SHORT COMMUNICATION https://doi.org/10.58297/HMCM2151

Screening of Rice Genotypes for Resistance to Leaf Folder, *Cnaphalocrocis medinalis* Guenee

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Received: 10th November 2022; Accepted: 10th December 2022

Abstract

In recent years, leaf folder incidence has been increasing in all rice ecosystems and is abundant during the wet season. Presently farmers are dependent on the use of toxic chemical pesticides alone for their management. Hence, an attempt was made to nominate genotypes developed at Agriculture Research Station, Bapatla for screening against leaf folder under the AICRIP entomology program. Of the 16 genotypes evaluated at multi-locations during the *Kharif* season for two years, 2020 and 2021, BPT 2699 was found promising in 2-8 locations. BPT 3034 and BPT 3059 were promising in 2-6 locations, four entries BPT 2677, BPT 2954, BPT 3049 and BPT 2932 were promising in 3- 5 locations. The majority of these entries consistently outperformed the check variety (TN1) for leaf folder resistance and can be used as donors in future breeding programmes.

Keywords: Genotypes, Screening, Resistance, Rice, Breeding, Test

Introduction

Leaf folders occur in all rice environments and are more abundant during the rainy season. They are commonly found in shady areas and areas where rice is heavily fertilised with nitrogen. In tropical rice areas, they are active year-round, whereas in temperate countries, they are active from May to October. Chitra *et al.,* (1998) reported that growing resistant cultivars would reduce the pest load and pesticide usage and thus can be of greater value for an eco-friendly future. Heinrichs *et al.,* (1985) opined the need to develop resistant varieties to combat this pest in Asia. Thereafter, identifying sources of resistance against this pest became the primary objective of various research workers (Heinrichs, 1986; Khan and Joshi, 1990; Singh and Dhaliwal, 1985). Recently, the leaf folder incidence has increased in various rice ecosystems. Keeping this in view, an attempt was made to screen rice genotypes developed at Bapatla against the rice leaf folder.

Sixteen rice genotypes developed at Agricultural Research Station, Bapatla, were nominated for screening against leaf folder under AICRIP testing. These entries were evaluated in three replications at 13 locations spread over 12 states during *Kharif*, 2020 (**Table 1**). Analysis revealed that four entries, *viz*., BPT 2932, BPT 2677, BPT 2954 and BPT 3049, were found promising at 4 locations. BPT 3081, BPT 3034, BPT 3029 and BPT 2824 were promising at three locations.

During *Kharif* 2021, the same entries were evaluated at 12 locations spread over 11 states (**Table 2**). Analysis revealed that BPT 2699 was promising at 8 valid field tests, while BPT 3034 and BPT 3059 were promising at 6 locations. Four entries, BPT 2677, BPT 2954, BPT 3081 and BPT 2935, were promising in 5 valid tests. Five entries, BPT 3049, BPT 3032, BPT 2953, BPT 3157 and BPT 3115, were promising at 4 locations/ tests. Other entries were promising in 2-3 locations.

Thus, in both the years, the entry BPT 2699 was found promising in 2-8 locations, BPT 3034 and BPT 3059 were promising in 2-6 locations, four entries BPT 2677, BPT 2954, BPT 3049 and BPT 2932, were

Table 1. Performance of nominations from Bapatla against leaf folder in LFST, *Kharif* 2020

