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INVESTIGATIONS ON PLANT DENSITY IN BAMBOO (*DENDROCALAMUS STRICTUS*)

Introduction

Bamboos are the tallest and largest of grasses distributed both in the hills and plains of India. Bamboo has many usages and is called "the poor man's timber". It can be used for agricultural implements, furniture etc. In addition it is a very good species for planting along river banks to regulate the width of a river.

Demand for bamboo is increasing both from industries as well as for commercial purposes. Natural forests are the main source of bamboos, but over-exploitation of these forests has led to decrease in their production. This scenario of increasing demand, decreasing supply and assured marketability makes cultivation of bamboo on private land an attractive economic proposition (Suri and Chauhan, 1994). Growth and yield of bamboo depends upon the method of planting and spacing (Gupta and Sood, 1978) and intensive management of monoculture play an important role in maximizing production in a unit area (Anon., 1988). Management practices viz. spacing and fertilizer application directly affect the productivity. In bamboo, clump and culm spacing are considered to be important for production of higher marketable poles (Kondas, 1982). Bamboo can be cultivated on marginal land both as a pure crop and as a mixed plantation. Bamboo cultivation is in fact more profitable when compared to mango, cashewnut, jackfruit and kokum cultivation.

In this paper, an effort has been made to find out the optimum spacing for higher productivity.

Material and Methods

An experiment to study influence of spacing on growth of bamboo was initiated in 1977 under rainfed conditions on red soils at the Main Agricultural Research Station, University of Agriculture Sciences, Dharwad (Karnataka). The bamboos (*Dendrocalamus strictus*) were planted at three different spacings viz S_1 - 1.0 m x 1.0 m; S_2 - 1.8 m x 1.8 m and S_3 - 3.0 m x 3.0 m. The experiment was laid out in randomized block design with 12 replications. Fertilizer dose of 100 : 50 : 50 N : P_2O_5 : K_2O kg/ha was applied in two split doses ie., 50% at the time of planting and the remaining after 6 months of planting. The mature culms were harvested every year during the summer. The pooled data is presented in Tables 1 and 2. The economic analysis was made based on market rate of harvested culms during the year.

Results and Discussion

Growth of bamboo : Bamboo planted at wider spacing (3.0 m x 3.0 m) had significantly higher number of internodes per culm (32.1) than a spacing of 1.8 m x 1.8 m (31.4) and 1.0 m x 1.0 m (28.9).

Table 1

Growth and yield parameters of bamboo as influenced by different spacing.

Spacing	Height (m)	DBH (cm)	No. of internodes/culm	Dry wt. (kg/culm)	No. of culms/ha
S_1 - 1.0 m x 1.0 m	5.98	2.24	28.9	2.18	71800
S_2 - 1.8 m x 1.8 m	6.55	2.36	31.4	3.46	39351
S_3 - 3.0 m x 3.0 m	6.61	2.58	32.1	4.23	28944
SEm±	0.15	0.08	0.7	0.12	689
CD 5%	0.44	0.23	NS	0.35	2021

Table 2

Economic analysis of bamboo cultivation

Spacing	Av. cost of cultivation (Rs./ha/yr)	Av. Income (Rs./ha/yr)	Av. net return (Rs./ha/yr)	IRR (%)	Benefit : Cost ratio
S_1 - 1.0 m x 1.0 m	1749	3673	1923	25.3	1.20
S_2 - 1.8 m x 1.8 m	1590	5475	3885	38.9	2.27
S_3 - 3.0 m x 3.0 m	1465	6310	4845	40.9	2.68

Both height and dbh were significantly higher in wider spacing (6.61 m and 2.58 cm, respectively) as compared to narrow spacing (5.98 m and 2.24 cm, respectively). The dry weight of culm was significantly higher in wider spacing (4.23 kg/culm) as compared to 1.8 m x 1.8 m spacing (3.46 kg/culm) and 1.0 m x 1.0 m (2.18 kg/culm). The total number of culms was higher in narrow spacing as compared to wider spacing.

The increase in dry weight of culm may be due to the better growth of culms in wider spacing. Harvestable culms were higher in wider spacing as compared to narrow spacing. Similar results were obtained by Kondas (1982) and Suri and Chouhan (1994).

Bamboos are generally used in cottage industries, but not many attempts have been made to assess the economic of bamboo cultivation. In this paper, some efforts have been made to assess the economics of bamboo cultivation. The economics were assessed based on harvested culms per clump and were converted on hectare basis.

Economic analysis

The average income from the poles was calculated and economic analysis was made after 12 years. The

average net income was lowest in narrow spacing as compared to wider row spacing. This may be due to higher marketable culms in wider row spacing as compared to narrow spacing. The cost of cultivation was higher in narrow spacing than wider spacing. Internal Rate of Returns (IRR) and Benefit : Cost ratio were higher in wider spacing (40.9% and 2.68 : 1, respectively) as compared to narrow spacing (25.3% and 1.20 : 1, respectively). Hence, bamboo can be profitably cultivated at 3 m x 3 m spacing in block plantation and when grown along bund/nala at 3 m apart is more suitable.

References

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