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Mixed Cropping with Sesamum

BY

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ABSTRACT

An experiment undertaken to study the comparative merits of pure and mixed cropping of *Sesamum* with either *Cholam*, *Cumbu*, groundnut or redgram shows that mixed cropping of *Sesamum* is better than pure cropping. The yield of *Sesamum* increases when raised with redgram but when raised with *Cholam* or *Cumbu* or even groundnut the effect is to the contrary. *Sesamum* + redgram is recommended from the point of view of increased production of pulses it would account for without affecting the area or the yield of *Sesamum*.

INTRODUCTION

A single crop of either *Cholam* or *Cumbu*, if it is a cereal, or in the alternative *Sesamum* or groundnut is raised year after year in the large dryland tract of Karur, Tamil Nadu State. In any given year, however, the largest area is usually under the *Sesamum* crop. To find out a suitable mixed cropping pattern that can be introduced into this area, an investigation was taken up at the Gingelly Research Station, Karur during 1965 to 1968.

MATERIALS AND METHODS

The chief objectives of this experiment were (i) to assess the relative merits of pure cropping of *Sesamum* versus a mixed cropping with *Sesamum* as one of the crops in the mixture and (ii) to fix up a crop mixture that can be adopted to the maximum advantage of the *Sesamum* grower.

The treatments consisted of four crop mixtures involving *Sesamum* and one other crop commonly grown in the region during the monsoon season. The experimental details are presented in Table 1.

RESULTS AND DISCUSSION

As the success or otherwise of a monsoon cropping depends on the distribution of rainfall, a study was made of the rainfall pattern in the tract and it has been presented in Table 2.

The seasonal conditions were somewhat better only during the first

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Table 1. Details of treatments

Particulars	Varieties	Spacing adopted
Treatments		
Sesamum	Local	30 cm × 30 cm
Cholam	Co 19	"
Cumbu	Co 4	"
Groundnut	TMV 3	22.5 cm × 22.5 cm
Red gram	Local	90 cm × 90 cm
Sesamum + *Cholam*		30 cm × 30 cm
Sesamum + *Cumbu*		"
Sesamum + Groundnut		30 cm × 30 cm and 22.5 cm × 45 cm
Sesamum + Redgram		30 cm × 30 cm and 90 cm × 180 cm
Plot size : 6 × 3 m [net]		Replications : Four

two years of the trial. The distribution of the rainfall was erratic and inconsistant during any two seasons or within a season itself. The rainfall received during the cropping period in the third year was only about half of the average rainfall for the season. Whereas in the first and second years the sowing was done on the 14th August and 1st September respectively, during the third year it could be done only on the 8th October. Probably the poor rainfall and the consequent late sowing was responsible for the poor yield obtained in that year. The data on the yield of crops recorded for individual years have been given in Table 3.

The yield of *Cholam* and *Cumbu* got depressed when sown mixed with *Sesamum* and such a reduction in yield was uniform in all the years In the combined yield data,the yield of *Cholam* as a pure crop was 166.1 kg per ha and in a mixture with *Sesamum* it came down to 106.2 kg. *Sesamum* sown in mixture behaved similarly with all crops except redgram. When sown with redgram there was an increase in the yield of *Sesamum* (202.8 kg/ha) as compared to that from a pure crop (180.7 kg ha) in the first year. Figures for the second year were 195.3 kg per ha. from a mixed crop and 231.4 kg per ha. from a pure crop. In the third year

TABLE 2. Rainfall data

Month	Years					
	1965 – '66		1966—'67		1967 – '68	
	Rain fall (mm)	Rainy days (No.)	Rain fall (mm)	Rainy days [No]	Rain fall (mm)	Rainy days [No]
August	206.5	9	45.6	3	20.4	2
September	72.0	4	84.7	8	2.2	...
October	89.8	4	194.4	6	83.0	5
November	42.3	4	146.5	4	71.8	1
December	89.6	8	28.2	4	61.2	5
January	1.2	...	45.0	1	...	...
Total for the season	501.4	29	544.4	26	283.6	13
Mean for the season (10 years)			428.1			

TABLE 3. Yield of different crops and crop mixtures (kg/ha)

