EFFECT OF *EUCALYPTUS CAMALDULENSIS* ON THE YIELD OF WHEAT AND MAIZE CROPS AFTER REDUCING TREE DENSITY

Waqar Ahmed[1]; Raja Muhammad Omer[2]; Chaudhry Muhammad Faisal[2]; Abdul Khaliq[1] and Raja Attaullah Khan[2]
[1]Agro-Forestry Research Branch, Punjab Forestry Research Institute, Faisalabad.
[2]Silviculture Research Forest Division, Punjab Forestry Research Institute, Faisalabad.

The study was conducted at Punjab Forestry Research Institute, Faisalabad, Pakistan. It examined the effect of *Eucalyptus camaldulensis* on yield of agricultural crops after reducing the tree density. *E. camaldulensis* was planted in 1993 at three different spacing; 6' x 6', 6' x 10', 6' x12'. In 1995 alternate rows of plants were removed to increase the spacing; 6' x 12' meters (m) (Treatment 1;T1), 6' x 20' m (Treatment 2;T2), 6' x 24' m (Treatment 3; T3) and a plot without trees was retained as control (Treatment 4; T4). Wheat and maize were intercropped during June and September from 1995 to 1997. Each treatment was replicated thrice. The yield of wheat grain, wheat straw and maize crops was measured from1995 to 1997 using $1m^2$ quadrate. The yield of agricultural crop was high in T4. The yield of wheat grain and straw was high in T2 and T3 as compared to T1. The yield of maize fodder was not different between T1, T2 and T3.
Key words: *Eucalyptus camaldulensis*, wheat yield, maize fodder yield, tree density

INTRODUCTION

The role of *Eucalyptus camaldulensis* in farm forestry programmes has increased over the past two decades because of its fast growth rate, high survival percentage and adaptability to varying soil conditions (Khan *et al* 1999). In the plains of Pakistan, *E. camaldulensis* has met success in reclaiming marginal lands on an extensive scale (Sheikh 1986). Therefore, the process of marginal land reclamation is expected to be faster if *E. camaldulensis* is planted in compact formation as compared to single rows. Although close spacing between *E. camaldulensis* improves marginal soils after certain number of years but effect of shade and competition with roots inhibit the growth of agricultural corps on the newly reclaimed lands (Sheikh & Haq 1978; & Ramparsad *et al* 1984). An option available is to reduce the density of *E. camaldulensis* after initial reclamation of land and then introduce agricultural crop. The present study examines the effect of *E. camaldulensis* on the yield of agricultural crops after reducing the tree density in the third year of planting. The study will suggest appropriate spacing of *E. camaldulensis* for attaining maximum production of agricultural crop and that will encourage intensive management of newly reclaimed lands.

MATERIALS AND METHODS

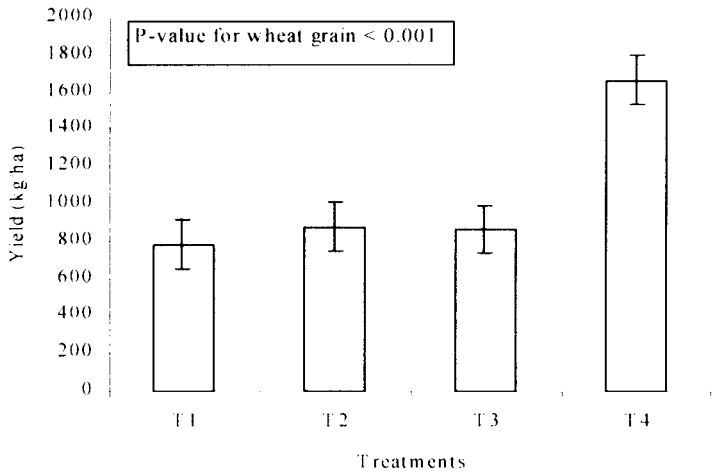
The study was conducted at Punjab Forestry Research Institute, Faisalabad, Pakistan from 1993 to 1997. Eucalyptus plants of six months (raised in polythene tubes) were planted during May, 1993 at three different spacing; 6' x 6', 6' x 10', 6' x12'. In 1995 alternate rows of plants were removed to increase the spacing; 6' x 12' meters (m) (Treatment 1;T1), 6' x 20' m (Treatment 2;T2), 6' x 24' m (Treatment 3; T3) and a plot without trees was retained as control (Treatment 4; T4). Wheat and maize were intercropped during June and September every year. Each treatment was replicated thrice (Randomized Complete Block Design). The yield of wheat grain, wheat straw and maize crops was measured from1995 to 1997. Wheat and maize crop was harvested from each treatment by using quadrate of $1m^2$. Harvested wheat crop was thrashed manually to separate grains and straw. Wheat grains/straw and maize fodder were dried and weighed. Mean dry weight of wheat grains/straw and maize fodder were converted into kg/ha. The difference in yield of wheat grain/straw and maize fodder under different treatments was analyzed through analysis of variance (ANOVA).

