

## EFFECT OF PRECEDING FODDER CROPS AND FALLOW ON PRODUCTIVITY MECHANICS IN FIRST CROP SEASON RICE

The role of land use pattern in productivity improvement is well established. Development of cropping patterns, however, should be in tune with the prevailing agro-climatic situations. Continuous cropping of rice round the year, though it increased the total annual yield, decreased the productivity per crop. Summer cropping with vegetables in rice lands has been reported to increase the yield of rice (KAU, 1982). Hence, an experiment to study the effect of fallowing as well as raising fodder crops in summer months on rice pro-

ductivity was conducted at the Agricultural Research Station, Mannuthy, Trichur.

Six fodder legumes, viz., sannhemp, soybean, rice bean, velvet bean, cowpea, and black gram, and a fallow, were the treatments applied in randomized block design in the summer months. The net plot size was 60 m<sup>2</sup> and the soil was acidic with a pH of 5.5. In June, with the onset of the south-west monsoon, the plots were separately ploughed and rice (cv. Jyothi) was then transplanted.

Table 1. Dry matter accumulation, grain yield, straw yield and grain-straw ratio of rice as influenced by the preceding legume crops and fallow.

Treatment	Dry matter accumulation, kg ha <sup>-1</sup>			Grain yield kg ha <sup>-1</sup>	Straw yield kg ha <sup>-1</sup>	Grain-straw ratio
	40 DAS	60 DAS	At harvest			
Sannhemp	1006	6732	4485	1841	2645	0.71
Soybean	1033	6190	4212	1704	2508	0.69
Rice bean	1075	6385	4251	1766	2485	0.72
Velvet bean	1004	5805	4299	2011	2288	0.90
Cowpea	998	6427	4478	1968	2510	0.79
Black gram	866	5605	4185	1853	2332	0.80
Fallow	1033	6649	3857	1402	2455	0.58
Mean	1002	6257	4252	1792	2460	0.74
CD (0.05)	278	1042	810	343	467	0.14
S Em.	92	344	265	111	154	0.04

Data on the dry matter accumulation of rice and the yield and yield attributes are presented in Tables 1 and 2. A comparison between summer fallowing and mean effect of summer cropping showed that they did not differ significantly in dry matter accumulation till the flowering stage. At the time of harvest however, they differed markedly and summer cropping resulted in a net advantage of 12 per cent increased dry matter production over fallowing. Data on productive attributes showed that summer cropping led to an improvement in the number of productive tillers and the 1000 grain weight, which was manifested in a significant improvement in dry matter accumulation at harvest. Improvement in yield of grain was also pronounced.

The number of productive tillers is a function of differentiation within the plant which also

depends on earliness of emergence. A higher number of productive tillers due to summer cropping would therefore indicate an early and synchronized emergence of more tillers and their lower decline subsequently. On the other hand, differentiation is an integral function and is a metabolic result in the plant. A higher number of productive tillers would therefore suggest a more efficient metabolic system of the plant and / or a more favourable metabolic environment. Observations on 1000 grain weight and grain-straw ratio substantiate this further. The 1000 grain weight in rice succeeding fallow was only 24.4 g which was lower by 12 per cent compared to summer cropping and the corresponding grain-straw ratios also differed similarly by 32.7 per cent. A higher 1000 grain weight and a narrower grain-straw ratio are evidences of more efficient translocation to the grain

from the vegetative parts. A significant improvement in these attributes suggests that fallowing probably leads to a soil environment that produces prohibitory influence on translocation of photosynthates in the plant. As this is an internal function, it is likely to be related basically to the nutrition and elemental composition of the plant and needs further investigation. The observations showed that the fodder crops varied significantly among themselves in their effect on productive tiller number and final grain weight of rice. Black gram was the least effective in influencing yield attributes whereas fodder cowpea gave the maximum grain weight through its effect on productive tillers. Differential influence of the preceding fodder legumes may be because

of their differential rhizosphere influences. Observations on yield showed that summer cropping, instead of fallowing, led to an increase in yield of grain by 32 per cent in the succeeding rice crop. This would mean that fallowing in summer unfavourably affects productivity. Menon (1987) has reported that fallowing in summer leads to degradation of soil properties, including reduced nutrient availability. Thus summer cropping could avoid this degradation leading to improvement in yield of the succeeding rice crop. Among the receding crops, velvet bean produced the highest rice yield, followed by cowpea, mainly by their favourable effect on dry matter production, indicating increased translocation of photosynthates to the grains.

Table 2. Yield attributes of rice as influenced by the preceding legume crops and fallow

Treatment	Productive tillers/hill	Length of panicle, cm	No. of grains/panicle	Percentage of filled grain	1000 grain weight, g
Sannhemp	4.0	16.3	48.3	63.0	28.0
Soya bean	4.3	16.5	49.3	66.6	27.4
Rice bean	4.0	15.8	48.2	63.9	27.6
Velvet bean	4.0	16.5	49.5	68.8	26.5
Cowpea	3.8	17.0	50.5	68.0	28.1
Black gram	3.3	16.3	44.3	64.8	27.3
Fallow	3.7	16.7	55.5	65.7	24.4
Mean	3.9	16.5	49.4	65.8	27.0
CD (0.05)	0.72	1.18	8.60	3.35	0.85
SEm.	0.24	0.39	2.84	1.09	0.27

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