Treatments	1965		1966		1967		Mean	
	Yield of Sesamum	Yield of other crops	Yield of Sesamum	Yield of other crops	Yield of Sesamum	Yield of other crops	Yield of Sesamum	Yield of other crops
Sesamum	180.7	...	231.4	...	122.7	...	178.1	...
Cholam	...	245.3	...	166.3	...	86.6	...	166.1
Cumbu	...	180.7	...	469.7	...	336.3	...	328.9
Groundnut	...	876.4	...	957.6	...	237.3	...	690.4
Redgram	...	651.0	...	309.8	...	62.9	...	341.2
Sesamum + *Cholam*	103.9	182.9	131.3	89.3	42.0	46.3	92.5	106 2
Sesamum + *Cumbu*	62.4	125.4	83.4	421.3	33.4	205.0	59.7	250.6
Sesamum+Groundnut	57.6	707.4	132.3	446.6	56.0	124.8	81.8	426.3
Sesamum+Redgram	202.8	200.6	195.3	142.6	133.4	35.0	177.0	126.1

TABLE 4. Yield of *Sesamum* (kg/ka)

Treatments	1965 *	1966 *	1967 *	Combined*
Sesamum	180.7	231.4	122.7	178.1
Sesamum + *Cholam*	103.9	131.3	42.0	92.6
Sesamum + *Cumbu*	62.4	83.4	33.4	59.7
Sesamum + Groundnut	57.6	132.3	56.0	81.8
Sesamum + Red gram	202.8	195.3	133.4	177.0
S. E.	27.8	12.4	3.1	3.7
C. D.	79.4	35.3	8.3	10.2

* Significant at P = 0.05

TABLE 5. Value of produce (Rupees/ha)

Treatments	1965	1966	1967	Mean
	Value [Rs]	Value [Rs]	Value [Rs]	Value [Rs]
Sesamum	259	463	196	316
Cholam	196	166	69	144
Cumbu	117	352	235	235
Groundnut	789	1532	237	858
Redgram	521	310	63	293
Sesamum + *Cholam*	313	352	104	256
Sesamum + *Cumbu*	181	483	197	287
Sesamum + Groundnut	729	979	214	641
Sesamum + Redgram	485	533	248	422

Sesamum from a mixed crop fetched the highest yield of 133.4 kg per ha compared to 122.7 kg per ha from a pure crop. In the overall combined performance the yield of *Sesamum* from a mixed crop was (177 kg/ha) almost equal to that obtained from a pure crop (178.1 kg/ha). The yield of the *Sesamum* crop constituting the various mixtures and that from a pure crop of *Sesamum* were alone taken up for analysis for the reason that the objective of the trial itself is to assess the relative merits of pure and mixed cropping with *Sesamum* (Table 4.)

In the first and third years, the *Sesamum* + redgram mixture was the best having fetched 12.2 per cent and 8.7 per cent respectively more yield of *Sesamum* than from a pure crop;whereas in the second year only the pure crop gave the highest yield. Mixed cropping was noticed to be superior to pure cropping in individual years though in the results of combined analysis both had parity. The experiment also revealed that during years of seasonal fluctuations in rainfall maximum advantages occured only from mixed cropping as evidenced by the results obtained in the third year.

To make a better evaluation of the results, the economics of the treatments were worked out and for doing so the gross value of produce obtained from the various treatments were alone taken into account due to the fact that excepting the case of groundnut the cultivation expenses for all crops are almost the same (Table 5)

The highest gross return was obtained from the treatment "groundnut' followed by "*Sesamum* + groundnut". These two treatments have on an average fetched Rs. 858/- and Rs. 641/- respectively from a ha. The third best treatment was "*Sesamum* + redgram" which results in obtaining a gross return of Rs.422/- per ha. Because of the higher ruling market rates for groundnut the treatments involving the groundnut crop in this investigation have accounted for the best results

It is inferred that mixed cropping is better than pure cropping for the Karur tract which is subject to an erratic rainfall distribution. The main advantage of this cropping is the benefit one crop derives by association with the other, like the linseed crop preferring a gram in a mixture (Gupta, 1964) The complimentary effect of redgram in crop mixtures with *Sesamum* is clear from this investigation in contrast to the competitive nature of the cereals. Howard (1916) and Metha (1942) found a marked advantage in sowing gram in crop mixtures and got much higher yield from them than from a pure cropping. Madhok (1940) noted that a single gram plant could supply enough nitrogen to support as many as four wheat plants It is only due to this complementary effect of the redgram crop on *Sesamum* that an increase is noticed in the yield of *Sesamum* when both are sown mixed together. Redgram is seen to have a complementary effect on *Sesamum* and hence it is more advantageous to raise these two crops together than to raise a pure crop of *Sesamum*. These apart, the gross economic return from a mixed

cropping of *Sesamum* and redgram is higher than that from a pure *Sesamum* crop.

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