

Assessment of performance of rice grown after babycorn, rapeseed cropping systems with mulch and irrigation treatments

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Rice (*Oryza sativa*) is the staple food of more than 60 per cent of the world's population. In India, rice is the most important and extensively grown food crop, occupying about 44.8 million hectares of land. It accounts for about 43 per cent of total food grain production and 55 per cent of cereals production in the country. Performance of rice was good when previous crop was mulched. The beneficial effects of organic mulches were carried over to the subsequent cereal crops. Irrespective of preceding crops, mulch shows positive residual effect on succeeding rice yield (Mandal *et. al.*, 1988). Actually organic mulches like straw (rice), husk increased nutrient availability on decomposition and growth of the following crops (Patil *et. al.*, 1972). Plots with sole crop previously gave higher response in succeeding rice crop than the plots with intercropped one. Keeping in view the factors discussed above present investigation was undertaken.

A field experiment was conducted during wet season of 2005-06 at the 'C' Block Farm of Kalyani, Bidhan Chandra Krishi Viswavidyalaya, Nadia. The soil was sandy loam in texture and pH-7.4. The experiment was conducted in split plot design and with three different crops in the previous season as treatments in the main plots, namely, M₁ –sole babycorn, M₂ –sole rapeseed, M₃ –grown intercrop of babycorn + rapeseed, and irrigation or mulch given to the previous crop as subplots treatments, namely, I₁ – No irrigation or mulch, I₂ – One irrigation of 5 cm depth, I₃ – Only mulch @ 7.5 t/ha, I₄ – Both mulch and one irrigation.

Rice variety IET 4786 (Shatabdi) was sown at 20 cm row to row spacing with a seed rate of 45 kg ha⁻¹. The same design was followed in case of rice without disturbing the plots where plot size was 4 x 3m. Fertilizer dose @ 60 kg N, 30 kg P₂O₅ and 30 kg K₂O ha⁻¹ was applied. Full dose of P as SSP, K as MOP and ¼th of the recommended dose of N fertilizer in the form of urea and were applied as basal, ½ of the recommended dose of N was top dressed at active tillering stage (21 DAS) and rest ¼ of the recommended fertilizer N was applied at the panicle initiation stage.

From the experimental results, it was observed that the height of rice plants, number of matured panicles m⁻², number of filled grains panicle⁻¹ were influenced by previous cropping systems and application of mulch to the preceded crops. Higher values were obtained from the plots where sole cropping was previously practiced compared with the intercropped plots. Mulched plots produced greater values over unmulched ones. Interaction effects also showed the similar trend (Table 2). Height of rice plant was highest (87.15 cm) with I₄ treatment where mulch was applied in previous plots. The highest number of matured panicles m⁻² (348.38), number of filled grains panicle⁻¹ (75.27) were obtained with I₄ subplot treatment where mulch was applied previously (Table 1).

The grain yield of rice was significantly influenced by the residual effects of previous cropping systems and mulch and by their interaction effects (Table 1 and 2). The grain yield of rice was higher when it succeeded sole cropped plots. Thus, it may be concluded that an increase in grain yield of rice had been attributed to the residual effect of organic mulch. Organic mulches besides increasing the organic matter and nitrogen status also improved the physico-chemical properties and available moisture status of the soil. The application of rice straw mulch to *rabi* crops not only increased the grain yield of succeeding rice crop but also improved the health of the soil

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Assessment of treatments

Table 1: Yield and associated characters of rice as influenced by previous cropping systems and mulches

Particulars	Height of the plants	Number of matured panicle m ⁻²	No. of filled grains panicle ⁻¹	Grain yield kg ha ⁻¹
Main plot				
M ₁	84.69	354.6	72.93	3785
M ₂	83.71	341.4	73.42	3811
M ₃	83.45	336.9	72.76	3755
SEm (±)	0.178	0.269	0.245	1.852
LSD(0.05)	0.699	1.057	0.730	7.272
Sub plot				
I ₁	80.78	334.4	70.74	3688
I ₂	81.25	335.1	71.15	3730
I ₃	86.62	347.4	74.97	3860
I ₄	87.15	348.3	75.27	3862
S E m (±)	0.305	0.764	0.311	2.625
LSD(0.05)	0.908	2.270	0.925	7.799

Table-2 Yield components of rice as influenced by the interaction effect between previous cropping system and mulch

Previous sub plot effects (mulch)	No. of panicle (m ⁻²)				No. of filled grains panicle ⁻¹				Grain yield (kg ha ⁻¹)			
	I ₁	I ₂	I ₃	I ₄	I ₁	I ₂	I ₃	I ₄	I ₁	I ₂	I ₃	I ₄
Previous main plot effects (cropping system)												
M ₁	336.61	337.90	351.81	356.36	70.48	71.38	75.51	76.33	3659.83	3719.16	3892.58	3780.64
M ₂	337.03	335.29	346.98	346.58	71.21	71.63	74.59	76.23	3745.74	3780.38	3851.21	3868.35
M ₃	329.78	332.17	343.48	342.21	70.52	70.43	74.82	75.26	3658.48	3692.96	3842.24	3829.88
SEm (±) (M x I)		1.323				0.539				4.546		
SEm (±) (I x M)		1.410				0.562				4.632		
LSD(0.05) (M x I)		3.933				NS				13.509		
LSD(0.05) (I x M)		4.191				NS				13.765		