Designation	Parentage	ADT	BPT	CHT	CHN	JDP	KRK	LDN	MLN	NVS	NWG	PTB	RNR	KUL	NPT
BPT 2677	MTU 2077/Ajay/MTU 2077	30.1	14.8	12.5	9.1	7.5	43.0	33.5	24.0	7.6	24.4	19.8	6.4	28.0	4
BPT 2954	NLR 34449/Annada/NLR 34449	29.7	13.5	13.2	5.4	6.2	42.1	32.2	25.6	7.9	18.9	26.9	6.1	32.8	4
BPT 3049	MTU 1010/IR 50	29.3	11.2	17.1	5.4	9.0	50.6	24.7	23.0	1.0	23.6	27.4	8.5	23.2	4
BPT 2932	BPT 5204/MTU 1075	31.7	16.0	12.1	9.0	9.8	46.3	25.5	25.3	5.4	22.9	26.4	4.7	21.6	4
BPT 3081	BPT 5204/MTU 1075	32.2	18.8	15.9	10.3	8.4	49.1	23.9	24.9	8.8	22.2	32.6	7.6	23.9	3
BPT 3034	BPT 5204/MTU 1075	20.2	29.3	16.2	14.0	13.0	48.1	29.3	23.2	5.5	23.9	19.6	6.5	32.1	3
BPT 3029	BPT 5204/IR 50	31.4	14.5	12.8	6.0	9.8	49.9	24.7	28.8	5.8	27.3	28.5	9.8	31.5	3
BPT 2824	MTU 2077/NLR 34449	33.5	13.1	14.7	6.5	8.5	45.4	27.4	26.3	3.9	26.0	18.6	13.3	30.3	3
BPT 3032	BPT 5204/IR 50	29.4	12.5	17.5	11.5	12.7	34.2	24.9	23.5	3.0	25.5	26.4	9.6	33.4	2
BPT 3059	MTU 1061/IR 78585-64-24-2-4-3-1	30.1	20.0	17.9	11.5	8.0	51.2	22.7	23.4	9.7	21.3	24.9	5.9	30.0	2
BPT 2935	MTU 1010/IR 50	23.8	19.9	12.5	11.3	12.0	52.0	24.7	25.5	5.9	21.4	45.0	7.9	30.3	2
BPT 2699	BPT 5204/RP 4677-16-6-1-12-1	22.7	20.1	13.5	11.1	8.4	47.7	29.6	25.4	5.7	22.5	23.9	8.4	29.4	2
BPT 2953	BPT 5204/IR 50	62.9	28.0	13.9	6.7	8.7	49.9	26.5	22.4	6.3	26.2	30.9	10.7	31.1	2
BPT 3050	BPT 5204/BPT 3291	32.3	14.4	13.3	6.5	9.3	52.7	34.5	24.5	8.0	22.3	34.2	10.1	28.2	2
BPT 3157	MTU 7029/IRGC 18195/MTU 1081	28.6	14.6	21.6	9.2	8.9	43.6	22.6	25.3	15.2	32.1	24.6	10.1	33.8	1
BPT 3115	BPT 2270/NLR 145	31.3	20.9	19.7	14.4	10.0	44.9	25.5	25.8	12.4	23.3	25.1	5.5	30.5	1
W 1263	Resistant check	4.9	7.7	9.6	5.6	2.4	4.4	19.4	19.5	0.7	18.3	19.9	7.7	27.3	12
TN1	Susceptible check	33.4	19.4	14.5	10.3	14.5	40.9	25.5	38.2	29.1	48.3	30.4	18.5	39.9	
Minimum damage		4.9	7.7	9.6	5.4	2.4	4.4	19.4	19.5	0.7	18.3	18.6	4.7	21.6	
Maximum damage		62.9	29.3	21.6	14.4	14.5	52.7	34.5	38.2	29.1	48.3	45.0	18.5	39.9	
Average damage in trial		29.9	17.2	14.9	9.1	9.3	44.2	26.5	25.3	7.9	25.0	26.9	8.7	29.8	
Promising level		15	10	10	10	5	15	20	20	10	20	20	10	25	
No. Promising		11	1	1	24	4	1	2	5	24	5	6	26	10	

ADT = Aduthurai, BPT = Bapatla, CHT = Chatha, CHN = Chinsurah, JDP = Jagdalpur, KRK = Karaikal, LDN = Ludhiana, MLN = Malan, NVS = Navsari, NWG = Nawagam, PTB = Pattambi, RNR = Rajendranagar, KUL = Kaul, NPT = Number of Promising tests

Table 2. Performance of nominations from Bapatla against leaf folder in LFST, *Kharif* 2021

