CHOICE OF EXOTIC AND INDIGENOUS TREE SPECIES FOR PLANTING ON FARMLANDS

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The study was conducted at Chichawatni irrigated plantation from 1989 to 2000 for suggesting the appropriate indigenous and exotic tree species with similar irrigated conditions for planting on farmlands. The naturally indigenous tree species included in the study were Dalbergia sissoo, Bombax ceiba, Melia azedrach and Albizzia procera, whereas the common exotic species are Populus deltoides and Eucalyptus camaldulensis. Each tree species was planted at a spacing of 3m x 2m. Tree height and diameter at breast height (DBH) were measure of each species at the end of the eleventh year. Total volume of all tree species was calculated by using their plant height and DBH in equations provided in the local volume tables. The diameter and height of E. camaldulensis was greater than all other tree species but the volume of both E. camaldulensis and A. procera was also better than all other species. D. sissoo and M. azedarach had lower diameter, height and volume than all other tree species.

Key words: Exotic trees, indigenous trees, tree planting

INTRODUCTION

It has been mentioned in different studies that indigenous trees have better resistance to diseases and pathogens as compared to exotic species (Byerlee et al 1992). Conversely, exotic species have faster rate of growth as compared to indigenous species (Hafeez 1986). The pros and con of both types of species have to be considered before selecting trees for planting on farmlands. The most commonly planted indigenous tree species on irrigated farmlands of Punjab are Dalbergia sissoo, Bombax ceiba, Melia azedrach and Albizzia procera, whereas the common exotic species are Populus deltoides and Eucalyptus camaldulensis (Khan et al 1999). These tree species have differences in growth i.e. diameter, height and volume. The general perception is that the exotic species have better growth than indigenous species (FAO 2001). The performance of these different species have been studied individually under different conditions and not under similar conditions. Therefore, to suggest the appropriate tree species for planting under irrigated condition there is a need to study the performance of main indigenous and exotic tree species under similar conditions. Such a study will benefit the farmers in assessing the quantity of wood expected from different trees. It will also benefit the researchers in attaining further information about possible effects of trees on agricultural crops.

MATERIALS AND METHODS

The study was carried out at Chichawatni irrigated plantation during May, 1989. Each tree species was planted in trenches that were three metres apart. Distance between plants was two metres. Tree height and diameter at breast height (DBH) were measured of each species at the end of the eleventh year during May, 2000. There was an imbalance in sample size due to missing values of plant height and DBH since few of the plants died or their tops broke during the course of study. Since the data was stratified into strata of unequal sample sizes hence Residual Maximum Likelihood (REML) method was used to analysis the data using Genstat 4.2 (Lawes Agricultural Trust 2000). Plant height and DBH were included as variables whereas replication of each tree species was used as random factor. Total volume of all tree species was calculated by using their plant height and DBH in equations provided in the local volume tables (Cheema et al 1998).

RESULTS AND DISCUSSION

There was significant difference between the diameter (Figure 1), height (Figure 2) and volume (Figure 3) of different tree species. The diameter and height of E. camaldulensis was greater than all other tree species probably due to unlimited availability of water which provided extra impetus towards its better growth (Figure 1 & 2). Champion et al (1965) and Brandis (1921) also reported that the growth of E. camaldulensis was better if water and distance between plants was suitable to allow penetration of light. B. ceiba, A. procera and P. deltoides had higher diameter than D. sissoo and M. azedarach presumably due to lesser competition with weeds during the early age. It was probably due to similar reason that D. sissoo and M. azedarach had the lower height than all
other tree species (Figure 2). The large sized crown of both *D. sissoo* and *M. azedarach* induces crown competition during the pole stage of these trees and consequently retards growth in diameter and height (Singh 1985). Tewari (1994) and Parker (1924) reported that the diameter and height of *D. sissoo* and *M. azedarach* improved on increasing the spacing between plants and also on reducing the competition with weeds.

*Figure 1: Mean (with standard errors) diameter of different indigenous and exotic tree species.*

*Figure 2: Mean (with standard errors) height of different indigenous and exotic tree species.*
Exotic and indigenous tree species

The total volume of *E. camaldulensis* and *A. procera* was more than all other tree species since their diameter and height was comparatively better than is normally found under similar locations (Venkataramany 1968a). *E. camaldulensis* tends to attain better volume if provided better edaphic conditions. *B. ceiba* and *P. deltoides* had higher volume than *D. sissoo* and *M. azedarach* probably due to better height and diameter of the former two species that is normally found under such conditions (Singh 1985 and Venkataramany 1968b).

**CONCLUSIONS**

Although the overall performance of an exotic species (*E. camaldulensis*) was better than other species but the volume produced by an indigenous species (*A. procera*) equalled the former. The high water requirement of both the exotic species limits their potential for planting on farmlands since they compete extensively with the agricultural crop for water and nutrients. Planting of *E. camaldulensis* on waterlogged and saline soils is beneficial for biological amelioration of the land to make it suitable for cultivation of agricultural crops. Two of the indigenous species (*A. procera* and *B. ceiba*) are suitable for planting on farmlands particularly due to their importance for providing light quality timber and also fuelwood. Although the growth of *D. sissoo* and *M. azedarach* was slower than other species but the importance of these two indigenous species for providing good quality timber increases their feasibility as long term investment.

**REFERENCES**


