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Perpetuation of *Magnaporthe Grisea* Causing Blast Disease in Paddy Crop Under Irrigated Conditions of Kashmir

KEYWORDS: Perpetuation, Magnaporthe grisea, stubbles, temperate, Auto-infection

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ABSTRACT *Investigations were carried out during the month of October to March after the crop was harvested, on various components viz. paddy straw, stubbles, weed straw, soil, rice husk, seeds and undecomposed material to examine the perpetuation of Magnaporthe grisea under temperate conditions of Kashmir. Data revealed that highest perpetuation rate was recorded in the month of October in all the specimens and minimum occurrence was found in the month of January to March. Moreover, the month of February exhibited least occurrence because of prevalence of sub zero temperature. Among the collected specimens, stubbles and weed straw exhibited maximum perpetuation while minimum was found in the soil and seeds followed by undecomposed material.*

INTRODUCTION

The blast disease is common where rice is being cultivated even between 9^0 and 45^0 N latitude. The survival of the fungus M.grisea through hot dry months in tropics and through cold winters in the sub tropics and in temperate rice growing areas in achieved by different means. One common method that had been suggested and act as source of auto-infection in the following season in survival through infection of collateral hosts which are believed to harbour different pathogenic races of the fungus which may or may not parasitize the local rice varieties but produce enough conidia to be epidemic and disseminated by air currents to infect crop in other localities. In tropics the fungus survives through the main host as several crops are grown in a year and the pathogen maintains a continuous disease cycle on the rice tropics is restricted to a limited number of days due to intense competition with and antagonism of soil micro flora. However there is possibility of survival of the fungus in off-season by forming sclerotial structures. The pathogen has long been shown to be seed borne in nature and over winter in/on seeds(Misra et al.,1994). However meager work has been carried out in temperate conditions of Kashmir to ascertain the mode of perpetuation and possible reservoirs of the pathogen M.grisea, hence necessitating the present work.

MATERIALS AND METHODS

During post harvest of the crop in the months of October to March, various specimens were randomly collected from high and semi high altitude research station, Larnoo and Khudwani of Anantnag district of Kashmir from the rice harvested fields. The samples include paddy straw, rice husk, stubbles , weed straw, soil , seeds and undecomposed material. The specimens were first incubated under humid and ambient temperature (28+ 2^0 C) for 5-7 days to break the possible dormancy of the pathogen and to get fungus sporulated. The bits of the specimens viz. paddy and weed straw, rice husk, stubbles, seeds and undecomposed material were then put on oat meal agar medium in 90mm petriplates with 20 replications of each sample and incubated for 7 days at 28-$^+2^0$C. The fungal colonies of the M.grisea were counted and calculated its frequency. The 1 gm soil was taken from the composite samples and spread with the help of spatula over the oat meal agar medium already containing in 90 mm petriplates with 20 replications and rotated to spread uniformly. The colonies of M. grisea obtained were counted and its frequency has been calculated.

RESULTS AND DISCUSSION

The investigations were carried out during the months of October to March to ascertain the mode of survival and perpetuation for the blast fungus for its auto-infection in the next season, revealed that maximum frequency percentage of fungus was found on weed and paddy straw in the month of October which declines with onset of winter season which might be due to the decrease in temperature. These findings are in conformity with that of Padmanabhan(1959) who had also been reported the survival of fungus on straw left in the field. The similar trend was observed when rice husk and stubbles were put under the investigation. Soil perpetuation analysis showed that maximum frequency was observed in the month of October which completely proceeded in the December but in the month of January and February, pathogen did not occur but in lower frequency, sclerotia were also observed on the cultures collected from the high altitude areas of Larnoo, thus suggesting their role as survival structures in the winter. The findings are in similar to that of Gangopadhyay et al.1981. These workers also reported the survival of pathogen by sclerotial formation in off season. Frequency percentage of M.grisea remained more or less static in all the months observed but maximum was obtained in October and February. Same was case with undecomposed material which showed maximum frequency in the month of November and least in February. The isolation of the pathogen from the seeds at different storage periods, confirmed the findings of Misra et al.1994 who also reported the survival of the pathogen through seeds.

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Table-1: Perpetuation of blast fungus, Magnaporthe grisea under Kashmir conditions at rice Research and Regional Station, Khudwani

Perpetuated On	Frequency Percentage of M. grisea						
	October	November	December	January	February	March	Average
Paddy straw	20.0	18.0	11.0	6.0	5.0	5.0	10.0
Stubbles	31.0	26.0	24.0	19.0	18.0	20.0	23.0
Weed Straw	26.0	22.0	18.0	16.0	14.0	15.0	18.5
Soil	9.0	7.0	5.0	5.0	6.0	7.0	6.5
Rice Husk	14.0	12.0	9.0	10.0	10.0	8.0	10.5
Seeds	9.0	8.0	10.0	8.0	7.0	9.0	8.5
Undecomposed Material	9.0	10.0	9.0	9.0	8.0	8.0	8.8

Table-2: Perpetuation of blast fungus, Magnaporthe grisea under Kashmir conditions at Rice Research Station of High Altitude, Larnoo, Anantnag

Perpetuated On	Frequency Percentage of M. grisea						
	October	November	December	January	February	March	Average
Paddy straw	15.0	8.0	0.0	1.0	1.5	2.0	2.5
Stubbles	10.5	4.0	0.6	2.0	1.6	1.5	3.5
Weed Straw	20.0	3.6	0.0	1.0	0.8	2.0	4.5
Soil	12.0	6.5	4.0	3.7	0.9	1.5	6.1
Rice Husk	9.5	0.6	0.0	2.0	0.5	1.0	7.1
Seeds	10.0	9.0	8.5	7.6	10.0	8.5	8.9
Undecomposed Material	6.7	7.5	5.0	5.0	1.0	2.0	8.8

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