

FACTORS AFFECTING CONIDIAL GERMINATION OF *PYRICULARIA GRISEA*, THE CAUSAL AGENT OF PEARL MILLET LEAF BLIGHT

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The effect of different physical factors and nutrients on the germination of conidia of *Pyricularia grisea* on pearl millet was studied. Optimum germination of fungal conidia was obtained in free water at 25°C and at pH 5.5. Highest conidial germination was found in free water and there was no germination at RH 90%. Among asparagine and glucose tested for germination, glucose (2%) induced 73.5% germination, although 86.8% germination occurred in tap water.

Keywords: Conidial germination; *Pyricularia grisea*; Factors.

Introduction

Pyricularia grisea on pearl millet was reported by Mathur and Mathur¹ as a minor disease and now has assumed an epiphytotic proportions in the country. The information on various aspects of the disease and the pathogen is still fragmentary. Therefore, the effect of different physical factors like incubation period, temperature, pH, relative humidity and nutrients was studied to find out a precise method of germination.

Material and Method

Conidial suspension of *P. grisea* was prepared from 10-day old culture grown on glucose asparagine vitamin medium to give a concentration of 30 to 40 conidia per low power (x 100) field of microscope. Two drps of conidial suspension was placed in moist chamber. Method recommended by Miller² was followed for conidial germination. There were four replications for each experiment. Germinating conidia were fixed by putting a drop of 10 per cent

formalin to prevent further germination of the conidia. The data were recorded on percentage basis. In case of incubation period, the data were recorded hourly. Temperature from 10 to 40°C were employed to see the effect of temperature. pH ranging from 3.0 to 9.0 were used and it was adjusted using 0.1 N HCl and 0.1 N NaOH with the help of Beckman pH meter. The relative humidity was maintained in different desiccators from 40 to 90 by different dilutions of conc. sulphuric acid. For 100 per cent relative humidity only water was kept in desiccator. Dry conidia were kept on the slides except where conidia were kept in free water. To study the effect of nutrients - glucose and asparagine along with the tap and distilled water was taken. Concentration of glucose and asparagine was similar to that of basal medium.

Results and Discussion

Environmental Factors : In the present studies the conidial germination was observed after 4 h. The maximum

germination (93.7%) was obtained after 7 h of incubation. However, after five and six hours conidial germination was 15.4 and 37.2 per cent, respectively (Fig.1).

Maximum conidial germination was recorded at 25°C after 8 h. It was good at 20°C and 15°C. The conidia were unable to germinate at 10°C and 40°C (Fig.2). Yadav and Agnihotri³ found that conidia of *P. penniseti* germinated better at 25°C (75 per cent). The rate of germination decreased rapidly above 27°C. At 33°C only 13 per cent conidia germinated in 24 h. The germination decreased at low temperatures and there was 12 and 80 per cent germination in 6 and 24 h respectively at 15°C.

During the present studies, maximum conidia germination was observed at pH 5.5 followed closely by pH 6.0 and 6.5. Good germination was recorded at 7.0, 5.0 and 4.5 while poor germination at 9.0, 8.5 and 3.0 pH levels (Table 1, Fig. 3). This showed that *P. grisea* had a wide range of pH for conidial germination.

The data on relative humidity showed maximum conidial germination in free water at 100 per cent humidity. There was no conidial germination from 40 to 90 per cent relative humidity (Fig.4). Similar findings were also reported by Yadav and Agnihotri³.

Table 1.

Table 1. Effect of pH levels on conidial germination of *P. grisea*.

Sl. No.	pH.. Level	Conidial Germination (per cent)	Average of transformed values
1.	3.0	25.18	30.00
2.	3.5	66.70	54.88
3.	4.0	73.90	59.30
4.	4.5	80.40	64.01
5.	5.0	81.30	64.51
6.	5.5	89.60	71.36
7.	6.0	88.90	70.76
8.	6.5	85.30	67.70
9.	7.0	83.80	66.32
10.	7.5	78.40	62.49
11.	8.0	53.40	46.96
12.	8.5	24.30	29.50
13.	9.0	13.93	31.84
S. Em. ±			1.78
C. D. at 5% level			4.95

Nutritional factors : In the present study, glucose (2% in distilled water) provided 73.5 per cent germination although 86.8 per cent germination occurred in tap water. Poor conidial germination was observed in distilled water (Fig.5). Dodman⁴ observed that conidia of many pathogens were able to germinate readily in distilled water, indicating that they had no exogenous substances required for germination. The present investigation revealed poor germination of conidia in distilled water indicating that conidia of *P. grisea* require

