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Yield Gap Analysis in Paddy Based on Demonstration on Seed Treatment Technique For Control of Bacterial Leaf Blight

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ABSTRACT

Rice is the world's most important food crop and a primary source of food for more than half of the world's population. Severe incidence of bacterial leaf blight (BLB) in paddy resulted in potential yield gap between achievable yield and yield realized by the farmers. To show the importance of proper method of seed treatment for control of BLB, total 328 demonstrations were conducted during the years 2009, 2010 and 2011. These demonstrations were conducted at different locations throughout the district. The existing farmers' practice was taken as a control for comparison. The yield performance of both control and demonstration plots was recorded and the yield gap, technology gap, extension gap and technological index were analyzed. The yield of demonstration plots was 70.0 q/ha as compared to 66.2 q/ha of untreated plots. Paddy yield of demonstration plots recorded 5.8 per cent increase over the farmers' practice. Average extension gap was recorded 3.9 q/ha. The yield gap analysis emphasized the need to educate the farmers through various extension means for the adoption of improved agricultural technologies to revert the trend of wide extension gap.

Key Words: Seed Treatment, Yield Gap Analysis, Technology Index, Extension Gap, Paddy.

INTRODUCTION

Paddy (*Oryza sativa L.*) is cultivated over an area of 28.18 lakh ha in Punjab, with an annual production of 105.42 lakh tones (Anony 2013). Paddy crop is prone to many diseases particularly bacterial leaf blight (BLB). The incidence of BLB increases due to the sowing of untreated seed, un-recommended varieties of paddy, use of higher dose of nitrogenous fertilizers and faulty disease control measure. The occurrence of BLB is the major reason for the loss of yield in paddy. So the present investigation was designed to assess the yield gap between farmers' practice and recommended practice of seed treatment technique for the control of BLB in paddy.

MATERIALS AND METHODS

Numbers of farmers were educated through village level and on-campus training camps organized before the start of crop season. Interested farmers were identified for conducting demonstration on seed treatment technique for control of BLB in paddy. Thus, a total 328 demonstrations (0.4 hectare each) were conducted during the year 2009, 2010 and 2011 in different blocks at different locations. The recommended package involved seed treatment with recommended fungicide + antibiotic before nursery sowing. For this eight Kg of paddy seed was soaked in water (10 l) + Emisan 6 (5 g) + Streptocycline (1 g) solution for 8-10 hrs. Soaked seeds were then removed from the treatment solution, kept in shade by maintaining proper moisture and covered with gunny bags for 24 hrs. and then sown in the prepared bed. The existing farmer practice of seed treatment (either no seed

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Table: Yield gap, technology gap, extension gap and technology index analysis of disease management in rice

Block	Year	No. of demo.	Yield (q/ha)			% increase over check	Technology gap	Extension gap (q/ha)	Technological index %
			Potential	Demonstration	Local check				
Bhunerheri	2009	19	80	75.07	67.5	11.21	4.93	7.57	6.16
	2010	18	80	78.12	74.58	4.75	1.88	3.54	2.35
	2011	16	80	71.08	68.12	4.35	8.92	2.96	11.15
	Mean	**17.67**	**80**	**74.76**	**70.07**	**6.69**	**5.24**	**4.69**	**6.55**
Sanour	2009	13	80	74.86	68.43	9.40	5.14	6.43	6.43
	2010	16	80	73.78	67.81	8.80	6.22	5.97	7.78
	2011	18	80	73.04	71.62	1.98	6.96	1.42	8.70
	Mean	**15.67**	**80**	**73.89**	**69.29**	**6.64**	**6.11**	**4.61**	**7.64**
Rajpura	2009	15	80	71.14	65.3	8.94	8.86	5.84	11.08
	2010	16	80	61.64	56.56	8.98	18.36	5.08	22.95
	2011	11	80	62.08	60.5	2.61	17.92	1.58	22.40
	Mean	**14**	**80**	**64.95**	**60.79**	**6.84**	**15.05**	**4.17**	**18.81**
Patiala	2009	18	80	73.83	69.27	6.58	6.17	4.56	7.71
	2010	20	80	72.87	67.62	7.76	7.13	5.25	8.91
	2011	16	80	73.34	69.37	5.72	6.66	3.97	8.33
	Mean	**18**	**80**	**73.35**	**68.75**	**6.69**	**6.65**	**4.59**	**8.31**
Nabha	2009	21	80	72.56	67.84	6.96	7.44	4.72	9.30
	2010	17	80	70.34	68.2	3.14	9.66	2.14	12.08
	2011	15	80	74.21	73.57	0.87	5.79	0.64	7.24
	Mean	**17.67**	**80**	**72.37**	**69.87**	**3.58**	**7.63**	**2.5**	**9.54**
Ghanour	2009	16	80	65.26	61.1	6.81	14.74	4.16	18.43
	2010	13	80	57.34	55.62	3.09	22.66	1.72	28.33
	2011	10	80	60	58.28	2.95	20.00	1.74	25.00
	Mean	**13**	80	**60.87**	**58.33**	4.35	**19.13**	**2.54**	23.91
Total demo.		**288**							
Pooled Average	**16**	80	**70.03**	**66.18**	5.82	9.97	**3.85**	12.46	

