

STUDY ON THE IMPACT OF INTERCROPPING IN BAJRA

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Experiments conducted at Cotton and Millets Experiment Station, Kovilpatti in black soil under rainfed condition for three years (1979 to 1983) to select suitable intercrop to bajra and also to study the effect of intercrop on the grain yield of bajra, under two different crop geometry arrangement indicated that paired row arrangement is superior to normal row arrangement for bajra to accommodate intercrops. There was reduction in grain yield of bajra when it was intercropped with pulses and reduction was maximum when lab-lab was the intercrop. Considering the competitive nature of lab-lab, either clusterbean or cowpea can be recommended as intercrop to bajra under paired row arrangement.

INTRODUCTION

Bajra (Pearlmillet) is mostly grown in vast area in black soils of southern districts of Tamil Nadu under rainfed condition and it forms the major staple food of this tract. The crop has an advantage that, it could be sown up to the last week of October even if the normal onset of monsoon is delayed. Elimination of risk in failure of crops in dryland agriculture is an insurance against total failure which could be achieved through intercropping systems which are found to be highly desirable and economically paying under rainfed condition. Usually bajra is not often intercropped because of its highly competitive nature (Palaniappan 1984). However groundnut is sometime raised as intercrop with pearl millet. It was reported that, LER of 1.26 was observed under pearl millet and groundnut intercropping systems (1:3 ratio), where intercrop groundnut yield per plant and harvest index (HI) were similar to

sole crop of groundnut while pearl millet per plant yield was substantially higher in intercropping than in sole cropping. Higher yield in intercropping was attributed to more efficient use of resources viz. light, water and nutrients (Willey and Reddy 1981). But so far only greengram and cowpea were tried as intercrop in pearl millet (Gautam 1982). So with an assumption that, inclusion of vegetable pulses as intercrops in pearl millet not only stabilises the yield, but also maximises the total productivity per unit area, under dryland, this study was carried out.

MATERIALS AND METHODS

Field experiments on intercropping in bajra with three pulses viz. cluster bean, lab-lab and cowpea were conducted at Cotton and Millets Experiment Station, Kovilpatti during 1979-80, 1980-81 and 1982-83 *rabi* seasons in black soil under rainfed condition. The trial was laid out in

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randomised block design with three replications with the following treatments.

- T₁. Bajra (Co.5) - normal row (45x15 cm) sole crop.
 T₂. Bajra (Co.6) - paired row (30x15 cm) + 60cm sole crop.
 T₃. T₁ + Cluster bean (Pusa Naubahar)
 T₄. T₁ + Lab-Lab (Co.9)
 T₅. T₁ + Cowpea (Co.3)
 T₆. T₂ + Cluster bean
 T₇. T₂ + Lab-Lab

- T₈. T₂ + Cowpea
 T₉. Cluster bean (Sole crop).
 T₁₀. Lab-Lab (Sole crop).
 T₁₁. Cowpea (Sole crop).

The rate of intercropping was 2:1. The rainfall received during the crop season is furnished in Table 1. Uniform doses of N and P @ 40, 20 kg/ha were applied to all the treatments under sole crop of bajra and intercrops while sole crop of pulses received N and P at 20 and 40 kg/ha.

Table 1 Rainfall during crop period (mm).

Month	1979-80	1980-81	1982-83
October	180.3 (9)	71.0 (8)	218.6 (10)
November	614.0 (17)	164.7 (11)	110.7 (12)
December	28.4 (2)	30.7 (1)	56.1 (3)
January	—	—	—
February	—	1.7	—
Total	822.7 (28)	268.1 (20)	385.4 (25)

Figures in paranthesis denote number of rainy days :

RESULTS AND DISCUSSION

The data on the grain yield of bajra, intercrops and LER are presented in Table II. The results of the 1979-80 experiment indicated that raising sole crop of bajra under normal as well as paired row was not found to differ. Reduction in bajra yield due to intercropping of pulses was higher under normal row planting (44%) compared to paired row planting (35%). As intercrop, cluster

bean recorded significantly higher yield than other intercrops studied. During 1980-81 and 1982-83 even though the bajra yield difference was not significant, paired row arrangement recorded numerically higher yield than normal row arrangement. In both the years, even though there was reduction in bajra yield due to intercropping, the reduction was less when cluster bean or cowpea was intercropped compared to lab-lab.

