

Effect of farm yard manure application on the growth and nutrient dynamics of *Albizia chinensis* Merr. under nursery conditions

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ABSTRACT

The experiment was carried out at the experimental area of Department of Silviculture and Agroforestry, college of Forestry, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, H.P. The experiment was laid out to see the influence of organic fertilizer on growth and seedling quality. Four doses of FYM (0, 5, 10, 15 t/ha) were applied to the nursery stock. The FYM at the rate of 10 t/ha significantly increased the germination (52.84%) and seedling shoot (24.04 cm) and root length (31.08 cm), number of leaves (7.08), leaf area (84.11 cm²), shoot (2.19 g) and root weight (3.01 g) stock quality index (0.61), NPK contents and their uptake. Whereas, the seedlings receiving farm yard manure at the rate of 5 t/ha recorded the maximum collar diameter (2.76 mm), nodules number (3.84) and nodule weight (0.106 g). Seedlings where no FYM was applied recorded the maximum root : shoot ratio.

Key words : Fym, *Albizia chinensis*, Growth, Nutrients dynamics.

INTRODUCTION

The usefulness of fertilizers in the forest nurseries has been well established all the world over and has become quite common these days, as the healthy planting stock usually develops sturdy root system and shows greater promise of growing successfully after transplanting. Fertilizers are also applied to accelerate growth in nurseries in order to cut short the period required to obtain seedlings of transferable size. Further, if the same nursery site is cropped year after year, fertilization, whether organic or inorganic, is obligatory. Since most plantations are raised on infertile soil, fertilization in the initial stage has become a part of regular Silvicultural treatments in several countries. Addition of manures and fertilizers at the time of planting boost the growth of seedlings by ameliorating the soil conditions and help in early establishment. Even if the vigorous seedlings raised by fertilization of nurseries are used for planting, they are liable to suffer from the lack of nutrients in poor soils. Therefore, fertilization at the suitable intervals may be necessary to maintain the accelerated growth during the subsequent life of the forest crop. The fertilization usage has tremendous scope in establishment of new plantation under Indian conditions. So, the studies were conducted to quantify the role of farmyard manure on the nursery growth of *Albizia chinensis*. It is an important multipurpose tree species widely distributed from Himachal Pradesh up to Assam in Sub Himalayan tract and ascends upto 2000 m above m.s.l. in western Himalayas.

MATERIALS AND METHODS

The present investigation entitled "Effect of soil Amendment on biomass and the Nutrient use efficiency of *Albizia Chinensis* under nursery" was carried out at Dr. Y.S. Parmar University of Horticulture and forestry, Solan (HP). The study was conducted at an altitude of

was laid out in the Randomized Block Design with three replications. The four levels of FYM were tried as given below :

Treatment	Quantity (t/ha)
F1 (control)	0
F2	5
F3	10
F4	15

Each treatment comprised of thirty polythene bags and each bag contained 1kg of well mixed soil and sand in 1:2 ratio. The physio-chemical characteristics of media have been shown in Table-1.

RESULTS AND DISCUSSION

The application of FYM at the rate of (10 t/ha) was found to increase seed germination, shoot and root length, number of leaves, leaf area, shoot and root weight and stock quality index excepting collar diameter and root : shoot ratio which were found to be the maximum under F2 and F1 respectively (Table 2). The increase in growth of *Albizia Chinensis* may be attributed to FYM containing plant nutrient which have direct effect on plant growth like any other commercial fertilizer. Further, it increases organic matter content and consequently, water holding capacity of soil and also provide food for microorganisms, which in turn increase the availability of minerals in the medium. Singh (1990) also observed that the FYM application increased production of total above ground biomass and lowered root. Shoot ratio. Almost all the growth attributes registered a decline at the highest dose of FYM. This could be attributed to the fact that increased concentration of "humic acid" a product of FYM which is reported to form an insoluble compound with nitrogen leading to the

Table 1 : Physio-chemical properties of growing media used in the experiment.