treatment or wrong method of seed treatment by the farmers) was taken as control or local check for comparison. The comparison in demonstration plots and farmers' practice was made from 6 blocks of district Patiala. The impact of transfer of technology was assessed in terms of per cent increase in yield and extension gap (Samui *et al*., 2000). Technology gap, extension gap and technology index were calculated as per following formulae.

Technology gap = potential yield – demonstration yield

Extension gap = demonstration yield – farmer yield

RESULTS AND DISCUSSION

The perusal of data revealed that in the demonstration plots, paddy yield was found substantially higher than the control plots under farmers practice 'during all the three years. In all the blocks , the paddy yield ranged between 60.87 q/ ha to 74.76 q/ ha which was 2.50 to 4.69 q/ha higher than the local check. On overall basis 4.28 to 6.76 per cent increase in yield was recorded. These results corroborate with the findings of Filippi and Prabhu (1997) who recorded 4.22 per cent increase in yield over the untreated plot against rice blast. However, the variation in yield from location to location can be accounted for varying field conditions, prevailing microclimate and variation in the agricultural practices followed.

The technological gap i.e. the difference between potential yield and yield of demonstration plots was 5.24, 6.11, 15.05, 6.65, 7.63 and 19.13 q/ha in the Bhunerheri, Sanaur, Rajpura, Patiala, Nabha and Ghanour blocks, respectively. The average technology gap in all the six blocks in three years was 9.97 q/ha. Technology gap imply researchable issues for realization of potential yield while the extension gap implies what can be achieved by the transfer of existing technologies.

On an average basis of three years study, an extension gap of 4.69, 4.61, 4.59, 4.17, 2.54 and 2.50 q/ha was observed in Bhunerheri, Sanur, Patiala, Rajpura, Ghanur and Nabha, respectively. An average extension gap of 3.8 q/ha emphasizes the need to educate the farmers through various extension means for the adoption of improved agricultural technologies to revert the prevailing trend of wide extension gap. Similarly Mishra *et al* (2007) reported an increase in the potato yield by 29.8 q/ha and presented a gain in yield to the tune of 13-19 per cent resulting from treatment of potato seed against blight disease. In all the blocks the extension gap from year 2009 to 2011 recorded a decreasing trend which shows good performance of technical interventions to increase the yield performance of rice and lower the losses caused by the bacterial leaf blight disease in rice.

The technological index shows the feasibility of the demonstrated technology. Lower the value of technology index, more is the feasibility of the technology demonstrated (Sagar and Chandra, 2004). The technology index was 12.46 in three years of demonstration from six blocks.

CONCLUSION

The study of yield gap analysis of disease management through demonstrations of seed treatment of paddy revealed that the yield losses caused by BLB disease could increase by 0.87 to 11.21 per cent. The technology gap which shows the gap in the demonstration yield and potential yield ranged from 1.88 to 22.66 q/ha and can be attributed to the dissimilarities in soil fertility and local field situations. Extension gap ranged between 0.64 to 7.57 q/ha, which emphasizes the need to educate the farmers through various means like village level/ on campus trainings, method demonstrations, front line demonstrations etc. Technology index which shows the feasibility of the technology demonstrated has depicted good performance of the intervention.

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