

PRODUCTION POTENTIAL OF BERSEEM IN EUCALYPTUS BASED AGRI-SILVICULTURAL SYSTEM

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SUMMARY

In the field study conducted at Research Farm of Agro-forestry Department in CCS Haryana Agricultural University, Hisar sowing of berseem (*Trifolium alexandrinum* L.) var. Muscavi was done on 2nd week of October in two & half year old eucalyptus planted at 6 × 2 m spacing at the same time the crop was also sown in the adjacent field devoid of trees (Control). The data recorded on plant height, stem diameter, yield and economics revealed that no doubt all these parameters were high in case of sole crops of berseem but if we consider the need of the farmer that requires regular income from his piece of land then it seemed practical that berseem as fodder could be grown successfully in standing eucalyptus with additional income of Rs. 3081/ha.

Key words : Eucalyptus, *Trifolium alexandrinum*, agri-silviculture, allelopathic

In India, about 70 per cent of the people live in villages. Their livelihood is dependent mainly on agriculture and animal husbandry. Increase in food production is prime concern but at the same time scientists are also worried about the degrading soil health, moreover, in country like India, under the situation of scarcity of land, capital resources and less productivity of labour, agro-forestry may be an ideal option for improving resource use efficiency. Small land holdings have inherent constraints being lack of resources at the disposal of farmers. As eucalyptus is multipurpose plant being its vital role in bio-drainage, eucalyptus plantation is likely to be adopted in large scale on government and private lands. Agro-forestry intervention can overcome these problems to a great extent. Therefore, this study was planned to find out the production potential of berseem in eucalyptus based agri-silvicultural system.

For this purpose, the experiment was laid out at Research Farm of Agro-forestry Department in CCS Haryana Agricultural University, Hisar and sowing of berseem was done on 2nd week of October in two and a half year old eucalyptus planted at 6 × 2 m spacing at the same time the crop was also sown in the adjacent field devoid of trees (control). Half of the recommended dose of nitrogen and full dose of phosphorus was applied before sowing. Crops were irrigated at 15 days interval.

Plant height was taken from five plants from each plot with the help of meter rod before each cut. Data on stem diameter were recorded from basal stem of same plants used for recording plant height with the help of digital vernier caliper and expressed in millimeter. Fodder yield was calculated by adding the fodder yield of all the cuttings and expressed in quintal per hectare.

The data presented in Table 1 show that the plant height at each cut in control attained significantly more than under eucalyptus. It was 22.9, 32.7 and 25.3 cm at 1st, 2nd and 3rd cuts, respectively, under eucalyptus and corresponding values of 39.1, 38.0 and 40.5 cm in respective control.

The data in Table 2 reveal that berseem stem was thin under eucalyptus as compared to control. However, the differences were significant only at 1st and 3rd cuts. At 2nd cut also stem diameter of berseem was less under eucalyptus, however, the differences were non-significant.

The yield data of crop eucalyptus and control showed maximum reduction in yield i. e. up to 52.1 per cent and income from crops grown with eucalyptus and without eucalyptus was Rs. 3018 and 6369, respectively (Table 3). The yield under eucalyptus was significantly less than sole crop (control).

But, other advantages of Agro-forestry such as

TABLE 1
Effect of eucalyptus on plant height (cm) of berseem

Plant height at	With eucalyptus	Without eucalyptus	Paired t-test value
1 st cut	22.9+0.42	39.1+0.42	37.50*
2 nd cut	32.7+ 1.19	38.0+1.19	5.71*
3 rd cut	25.3+0.97	40.5+0.97	16.46*

TABLE 2
Effect of eucalyptus on stem diameter (mm) of berseem

Plant height at	With eucalyptus	Without eucalyptus	Paired t-test value
1 st cut	2.54+0.05	3.21+0.05	11.80*
2 nd cut	3.28+ 0.07	3.40+0.07	2.85
3 rd cut	2.62+0.10	3.56+0.10	7.10*

TABLE 3
Yield and economics of berseem in Agro-forestry and control

	With eucalyptus	Without eucalyptus	Paired t-test value
Yield (q/ha)	87.1	182.1	52.1 %
Cost of cultivation (Rs./ha)	30217	30217	-
Income (Rs./ha)	3018	6369	3351

protection against erosion, insurance against drought, availability of fuel & fodder and environmental protection are valuable.

Plant height of berseem was less under eucalyptus than control which may be due to reduced light intensity under eucalyptus. The data recorded during the course of field studies in the month of December have clearly shown that PAR available to test crop under eucalyptus was about half of light available to crops in the control. Thus, more light intensity in control increased the photosynthetic efficiency of crops resulting in better growth as reported by Wassink (1954).

Dhillon *et al.* (1982) and Singh and Singh (1996) also reported that higher tree density had more suppressing effect on crops through reduced solar radiation on crop canopy and lower availability of nutrients. The poor growth of crops under eucalyptus may be attributed to other factors like root competitions for moisture and nutrients and allelopathic effects of eucalyptus. Ahlawat *et al.* (2012) also reported less photosynthesis rate under Agro-forestry system.

CONCLUSION

Though the yield of berseem crop in Agro-forestry system was about 52 per cent less than control, but loss can be compensated by selling trees at maturity stage. Additional income can be generated by growing berseem under eucalyptus.

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