

SEED YIELD OF CLUSTERBEAN, COWPEA AND MOTHBEAN VARIETIES GROWN WITH THREE ARID ZONE TREE SPECIES

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The practice of having tree in farmers' fields and cultivation of crops has been in vogue traditionally in Indian arid zone but little attention was paid to compatibility and choice of trees and crops for higher yields (Shankarnarayan 1984). Moreover, exotic trees are being recommended and there is hardly any information available for their compatibility with traditional crops. The correct choice of tree species and crop varieties may play an important role in increasing biomass production, the present study was undertaken with this objective.

Of the three tree species included in the study one was exotic (*Acacia tortilis*) and two were indigenous (*Prosopis cineraria* and *Tecomella undulata*). *A. tortilis* was planted during 1983 and the other two species during 1984. Trees were planted at a distance of 3 x 3 m. Three crops were: clusterbean (*Cyamopsis tetragonoloba*), cowpea (*Vigna unguiculata*) and mothbean (*Vigna aconitifolia*). Two varieties of each crops were grown in three replications with a plot size of 6 x 6 m; the varieties being FS 277 and HFG 182 of clusterbean; FS 68 and HFG 42-1 of cowpea; and Jwala and Jadia of mothbean. The crops were sown at a distance of 45 x 15 cm during kharif 1985. Rainfall during the year and cropping season was 214 and 142 mm respectively. The mean height of *A. tortilis*, *P. cineraria* and *T. undulata* was 290, 78 and 107 cm, respectively.

All the three crops failed in association with *A. tortilis*. There was little initial germination but the seedlings wiped out within first week of germination. Poor herbaceous growth under *A. tortilis* has also been reported elsewhere (Anonymous 1987). The comparison between tree species showed that the performance of clusterbean and cowpea in association with *P. cineraria* and *T. undulata* was not statistically significant. In case of mothbean, however, there were significant differences and performance of both the varieties was poor when grown in association with *T. undulata* (Fig. 1). Reduction in yield in Jwala was 63.8%, whereas, in Jadia it was 75.1%. *In vitro* studies showed that leaf extract of *T. undulata* significantly reduced the root length of mothbean, whereas leaf extracts of *P. cineraria* and *T. undulata* had no significant effect on root and shoot length of clusterbean seedlings. Hence, the reduction in yield of mothbean under *T. undulata* may be due to retardation in root growth. The two varieties of cowpea differed significantly. Average seed yield of FS 68 (70 days to

Table 1. Direct and indirect effects of different characters influencing grain yield per plant at genotypic level

Character	Effects via						Correlation with grain yield per plant
	Plant habit	Days to maturity	Pods per plant	Pod length	Hundred seed weight	Straw yield per plant	
Plant habit	0.1865	0.0019	0.0164	0.0232	-0.0007	-0.0150	0.2123**
Days to maturity	0.0041	0.1014	0.0667	0.0722	0.0994	0.3637	0.7075**
Pods/Plant	0.0146	0.0279	0.1884	0.0183	0.0160	0.3955	0.6607**
Pod length	0.0224	0.0327	0.0199	0.2126	0.0364	0.2703	0.5943**
Hundred seed weight	-0.0008	0.0525	0.0200	0.0424	0.1640	0.2445	0.5226**
Straw yield per plant	-0.0047	0.0532	0.1384	0.0873	0.0678	0.5660	0.9080**

Residual Path 0.1957

**Significant at 0.01 level