Evaluation of planting methods and tree species for non-arable lands of northern dry zone of Karnataka

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ABSTRACT

A field experiment was conducted at non-arable site at Regional Agricultural Research Station, Bijapur, Karnataka from 2004-05 to 2009-10. The treatments consisted of four planting methods and four tree species laid out in split plot design with three replications. The silvicultural parameters of tree species, *viz.,* plant height, clear bole height, collar diameter and crown spread were positively influenced by the *in-situ* moisture conserved by crescent method of planting closely followed by pit method and staggered trench method. In case of tree species, among the fast growing species *Dalbergia sissoo* produced better silvicultural parameters. Whereas in case of slow growing species *Azadirachta indica* produced better silvicultural parameters as compared to other tree species. It may be because of their adoptability to hard dryland conditions. The interaction between method of planting and tree species were found to be non significant.

Key words : *In-situ,* Non-arable land, Planting method, Silvicultural parameter

INTRODUCTION

The northern dry tract of Karnataka state comprising five districts (Bijapur, Bagalkot, Gulbarga, Koppal and Raichur) occupy on an average of 4.3 per cent under forest cover whereas average net sown area is 74.60 per cent. The area of the tract under forest cover is not only below the national average but also becoming degraded at faster rate due to unscientific cultivation practices. In the dryland ecosystems due to their poor soil fertility status and harsh atmospheric conditions, the planting of seedlings is a challenge. Such conditions cannot support better survival and growth of tree crops. Soil moisture is often the major factor limiting the survival and growth of seedlings planted out in semi-arid tropics. Therefore, in non-arable soils of drylands, adoption of proper planting methods which can help for *in-situ* moisture conservation and thereby support the growth of seedlings is essential. Such planting methods should not be only effective but also cheap. In dryland ecosystems always moisture plays an important role which decides survival, growth and productivity of tree crops. In the early stages of plantations moisture is the most important limiting factor which affects the performance of tree crops. In this context appropriate planting methods are to be identified which are cheap and effective. Further, the tree species may respond differently to the conserved moisture. The species which responds well to the conserved soil moisture would be a better choice. With this fact, efforts were made to evaluate the planting methods suitable for

some of the important tree species grown in this region.

MATERIALS AND METHODS

The experiment was conducted at non arable site at Regional Agricultural Research Station, Bijapur (northern dry zone of Karnataka) from 2004-05 to 2009-10. The soil of the experimental site was analyzed for various physico-chemical properties. It contained 25% of Sand, 23% of Silt, 52% Clay, bulk density - 1.43 g/cc, pH - 8.5, EC- 0.34 dSm^{-1}, $CaCO_3$ 18.5% and soil depth 30-35 cm. The average rainfall of the region is 586 mm with 39 rainy days.

The experiment was laid out in a Split Plot Design with three replications. The treatments consisted of four planting methods *viz.,* M_1 – Continuous contour trench method, M_2 – Staggered trench method, M_3 – Crescent method and M_4 – Pit method in main plots and four species *viz.,* S_1 – *Dalbergia sissoo*, S_2 – *Azadirachta indica,* T_3 – *Albizzia lebbeck* and S_4 – *Cassia siamea* in sub-plots. The seedlings of uniform age were planted as per treatment on September, 2004 in the different types of planting methods. The seedlings were given a small watering immediately after planting. The different tree species were planted at a spacing of 2 x 2 m in the different structures as per treatment, which were prepared 10 to 15 days in advanced. The observations on various silvicultural parameters were recorded every year and the data of last two years (2008-09 and 2009-10) were used for interpretation of results. The data recorded on various characters during the course of investigation were

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