Media	Ph	Organic Carbon (%)	Available (Kg/ha)	Available P (Kg/ha)	Available K (Kg/ha)
Soil : Sand (1:2)	7.2	1.12	251.0	78.78	175.0

1225 m above m.s.l. and the site is located at 30°51' N latitude and 76°11' E longitude. The physiography of the area is marked by undulating topography. The experimental area falls under subtropical to sub-temperate climate. The winter months are the coldest and the area experiences severe frost during December and January. May and June are the hottest months. The area receives moderate rainfall of 100 mm annually, the major part of which is received during monsoon i.e. from July to mid-September and some during winter. The experiment

non availability of minerals for plant growth (Kristena, 1951). He further observed that low concentration of 'humic acid' enhanced the growth but slightly higher concentration of it retards growth. Data in Table – 2 reveals that the maximum number of nodules and their weight increased when seedlings were applied with FYM at the rate of 5 t/ha and declined thereafter. This may be ascribed to the increase in free available nitrogen with the corresponding increase in FYM application which seems to have depressing effect on nodule formation and

Table 2 : Effect of farm yard manure (FYM) on the germination, growth and biomass production of *Albizia chinensis* seedlings.

Character	Farm yard manure (t/ha)				SE(d)	CD _{0.05}
	F1	F2	F3	F4		
Germination (%)	51.38 (45.81)	52.09 (46.22)	52.84 (46.75)	49.64 (44.80)	0.90	1.79
Shoot length (cm)	18.76	22.35	24.04	21.53	0.32	0.63
Root length (cm)	23.82	26.33	31.08	28.74	0.35	0.70
Collar diameter (mm)	2.26	2.76	2.72	2.44	0.052	0.11
Number of leaves	5.19	6.78	7.08	5.86	0.17	0.34
Number of nodules	3.73	3.84	3.60	2.82	0.17	0.34
Leaf area (cm ²)	69.46	81.53	84.11	68.08	4.48	8.68
Nodules weight (g)	0.082	0.106	0.091	0.071	0.007	0.014
Shoot weight (g)	1.55	1.91	2.18	1.88	0.045	0.09
Root:shoot ratio	1.61	1.60	1.52	1.55	0.04	0.08
Stock Quality Index	0.45	0.52	0.61	0.51	0.02	0.05

* Values in parentheses are transformed per cent data.

Table 3 : Effect of farm yard manure (FYM) on the plant nutrient contents and their uptake by *Albizia chinensis* seedlings.

Character	Farm yard manure (t/ha)				SE(d)	CD _{0.05}
	F1	F2	F3	F4		
Nitrogen (%)	1.75	2.05	2.14	1.94	0.03	0.06
Phosphorus (%)	0.087	0.113	0.120	0.103	0.02	0.004
Potassium (%)	1.07	1.09	1.16	1.13	0.10	0.20
Nitrogen uptake (mg/plant)	71.84	94.00	108.16	91.50	2.80	5.60
Phosphorus uptake (mg/plant)	3.61	4.92	7.03	5.20	0.02	0.05
Potassium uptake (mg/plant)	46.03	47.31	59.58	46.46	1.47	2.90

even if the nodules are formed, the application of farm yard manure significantly influenced the N, P and K contents and their uptake in the *Albizia chinensis* (Table 3) g, phosphorus and potassium contents registered an increase with the corresponding increase in FYM application up to F3 (10 t/ha) and therefore declined at the highest level of F4 (15 t/ha). The availability of N content in growing medium with the highest N percent in the seedlings under F3. Srivastava and Behl (2002) reported higher concentration of N, P and K in plant of *Terminalia arjuna* in media containing FYM than pure sand and soil and mixture. Pattern of increase or decrease in N, P and K uptake was similar to that of N, P and K contents in *A. chinensis* seedling.

So it may be concluded from the above study that the farmyard manure at the rate of 15 t/ha may be the best suited dose for obtaining the healthy and vigorous nursery stock of *Albizia chinensis*.

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