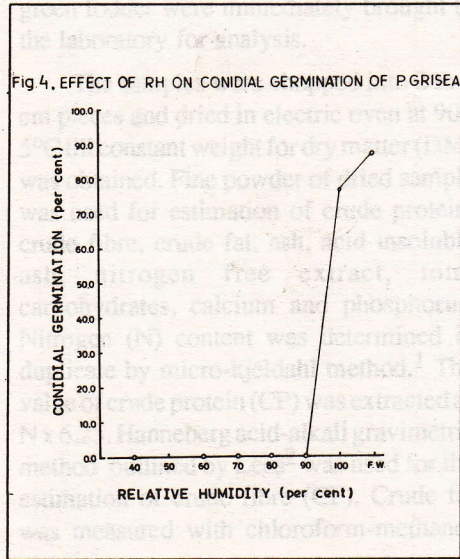
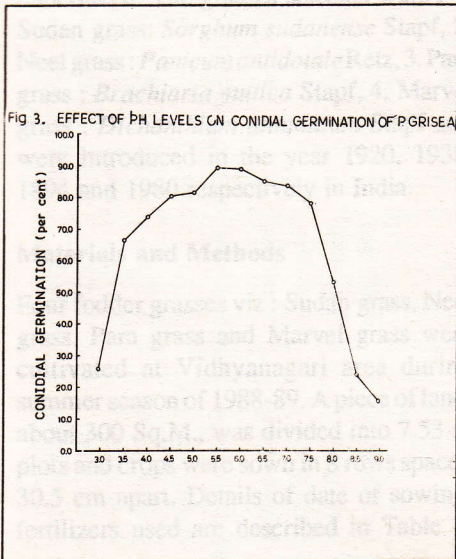
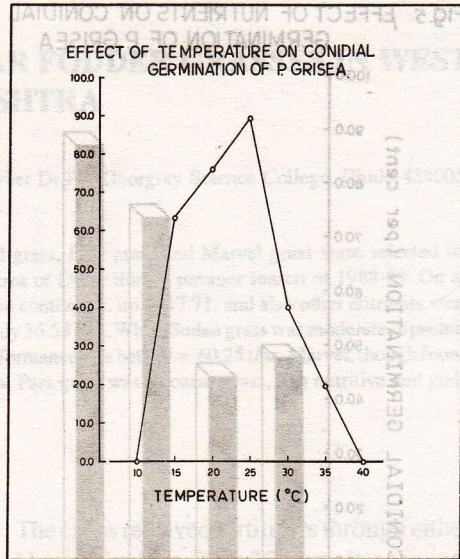
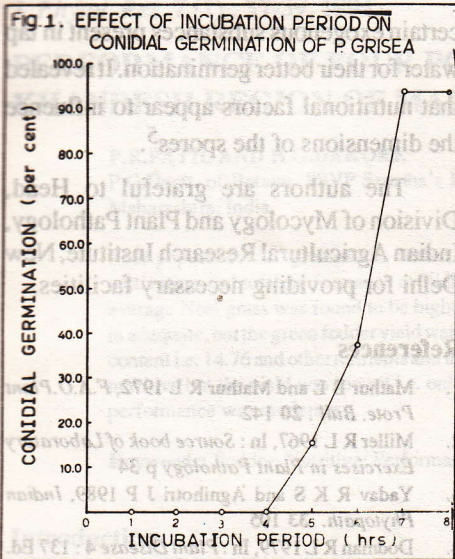
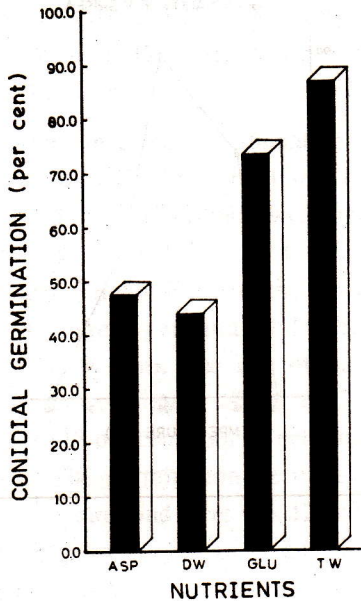


Fig.5 EFFECT OF NUTRIENTS ON CONIDIAL GERMINATION OF *P. GRISEA*



certain exogenous substances present in tap water for their better germination. It revealed that nutritional factors appear to influence the dimensions of the spores⁵.

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References

1. Mathur B L and Mathur R L 1972, *F.A.O. Plant Prote. Bull.* 20 142
2. Miller R L 1967, In : *Source book of Laboratory Exercises in Plant Pathology* p 34
3. Yadav R K S and Agnihotri J P 1989, *Indian Phytopath.* 33 105
4. Dodman R L 1979, In : *Plant Disease* 4 : 137 Ed. Horsfall, J.G. and Cowling, E.B., Academic Press, London.
5. Kulkarni N B and Patel M K 1956, *Indian Phytopath.* 9 31