RESULTS AND DISCUSSIONS

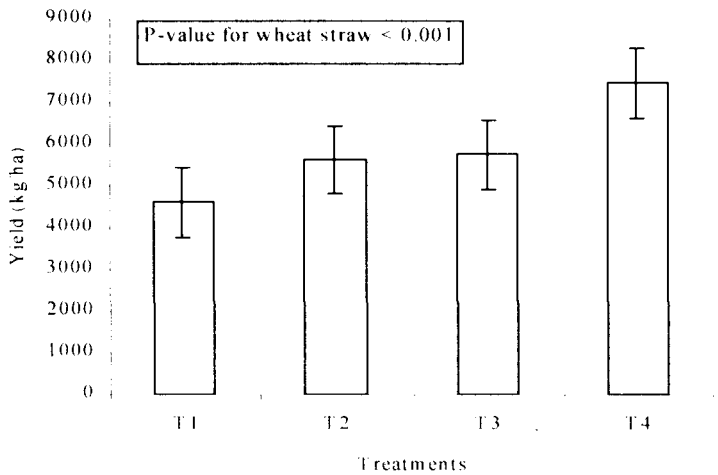
There was significant difference in yield of wheat grain and straw in different treatments over the three years (Figures 1a&b). The high yield of wheat grain and straw in areas with out trees (T4) was presumably due to removal of competition between agricultural crops and trees for soil moisture, nutrients and sunlight (Hussain *et al* 1998). The significantly low yield of wheat grain and straw in T1 was probably due to increase in competition between agriculture crop and trees (Figures 1 a&b). Ramshe *et al* (1995) also concluded that the yield of wheat grain and straw increased significantly with increase in spacing.

Figure 1a&b: Mean yield (±SE) of a) wheat grain b) wheat straw for different treatments; T1 = 6' x 12' meters (m), T2 = 6' x 20' m, T3 = 6' x 24' m and T4 = without trees (control).

a) Wheat Grain



b) Wheat straw

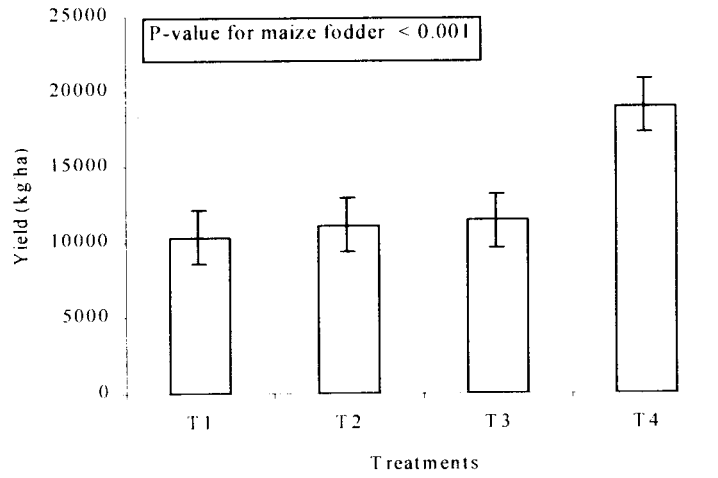


There was a significant effect of spacing on yield of maize fodder (Figure 2). The high yield of maize in areas without trees (T4) was probably due to higher requirement of water and light by maize. Mittal & Singh (1989) also concluded that maize yield was high when grown as solo crop. Lal & Lal(a) (1989) concluded that the yield of maize was low on intercropping with trees as compared to solo crop.

CONCLUSIONS

There is scope for introducing wheat under three year old *E. camaldulensis* after increase in spacing to 6' x 20' and 6' x 24'. The spacing between *E. camaldulenis* has to be further increased to attain maximum production of maize crop. Further studies with different spacing of *E. camaldulensis* may be conducted to accrue maximum production of maize crop. The difference in yield of both wheat/maize crops, between control and treatments suggest that if the objective is to gain maximum production of agricultural crop then the rows of *E. camaldulensis* have to be further reduced to minimise this difference in yield. A preferable option is to retain single rows of *E. camaldulensis* after the land is reclaimed.

Figure 2: Mean yield (±SE) of maize fodder for different treatments; T1 = 6' x 12' meters (m), T2 = 6' x 20' m, T3 = 6' x 24' m and T4 = without trees (control).



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