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Effect of gibberellic acid on the growth of bushy lac host plants in relation to lac yield

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ABSTRACT

Foliar spray of GA at 40 ppm on bushy lac hosts of *Mog'iania macrophylla* (Willd.) O. Ktze. and *Albizzia lucida* Benth. at the initial stage induced enhanced growth and reduced the gestation period of plants, which gave higher yield of lac.

The introduction of a mixed plantation technique of potential bushy lac hosts *Albizzia lucida* Benth. and *Moghania macrophylla* (Willd.) O. Ktze. has offered great promise for intensive cultivation of *kusmi* (spring) lac at reduced costs and with great convenience (Purkayastha, 1973). The need to establish plantation with these hosts within a short period providing satisfactory shoots for inoculation of lac was keenly felt. To achieve this objective, a trial was undertaken with gibberellic acid, a known growth-promoter of plants (Seth and Mathauda, 1959; Kar and Saha, 1964), to study its effect on these bushy host plants in relation to lac yield.

MATERIALS AND METHODS

Albizzia lucida and *Moghania macrophylla* were raised in plots by transplanting nursery-raised seedlings in June–July. Gibberellic acid in the form of foliage spray @ 20, 40 and 80 ppm was used at the initial stage after transplantation for 3 successive periods at fortnightly intervals, and a set of plants was kept as the control.

Moghania bushes were put under lac culture in June–July in the second year of transplanting for raising the *aghani* (winter) crop and *Albizzia* bushes in January-February, after being trained into bushes within 3 years of transplanting, for the *jethwi* (summer) crop. Observations on shoot length were recorded before lac inoculation and the crop yields were compared between the treatments after harvesting of lac from the bushes.

The experiment was conducted on randomized-block design with 4 replications.

RESULTS AND DISCUSSION

Growth of shoots

Application of foliar spray of GA with different concentrations increased the shoots length per plant considerably over the untreated plants in both *Albizzia lucida* and *Moghania macrophylla*, and the increase was more pronounced with GA at 40 ppm. For *M. macrophylla* the best effect on the vegetative growth of plants was observed on the plants treated with 40 ppm of GA, though all other treated plants showed satisfactory growth compared with the control. The growth in thickness in *M. macrophylla* seem to be proportional to the growth in height under all treatments. But in *A. lucida* with higher concentrations of 40 and 80 ppm the internodes elongated without a proportional thickness at the top portion. Consequently the plants had a lanky growth at the initial stage. Similar findings were also reported by Seth and

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Table 1. Effect of GA on shoot growth and yield of lac

Treatment	*Moghania macrophylla*			*Albizzia lucida*		
	Total shoot length/plant (cm)	Lac yield/ plant (g)	Increase (%) in lac yield over the control	Total shoot length/plant (cm)	Lac yield/ plant (g)	Increase (%) in lac yield over the control
Control	889.5	66.8		235.0	54.8	
GA 20 ppm	1,016.8	81.5	22.0	380.8	71.2	29.9
GA 40 ppm	1,221.4	107.0	60.0	636.2	132.3	141.4
GA 80 ppm	1,014.2	86.6	29.6	418.0	89.5	63.3
SEm (±)	16.51	5.36		33.18	10.03	
CD at 5%	52.55	17.78		105.60	31.92	

Mathauda (1959).

Following coppicing, *A. lucida* plants treated with GA put forth branches and showed more compact bushy growth than the control. Plants given 40 ppm GA spray were the best as the spray ensured quick and vigorous growth for early attainment of the stage suitable for lac inoculation, developing suitable bushes and putting forth maximum shoot length. The increase in length of the shoots over the control at the time of lac inoculation was 179.2% in *A. lucida* and 37.3% in *M. macrophylla*. The data on analysis also showed a significant difference between the treatments.

Root growth

The root depth and spread were better with GA application, the optimum concentration of GA being 40 ppm. Better root growth was reported by Sircar and Chakravarty (1960) in jute plants. The amount of moisture held per unit (100 g) dry matter was maximum in the plants treated with GA at 40 ppm. This shows that the increase in the depth of roots with higher moisture content in them would help the plants to withstand drought in summer, and such plants would establish better in regions where soil-moisture is a limiting factor for lac culture.

Yield of lac

GA at 40 ppm was found superior to all other treatments in respect of per-plant yield of lac when the yield data were compared (Table 1). Foliar spray of GA at 40 ppm reduced the gestation period and induced longer shoots in the plants, which gave more yield of lac. The increase in yield over the control was 141.4% in *A. lucida* and 60.0% in *M. macrophylla*, and the treatment differences were significant for the yield of lac on both the host plants.

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