

## STUDIES ON INTERCROPPING IN RAINFED COTTON.

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The sole crop of cotton recorded significantly higher kapas yield (597, 504 and 536 kg/ha, respectively during 1980-81, 1981-82 and 1982-83) compared to that of cotton intercropped with blackgram, senna, cluster bean, chillies, soybean and coriander. All the intercrops, irrespective of their yield advantage, had reduced the kapas yield of cotton and the reduction was up to 28 per cent. Among the intercrops, the clusterbean had registered higher yield than other intercrops studied and the reduction in kapas yield was compensated by clusterbean due to its high yielding potential.

It was also confirmed that in years of drought with low rainfall and severe moisture stress, the inclusion of clusterbean as intercrop was better and its yield performance was far superior over other intercrops. The possibility of growing senna as second intercrop after the harvest of first intercrops (blackgram and clusterbeans) in cotton is not possible under rainfed black cotton soil in view of the low rainfall received during the cropping period, (267.1 mm, 271.9 mm and 379.3mm, respectively during 1980-81, 1981-82 and 1982-83) of cotton (October-March). The commercial viz., coriander and chillies failed to perform as intercrop due to their poor establishment. The highest net return of Rs. 2096, Rs.315 and Rs.1198/ha, respectively were obtained, during 1980-81, 1981-82 and 1982-83 in the cotton + clusterbean intercropping system followed by cotton + blackgram system.

In Tamil Nadu, nearly 2.25 lakhs hectares are under rainfed cotton cultivation. Of this, more than 60 per cent area is in Madurai, Ramnad and Tirunelveli districts. In these districts the cotton is sown either as broadcast crop or sown with seed drill. In the case of broadcast, cotton is mixed either with one or more than one pulse crops (blackgram, greengram, cowpea, lab-lab) or cereals like tenai and sown without regular row arrangement. In the drill sown crop one line of blackgram is sown for every two lines of cotton. Cotton and blackgram is a popular mixture

and adopted by a large number of farmers. The average yield of blackgram as a mixed crop ranges from 150 to 200 kg/ha. The low yield is due to lack of optimum plant population of blackgram and plant protection measures. Christidis and Harrison (1955) observed that mixed cropping gives benefits of crop diversification and improves the chances of economic returns. Anjaneyalu and Venkoba Rao (1959) found cotton and setaria in the proportion of 1:2 was conducive for higher returns on black cotton soils. Kairon and Avtar Singh (1972) obtained increased yield of

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137 kg of seed cotton per hectare from cotton + mung (1:1) as compared to cotton alone besides harvesting 395 kg/ha extra mung grain. Devotta and Chowdappan (1975) reported that cotton + greengram sown in alternate rows and cotton + greengram (two rows) under paired system gave highest net return. The present investigation was carried out with the following objectives: (i) to find out the possibility of introducing a vegetable or cash crops like chillies, coriander and senna and also to find out the possibility of introducing a second intercrop either by relay or sequential cropping after first intercrop.

#### MATERIALS AND METHODS

Trials were laid out for three years (1980-81 to 1982-83) at cotton and Millets Experiment Station, Kovilpatti with cotton (C.50) as main crop and senna (local) or blackgram (Co. 3) or clusterbeans (Pusa Neuber) or chillies (K. 2) or soybean (Co. 1) or coriander (local) as intercrops of cotton. Two rows of intercrops were raised in between paired rows of cotton. Senna was sown as second intercrop after harvesting first intercrops in cotton + blackgram and cotton + clusterbeans treatments. The experiment was laid out in a RBD with four replications. The intercrops were harvested on 65 to 75 days depending on the date of maturity. The treatments viz., T2, T5

and T6 were tried only during 1980-81 and they were not included during 1981-82 and 1982-83 as they were recommended. In addition to the treatment T1, T3, T4, three more treatments viz., T7, T8 and T9 were included in the 2nd and 3rd year of trials. (ie. 1981-82 and 1982-83).

#### RESULTS AND DISCUSSION

The yield of different crops and net return obtained in each of the treatments are presented in Table 1. It was observed that in all the three years, the yield of kapas obtained under pure stand of cotton was significantly higher than that of cotton intercropped with other intercrops. (sennaindigo, blackgram clusterbeans, chillies, soybean and coriander). The maximum yield reduction in kapas was 28 percent due to different intercrops. In all the three seasons the intercrop clusterbeans gave higher yield than the other intercrops tried. The lower yield of other intercrops might be attributed to the moisture stress due to low amount of rainfall (267.1 m.m, 271.9 m.m. and 379.3 m.m. respectively during 1980-81, 1981-82 and 1982-83) received during the cropping period of cotton (October-March). The better performance of the vegetable clusterbeans may be due to its nature of drought tolerance, indicating its good performance and suitability and superiority over other intercrops

Table 1 The influence of intercrops on the yield of cotton and the economics of intercropping in cotton

Treatments	Seed cotton yield (kg/ha)			Yield of intercrops (kg/ha)			Net return/profit (Rs./ha)		
	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83
T1 Cotton pure stand	597	504	535	—	—	—	588	135.00	765
T2 Cotton+senna	595	—	—	50	—	—	830	—	—
T3 Cotton+blackgram	430	437	438	600	203	118	1460	245.00	858
T4 Cotton+clusterbeans	461	406	418	4920	2969	3031	2096	315.30	1198
T5 Cotton+Clusterbeans followed by senna.*	433	—	—	5125	—	—	2107	—	—
T6 Cotton+blackgram followed by senna*	448	—	—	543	—	—	1360	—	—
T7 cotton+chillies**	—	468	474	—	—	—	—	-45.0	381
T8 cotton+soybean	—	347	345	—	213	219	—	-615.50	315
T9 cotton+coriander**	—	376	531	—	50	—	—	-32.00	665
S.E :	20.3	8.8	5.0	—	—	—	105	—	54
C D:	60.8	36.6	14.0	—	—	—	317	—	158

Rainfall during Cropping period	1980-81	1981-82	1982-83
	267.1 mm	271.9 mm	379.3 mm
Rainy days	21	23	24

\* Senna as second intercrop after clusterbeans and blackgram withered away due to severe drought

\*\* Chillies and coriander did not establish as intercrops.

even in years of low rainfall. The establishment of chillies and coriander was poor and were found to be unsuitable as intercrops. This was in conformity with the findings of Devotta and Chowdappan (1975) who reported that coriander was unsuitable as intercrop in cotton because of its poor establishment and consequent poor yield. It was also confirmed that in years of low rainfall, it will not be possible to have second intercrop. The senna as intercrop after blackgram or clusterbeans withered due to severe drought that prevailed after 60th day of cotton.

Considering the economics of intercropping in all the three years of study, cotton + clusterbeans system recorded the highest net return of Rs. 2096, Rs. 315 and Rs. 1198/ha, respectively during 1980-81, 1981-82 and 1982-83 and this was followed by cotton + blackgram system.

Hence considering the yield and net return, cluster bean or blackgram could be recommended as intercrop with cotton during years of low rain fall in rainfed blacksoils.

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