Designation	Parentage	ADT	KRK	CHT	CTC	KUL	LDN	MLN	MSD	NLR	NVS	NWG	PTB	NPT
BPT 2699	BPT 5204/RP 4677-16-6-1-12-1	3.0	15.4	19.4	5.4	23.6	44.6	20.8	8.2	12.6	7.0	8.9	41.0	8
BPT 3034	BPT 5204/MTU 1075	3.5	13.3	19.8	6.5	26.3	43.8	21.6	7.5	20.0	6.8	9.4	63.6	6
BPT 3059	MTU 1061/IR 78585-64-24-2-4-3-1	47.1	19.9	18.6	9.4	23.9	44.3	20.9	6.4	21.1	2.6	9.1	73.5	6
BPT 2677	MTU 2077/Ajay/MTU 2077	14.3	16.7	18.6	9.2	27.3	47.4	20.3	6.3	14.7	10.1	9.6	36.5	5
BPT 2954	NLR 34449/Annada/NLR 34449	27.4	10.3	21.1	2.7	31.5	40.3	21.1	9.5	13.4	2.5	9.9	61.4	5
BPT 3081	BPT 5204/MTU 1075	28.5	14.8	19.7	9.5	23.8	42.4	21.6	6.5	25.8	3.9	11.9	54.0	5
BPT 2935	MTU 1010/IR 50	14.9	17.8	19.4	5.9	23.6	42.2	21.3	11.4	17.6	6.0	9.7	49.7	5
BPT 3049	MTU 1010/IR 50	19.2	15.5	20.3	7.2	32.1	51.1	21.3	8.0	20.2	7.3	8.8	58.7	4
BPT 3032	BPT 5204/IR 50	29.9	17.6	20.1	10.0	27.3	39.4	19.6	7.3	20.5	5.5	8.9	75.4	4
BPT 2953	BPT 5204/IR 50	30.9	16.5	20.4	10.4	23.2	53.1	21.3	5.9	22.8	9.4	8.8	68.1	4
BPT 3157	MTU 7029/IRGC 18195/MTU 1081	51.0	12.3	21.5	8.0	31.7	48.7	19.8	7.9	22.0	4.3	10.2	68.4	4
BPT 3115	BPT 2270/NLR 145	35.5	17.0	21.0	4.6	27.4	38.3	20.3	9.8	22.9	6.7	9.3	64.9	4
BPT 2932	BPT 5204/MTU 1075	20.5	18.1	20.1	5.0	22.9	47.1	20.5	7.7	24.1	11.7	10.9	75.8	3
BPT 3029	BPT 5204/IR 50	30.0	16.9	19.8	11.7	23.5	52.0	20.4	8.4	21.3	10.7	10.1	67.6	3
BPT 3050	BPT 5204/BPT 3291	36.3	15.5	21.0	6.4	25.1	48.1	21.8	5.4	22.1	5.9	10.4	58.2	3
BPT 2824	MTU 2077/NLR 34449	30.4	19.4	20.4	10.7	31.4	58.8	21.3	8.1	20.4	7.8	11.4	62.7	2
W1263	Resistant check	5.8	1.6	20.4	1.2	20.4	24.8	21.5	6.4	14.9	2.3	8.6	21.5	10
TN1	Susceptible check	72.0	24.1	20.6	28.7	34.3	55.1	21.9	14.7	50.3	18.0	12.8	75.7	
Minimum damage		3.0	1.6	18.6	1.2	20.4	24.8	19.6	5.4	12.6	2.3	8.6	21.5	
Maximum damage		72.0	24.1	21.5	28.7	34.3	58.8	21.9	14.7	50.3	18.0	12.8	75.8	
Average damage in trial		28.8	15.2	20.2	8.0	26.6	44.7	21.0	7.9	22.0	7.7	10.0	58.2	
Promising level		10	10	20	10	25	30	20	10	15	10	10	25	
Number Promising		3	1	7	16	9	0	2	19	3	15	12	0	

ADT = Aduthurai, KRK = Karaikal, CHT = Chatha, CTC = Cuttack, KUL = Kaul, LDN = Ludhiana, MLN = Malan, MSD = Masodha, NLR = Nellore, NVS = Navsari, NWG = Nawagam, PTB = Pattambi, NPT = Number of Promising tests promising in 3- 5 locations. Most of these entries consistently performed better during both years across several locations tested and proved promising over the check variety (TN 1) for leaf folder resistance and can be used as donors in future breeding programmes.

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