: 1.74a	1:1.99a

*Mean values having similar letters are not significant from each other.

Germination Percentage

Germination data revealed that germination in no shade treatment (79%) was significantly more than partial shade treatment (38%).

Growth

Seedling growth was measured for height and diameter at root collar (DRC) after 6 months. Statistical analysis of the data was not significantly different from each other under both the treatments after the six months of nursery stage. According to Alberte and Thornber (1976), for light demander trees sun leaves are more efficient than shade leaves because they contain a higher proportion of light harvesting chlorophyll a/b protein complex which might be responsible for more DRC under no shade treatment of *Albizia lebbbeck*. Height and DRC was not significantly different from each other under both the treatments after three and six months of nursery stage. Contrary to results of evergreen species of *Acacia nilotica* (Kikar) which depicted more growth of plants under no shade treatment (Chaudhry, 2003), deciduous plants like *Albizia lebbbeck* showed no difference of growth for above mentioned treatments (Champion and Trevor, 1987).

Fresh and Dry weight

Fresh and dry weights of seedlings after 6 months differs significantly from each other under partial shade and no shade treatment (Table 2). Significantly less fresh and dry weight under partial shade treatment was indicative of the fact that seedlings were physically weak and thin. Under no shade condition, incoming light energy was taken up by the chlorophyll and the concentration of chlorophyll was an important factor for the rate of primary production (Negi, 1983) which resulted in more fresh and dry weight. Kramer and Kozlowski (1979) also stated that leaves of plants under normal sunlight possess a greater volume of chlorophyll contents per unit area of leave than leaves of plants under shade.

Root shoot ratio

After six months, no significant difference was observed for root-shoot ratio for both the treatments.

CONCLUSION

The result of the study showed that *Albizia lebbbeck* is a light demander deciduous tree which needs no shade at nursery stage. *Albizia lebbbeck* requires full sunlight at the time of germination. Height and Diameter at root collar, fresh and dry weight as well as root length showed significantly better result under no shade treatment. It was statistically confirmed that the *Albizia lebbbeck* should be raised under full sunlight for better results.

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