

Rice necrosis mosaic virus technology – a new low cost production technology for jute fibre production

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Rice Necrosis Mosaic Virus (RNMV) that causes visible virus symptoms on leaves and retards growth in rice induces growth promotion and higher yield upon artificial inoculation in phylogenetically unrelated plants like jute (*Corchorus olitorus* cv. JRO-524). Since the property of such RNMV-induced growth promotion is transmissible to next generation in jute, a trial was conducted in farmers' plots of Basirhat sub-division with RNMV-energized jute seeds (JRO-524E) to observe the sustainability of such effect. Results revealed that plants grown from RNMV-energized seeds produced appreciable higher fibre even when half of the recommended dose of fertilizers and no plant protection measure over control (standard JRO-524) were used. Early sowing of JRO-524E seeds with 110 days of growing period was found to be a good package of cultivation. Net profit earned by the farmers with such technology was observed to be as high as 38%. The technology, thus, highlighted an unusual host : virus interaction in utilizable form for the benefit of jute growing farmers.

Key words : Rice necrosis mosaic virus, jute fiber production

INTRODUCTION

Rice Necrosis Mosaic Virus (RNMV) is reported to cause disease and reduces yield in rice (Ghosh, 1980), while growth promotion and enhancement of fibre yield in jute (*Corchorus olitorius* cv. JRO-524) was noticed upon artificial sap inoculation with the same virus (Ghosh, 1985). Such effect in jute is more pronounced with the use of half of the recommended dose of fertilizers (Ghosh, 1988) and without any plant protection measure. The property of RNMV-induced growth promotion and higher yield potential is also passed through the seeds of inoculated plants and termed as Energized seeds. To observe the feasibility and acceptability by the farmers a trial was conducted in farmers' plots located at Atghara, Basirhat with the assistance of SEVA, NGO working there and cost-benefit ratio was analyzed. The results are presented.

MATERIALS AND METHODS

Energized seeds of jute (JRO-524E) were obtained

through inoculation of jute plants (JRO-524, 15 days old) with RNMV prior to the experimentation. Such energized seeds were distributed to farmers through Vikas Kendra, SEVA, Atghara along with the standard control seeds (JRO-524) for comparison with a package of practices namely, (i) fertilizer schedule as $N_{20}P_{10}K_{10}$, and (ii) early sowing (i.e., March-end) and without any plant protection measure for a well-pulverized soil. Nitrogenous fertilizers were given in two split doses (0.5 at sowing time and 0.5 after thinning) while others were given as basal doses.

Plants were grown for 110 days under field condition. These were then harvested and retted under flowing water. The fibers obtained were then dried and weighed for comparison.

The cost : benefit ratio was then analyzed taking into consideration all the operational expenses involved therein.

RESULTS AND DISCUSSION

The study showed higher plant growth and fibre

Table 1. Cost : benefit ratio analysis of JRO-524E cultivation in farmers plots.

Farmer	Seed	Cost of Production (Rs.)	Fibre yield (Q/ha)	Gross Return/ha (Rs.)	Net Return/ha (Rs.)	Net Profit/ha (Rs.)	Increase in net profit (%)
1	JRO-524E	5997	25.02	32,526	26,529	(+)5746	(+) 27.6
	JRO-524	6088	20.67	26,871	20,783	--	--
2	JRO-524E	6036	27.02	35,126	29,090	(+) 7447	(+)34.4
	JRO-524	6099	21.34	27,742	21,643	--	--
3	JRO-524E	6006	29.47	38,311	32,305	(+) 7024	(+) 27.8
	JRO-524	6088	24.13	31,369	25,281	--	--
4	JRO-524E	5993	30.63	39,819	33,826	(+)9468	(+)38.9
	JRO-524	6088	24.13	31,369	25,281	--	--
5	JRO-524E	6046	28.70	37,310	31,264	(+) 5344	(+) 20.6
	JRO-524	6099	24.63	32,019	25,920	--	--
6	JRO-524E	5993	27.42	35,646	29,653	(+)3707	(+)14.3
	JRO-524	6099	24.63	32,019	25,920	--	--
7	JRO-524E	6006	30.88	40,144	34,138	(+)8517	(+)33.2
	JRO-524	6099	24.40	31,720	25,621	--	--
8	JRO-524E	6042	30.83	40,079	34,037	(+)5810	(+)20.6
	JRO-524	6132	26.43	34,359	28,227	--	--
9	JRO-524E	6003	24.68	32,084	26,081	(+)142	(+)0.5
	JRO-524	6080	24.63	32,019	25,939	--	--
10	JRO-524E	5998	28.90	37,570	31,572	(+)12,003	(+)61.3
	JRO-524	6093	19.74	25,662	19,569	--	--
11	JRO-524E	6038	29.00	37,752	31,714	(+)5991	(+)23.3
	JRO-524	6088	24.47	31,811	25,723	--	--
12	JRO-524E	6039	23.56	30,628	24,589	(-)1396	(-)5.4
	JRO-524	6099	24.68	32,084	25,985	--	--
13	JRO-524E	6045	30.01	39,013	32,968	(+)6621	(+)25.1
	JRO-524	6088	24.95	32,435	26,347	--	--
14	JRO-524E	6068	30.13	39,169	33,101	(+)3868	(+)13.2
	JRO-524	6088	27.17	35,321	29,233	--	--

Fibre price @ Rs. 1300/- Q(1995)

yield in JRO-524E plants as compared to control in the farmers' field tested.

The yield of fibre was found to vary from 11%-46% in all the plots except one where the yield in energized plants was found slightly lowered (Table 1).

The energized jute plants showed more juvenility and did not show any visible virus symptom on them.

With regard to analysis of cost : benefit ratio it was revealed that the cultivation of RNMV-energized jute seeds was profitable as it incurred no additional expense on pesticide application to control insect pests and diseases. Presence of such bio-agents on energized plants is no doubt evident that the damages caused by them were slight. Moreover, the application of half the recommended dose of fertilizer made the technology more viable. As a

result, the profit of farmers increased to the maximum tune of 61.3%. In general, the net profit achieved was around 35%. Even though the total mechanism behind such unusual behaviour of RNMV is not known, the virus possibly acted under reduced fertilizer level in a pseudo-symbiotic way and that the virus in concurrence with its multiplication *in situ* (Ghosh, 1982) triggered hormonal level especially IAA and cytokinin in the jute host to a great extent resulting into higher yield (Ghosh, 1995).

Thus, the study highlights an unusual host : virus interaction which resulted into higher fibre production in jute. Application of fertilizer in a low dose with no application of pesticide on such energized plants opened a new vista towards the development of pollution-free agriculture in one hand and saving of the soil erosion through use of high dose of fertilizers on the others.

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