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## Management of paddy blast under temperate conditions of Kashmir

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### Abstract

A field experiment was conducted to study the Management of blast of Paddy in rice (var jehlum) caused by *Pyricularia oryzae* under temperate conditions of Kashmir for Technology assessment of Different locally available fungicides that were evaluated against the pathogen *Pyricularia oryzae*, the Treatments comprised of Hexaconazole: T1 @ 0.03%, Captan: T2 @ 0.3%, Mancozeb: T3 @ 0.3%, Copper oxychloride: T4 @ 0.3%, Propineb: T5 @ 0.3%, Flusilazole : T6@ 0.01%, T7:Tricyclozole @ 0.06%, T0: Control. Each Treatment includes Seed treatment+ Foliar Spray at 25 Days after Transplanting (DAT) + 60 DAT+ at flowering stage. The significant results were obtained with Application of Tricyclozole @ 0.06%, The maximum yield 46.90 qt/ha, seed germination 91.60% and lowest blast incidence 2.20% were recorded in Tricyclozole treated plots as compared to farmers Practice wherein the farmers were not eradicating the collateral weed hosts and infected stubbles. The farmers were sowing the seeds without any treatment of fungicides as recommended by the SKUAST-K. The farmers were satisfied so far as Subsequent germination & yield obtained were redressed during the conduct of on farm trial. The results suggested that seed treatment of Tricyclozole @ 0.06%, before sowing of the crop effectively control paddy blast. As far as Economics is concerned, the farmers practice obtained the Net Return (Profit) of Rs.1224/ha as compared with treatment of application of Tricyclozole @ 0.06% obtained the Net Return (Profit) of 47800 Rs/ha with B:C ratio of 1.59.

**Keywords:** paddy blast, yield, Tricyclozole

### Introduction

Rice (*Oryza sativa*) is one of the three important food crops in the world, forms the staple food of 2.7 billion people. In India paddy is grown on an area of 44 million hectares with the production of 117.94 million tonnes. While paddy is the main crop/staple food of Kashmir region followed by maize and wheat. Cultivation of paddy extends from plains (1600 masl) to high hills (2300 amsl). The crop is affected by a number of diseases and pests like blast which is caused by *Pyricularia oryzae* and is the deadliest disease that affects the rice crop destroying about 35 per cent of the crop (Prassana and Veerabhadraswami, 2014) [3]. It is an infectious disease and decreases the quality and seed production in paddy (Pasha *et al*, 2013) [5]. Paddy blast is a seed borne disease and resulted from infected rice seed which can be avoided by seed treatment (Hashim *et al.*, 2019) [2]. The symptoms appear on all the aerial parts. Depending upon the site of the symptom the rice blast is referred as leaf blast, collar blast, node blast and neck blast. The disease is more prevalent during the vegetative stage than reproductive stages of the crop. In this the diseased stems and leaves do not allow the flow of nutrients to the panicle because of which grains remain immature, resulting in total yield loss. Depending on cultivar susceptibility, environmental conditions and management system, it causes yield losses upto 100% (Magar *et al* 2015) [4]. Fungicides have been used successfully to control blast but the efficiency of particular fungicides could vary from place to place or from dosage to dosage. Farmers were advised to resolve the fungi toxicants used to prevent the infectious fungus from rising resistance against these fungicides (Tangliabang and Pakki 2006). Therefore information about efficient fungicides with different modes of action should be offered to farmers (Prassana and Veerabhadraswami, 2014) [3]. As the local variety of Bandipora District was low yielding variety and highly susceptible to blast as compared to Jehlum that is moderately susceptible to blast and is high yielding variety and is recommended for cultivation in lower belts upto (1700m amsl) under irrigated or water logged conditions. The variety possesses moderate tolerance to cold and has good cooking quality. It matures in 135-140 days with yield potential of 65-70q/ha.

Therefore the present study was undertaken to assess the efficiency of different fungicides on paddy blast disease under temperate conditions.

### Material and Methods

A field experiment was laid out at farmers field at District Bandipora at two locations viz Potshahi and Quilmaqam during three consecutive years. The farmers were facing the problem of rice blast in their paddy fields. So the experiment

was designed to assess the effect of various fungicide treatments on the blast incidence in paddy. The experiment comprised of seven treatments i.e 0.03% Hexaconazole (T<sub>1</sub>), 0.3% Captan (T<sub>2</sub>), 0.3% Mancozeb (T<sub>3</sub>), 0.3% Copper oxychloride (T<sub>4</sub>), 0.3% Propineb (T<sub>5</sub>), 0.01% Flusilazole (T<sub>6</sub>), 0.06% Tricyclozole (T<sub>7</sub>) and Control (T<sub>0</sub>). Each Treatment includes Seed treatment followed by three foliar sprays. The Foliar Sprays were carried out at 25 Days after Transplanting (DAT), 60 DAT and last at flowering stage.