TABLE II YIELD OF BAJRA, INTERCROPS AND LER

Tr. Details of treatment No.	Bajra grain yield kg/ha				Intercrop yield kg/ha				Cumbu stalk yield kg/ha				Mean LER
	1979-80	1980-81	1982-83	Pooled Mean	1979-80	1980-81	1982-83	Pooled Mean	1979-80	1980-81	1982-83	Pooled Mean	
T ₁ Bajra (Co. 6) Normal row sole crop	2222	982	1003	1402	—	—	—	—	5122	1881	2787	3263	—
T ₂ Bajra (Co. 6) Paired row sole crop	2043	1019	1066	1376	—	—	—	—	4444	1666	2734	2948	—
T ₃ T ₁ + Cluster bean	1333	983	1125	1140	1478*	1723*	794*	1332	4074	1728	2716	2839	1.13
T ₄ T ₁ + Lab-Lab	1049	852	986	962	185	588*	44*	266	3703	1851	2769	2774	1.16
T ₅ T ₁ + Cowpea	1377	870	1069	1105	125	83	238	149	3766	1605	2769	2713	1.15
T ₆ T ₂ + Cluster bean	1463	840	1173	1159	1349*	1153*	1146*	1216	3951	1728	3034	2904	1.10
T ₇ T ₂ + Lab-Lab	1160	870	938	989	136	531*	48*	238	3640	1543	2610	2598	1.11
T ₈ T ₂ + Cowpea	1358	833	986	1059	133	47	349	176	4074	1629	2575	2759	1.09
T ₉ Sole cluster bean	—	—	—	—	6346*	6556*	4065*	5656	—	—	—	—	—
T ₁₀ Sole Lab-Lab	—	—	—	—	420	1235*	173*	609	—	—	—	—	—
T ₁₁ Sole Cowpea	—	—	—	—	463	249	894	535	—	—	—	—	—
S. E.	149.6	131.5	169.3	131.1	222.2	156.7	238.1	301.9	303	193	566	159	—
C. D (P=0.05)	483.7	NS	NS	NS	666.7	470.4	715.3	904.9	NS	NS	NS	NS	—
				S.E: 131.1									
				Season									
				C.D. 397.3									

* Vegetable; ** Significant in respect of year of study alone

The higher reduction in bajra grain yield due to lab-lab intercropping might be due to high competitive nature of lab-lab with bajra. It was reported that the available nitrogen status of soil was maximum in the pearl millet + cluster bean (Annon. 1983). This may be the reason for lesser reduction in bajra grain yield under cluster bean and cowpea intercropping combination. In respect of LER, all intercropping combinations had recorded LER of more than 1 indicating the yield advantage.

There was no significant difference between treatments in respect of bajra straw yield in all the years of study. The study also indicated that raising bajra under paired row was found to suit very well to different rainfall situations. Gautam (1982) also reported that paired row system provides additional space for the growth of intercrop component. It was also found that the available-N content of post harvest soils was the least when bajra was raised as sole crop indicating the advantage of intercropping on the soil available nitrogen content (Annon 1983). It was reported under intercropping system of pearl millet and groundnut,

there was above ground competition and not below ground competition (Willey and Reddy 1981). This might be the reason for increase yield obtained under paired row arrangement rather than normal row planting of bajra. Considering the competitive nature of lab-lab on bajra, it is concluded that either cluster bean or cowpea could be sown as intercrop in bajra under paired row arrangement.

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