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

A. SARKAR, S. SARKAR, B. K. MANDAL AND A. ZAMAN

Department of Agronomy, Faculty of Agriculture
Bidhan Chandra Krishi Viswavidyalaya, Mohanpur-741252, Nadia, West Bengal

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. el*.,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, M_1 –sole babycorn, M_2 –sole rapeseed, M_3 –grown intercrop of babycorn + rapeseed, and irrigation or mulch given to the previous crop as subplots treatments, namely, I_1 – No irrigation or mulch, I_2 – One irrigation of 5 cm depth, I_3 – Only mulch @ 7.5 t/ha, I_4 – 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 P_2O_5 and 30 kg K_2O 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 I_4 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 I_4 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

REFERENCES

Mandal, M. K., Mahapatra, S. K. and Mandal, Bikash K.. 1988. Residual effect of mulch and different cropping patterns on rice yield. *Oryza,* **25** : 129-31.

Mandal, B. K., Subuddhi, U. K., Singh, Y. V. and Mandal, Bikash K.. 1992. Residual effect of mulch and preceding crops on rice. *Madras Agric. J.* **79**: 164-67.

Patil R. V, Singh S. D, Yadahalli Y. H and Prabhakar A. R. 1972. Effect of straw mulch and application of fertilizers on soil moisture conservation and the yield of potato. *Indian J. Agron.* **17** : 17-19.

Email: amitava_agro@rediffmail.com
Short communication

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 Em (±)	**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})			
Previous main plot effects (cropping system)	**I_1**	**I_2**	**I_3**	**I_4**	**I_1**	**I_2**	**I_3**	**I_4**	**I_1**	**I_2**	**I_3**	**I_4**
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**			