**Table 1:** Comparison of Cultural Practices Adopted by Farmer and SKUAST-K recommendation

S. No.	Cultural operations	Farmers practice	improved cultivation practices recommended by SKUAST-K	Gap%
1	Variety	Local	Jehlum	100%
2	Sowing time	Apr- May	Apr-May	No gap
3	Seed quality	Low quality seed	High quality seed	100%
4	Seed treatments	No treatment	Seeds treated according to the treatments.	100%
5	Seed rate	10-15kg/ha	3kg/ha	100%
6	Age of seedling for transplanting	35-40 DAS	25-30 DAS	100%
7	Seedlings per hill	8-12	2-3	100%
8	Method of transplanting	haphazard	Line transplanting	100%
9	Spacing	Not maintained	15x15cm	100%
10	Fertiliser application	Indiscriminate use of NPK fertilizers. Don't apply ZnSO <sub>4</sub>	10 t/ha, 210 kg urea, 130 DAP and 50 kg MOP and 10-15kg ZnSO <sub>4</sub>	100%
11	Weed Control measures	Indiscriminate use of weedicides	As per recommendation	100%
12	Handling of weedicide	No safety measures undertaken	Use of all safety measures. (gloves, glasses, mask etc)	100%

**Table 2:** Details of the Experiment

Crop	Farming system	Problem diagnosed	Name of OFT	No. of trails	Technology assessed	Treatments involved in assessment
paddy	irrigated	Blast disease	Effect of different fungicide treatment on paddy blast	3	Use of different fungicides as seed treatment and foliar sprays	T1: Hexaconazole @ 0.03% T2: Captan @ 0.3% T3: Mancozeb @ 0.3% T4: Copper oxychloride @ 0.3% T5: Propineb @ 0.3% T6: Flusilazole @ 0.01% T7: Tricyclozole @ 0.06% T0: Control

The farmers were also advised to raise the crop scientifically using recommendations from SKUAST-K Shalimar. The effect of different treatments were evaluated (pooled over three years) on Seed Germination (%), Blast incidence% and Yield (Q/ha)

$$\text{Per cent Disease Incidence (PDI)} = \frac{\text{No. of leaves infected}}{\text{Total No. of leaves examined}} \times 100$$

### Results and Discussion

The seed germination percentage, blast incidence% and yield recorded is presented in table 3. The treated seeds showed higher germination percent than the control. However maximum germination percentage of 91.60 was recorded in T7 (0.06% Tricyclozole). The results obtained suggested that the use of seed treatments significantly decreased the disease incidence. However the best results in terms of disease control

was obtained by seed treatment and three foliar sprays of 0.06% Tricyclozole. Similar results were obtained earlier by Prasanna and Veerabhadraswamy (2014) [3] who found Tricyclozole to be very effective in controlling the blast disease. This is because, prophylactic spray of systemic natured tricyclozole safeguards plants from infection by preventing the entry of the fungus into the epidermis. Tricyclozole has proved to exhibit excellent protective activity by protecting the crop from fungal infection by preventing the fungal penetration into the crop's epidermis (Amarajyoti and Naidu, 2020) [1]. Decrease in the disease incidence enhances the yield obtained in various treatments. The maximum yield of 63.90q/ha was obtained in T7 and lowest (38.52q/ha) in control. Similar results were obtained by Rodriguez *et al* (1993) [6] who reported leaf blast was reduced by at least 50% and plant height increased by 27%, compared with the control.

**Table 1:** Effect of Different Fungicide Chemicals on Seed Germination, Blast Incidence and Yield

Treatments	Seed Germination%	Blast incidence%	Yield (q/ha)
T1: Hexaconazole @ 0.03%	90.60	10.33	57.92
T2: Captan @ 0.3%	88.00	17.66	51.72
T3: Mancozeb @ 0.3%	88.66	20.66	50.00
T4: Copper oxychloride @ 0.3%	90.60	15.33	55.87
T5: Propineb @ 0.3%	88.33	21.20	48.50

T6: Flusilazole @ 0.01%	89.66	5.00	59.50
T7: Tricyclozole @ 0.06%	91.60	2.20	63.90
T0: Control	87.66	36.10	38.52

### Economics

Based on the experimental results it was observed that tricyclozole was effective in controlling the disease efficiently. So the economics of this best treatment was worked out and compared with the farmers practice. However, higher yields were realized in treated plot which resulted in higher gross returns (Rs.127800/ha) as compared

to farmers field (Rs. 46224/ha). Net returns also showed similar trend. Farmer's practice was found to be minimum net return (Rs. 1224/ha) in comparison to the T7 (Rs.47800/ha). The average benefit cost ratio of recommended practices was 1.59 and that of farmers practice was 1.02, this may be due to higher yields and less disease incidence obtained under recommended practices compared to farmers practice.

**Table 4:** Economics of Best Treatment in Comparison to Farmers Practice

Technology Assessed / Refined	Production Qt/ha	Percent Increase In Yield Over Check	Net Return (Rs./ha)	B:C Ratio
<b>Farmers Practice:</b> The farmers were not eradicating the collateral weed hosts and infected stubbles. The farmers were sowing the seeds without any treatment of fungicides as recommended by the SKUAST-K.	38.52	65.88	1224	1.02
<b>Technology Assessed:</b> The maximum yield 46.90, seed germination 91.60 and lowest blast incidence 2.20 were recorded in Tricyclozole treated plots.	63.90		47800	1.59
Sale price of local variety	1200/ha	Sold as grain		
Sale price of Jehlum variety	2000/ha	Sold as quality seed		

### Conclusion

Under the present study, there was the good control on prominent disease incidence of rice and increased the yield and net returns due to the eradication of collateral host and chemical control. The reduction in yield and germination percentage was highly correlated with disease incidence, indicating that prophylactic measures like seed treatment and removal of collateral host should be taken to control the disease incidence and to increase the germination percentage and yield particularly in rice. Hence there is the foremost requirement of controlling the disease at an early stage of the rice crop.

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