

## Incidence of Pearl Millet Rust in Relation to Sowing Time and Relative Humidity

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Two time of sowing experiments were conducted in pearl millet during 1978-79 and 1979-80 to find out the seasonal incidence of rust in relation to the weather factor relative humidity. A positive and significant correlation was observed between the rust incidence and relative humidity. In general the sowings commencing from the last week of March and upto the first week of July were found to be either completely free or with low incidence of rust.

Rust caused by *Puccinia penniseti* Zimm., is an important disease of Pearl Millet (*Pennisetum typhoides* Stapf & Hubb). Most of the Pearl Millet cultivars are found susceptible to rust. Finding out the disease free seasons and influence of weather factors like relative humidity will be useful in avoiding the disease by adjusting the sowing time.

### MATERIAL AND METHODS

The experiments were conducted as observational trials with two replications. The Pearl Millet hybrid KM. 2 was used in both the experiments. In the first experiment during 1978-79 twenty four fortnightly sowings were taken up from 22-7-78 to 7-7-79 (Table.1) and for the second experiment the sowings were initiated from 7-9-79 and continued upto 22-8-80 at 15 days intervals. The plot size adopted was 4.5 × 3.6 M, with a spacing of 45 cm. between rows and 15 cm. within rows. The crops were raised under protective irrigated conditions and unprotected for diseases. The rust incidence was

assessed for each time of sowing at the soft dough stage of the crop (60th day) following the modified Cobb rust rating scale. Twenty plants per plot was selected at random and the rust incidence was recorded in the top four leaves in each plant. The mean relative humidity (recorded at 7.15 A.M) for 15 days prior to the soft dough stage of the crop was used for the correlation studies (Table.1)

### RESULTS AND DISCUSSION

The percentage of rust incidence and the mean relative humidity for each time of sowings are presented in the Table. 1. The treatment differences in respect of rust incidence were highly significant in both the years. In the year 1978-79 experiment, eight fortnightly sowings commencing from 22-3-79 and upto 7-7-79 were significantly superior to the rest of the sowings with no rust incidence. The rust incidence was significantly lesser in six sowings commencing from 7-4-80 to 22-6-80 in the 1979-80 studies. The correlation and regression analysis were done to

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find out the relationship between mean relative humidity and rust incidence in

both the experiments and the results obtained are as follows:-

1978-79

$r = 0.81$

(significant at 1% level)

$Y = a + bX$

$Y = -12.07 + 0.20X$

1979-80

$r = 0.52$

(Significant at 5% level)

$Y = a + bX$

$Y = -5.64 + 0.13X$

Where  $r$  = Correlation coefficient

$X$  = Relative humidity in percentage

$Y$  = Rust incidence

$(\sqrt{X + 0.5})$

$x$  = Rust incidence in percentage

$a$  = Constant

$b$  = Regression coefficient.

A positive and significant correlation was obtained between the Relative humidity and rust incidence in both the experiments. The maximum rust infection had been observed in the sowings taken up from September to February months and the relative humidity was also comparatively high during these months. The regression analysis reveals that an increase in Relative humidity by 1% could increase the rust incidence to an extent of 0.39 to 0.49%.

Sivaprakasam *et al* (1976) had observed a positive relationship between the Relative humidity and ergot incidence in Pearlmillet. Relative humidity above 75% are considered necessary for the stimulation of sporangial production of downy mildew pathogen of pearl millet (Suryanarayana, 1965). Siddiqui and Khan (1973) reported that the field infection and spread of pearl millet ergot was noticed when the mean relative humidity was above 90%. The results of present studies reveal that in

general the incidence of pearl millet rust was comparatively higher when the mean relative humidity in the morning exceeds 85%.

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TABLE 1 Rust Incidence and Relative Humidity.

Date of sowing	1978			1979			1980		
	Mean Rela- tive humidity	Rust incidence in percentage	Mean rela- tive humidity	Rust incidence in percentage	Mean rela- tive humidity	Rust incidence in percentage	Mean rela- tive humidity	Rust incidence in percentage	
January 7th	-	-	92.7	41.9 (6.51)	91.7	74.0 (8.63)			
January 22nd	-	-	90.9	47.2 (6.90)	90.6	41.5 (6.48)			
February 7th	-	-	91.0	67.4 (8.20)	87.4	43.5 (6.63)			
February 22nd	-	-	85.0	48.0 (6.96)	84.1	18.0 (4.30)			
March 7th	-	-	83.2	27.8 (5.31)	84.0	42.0 (6.51)			
March 22nd	-	-	73.2	0 (0.71)	78.7	15.5 (4.00)			
April 7th	-	-	70.1	0 (0.71)	76.1	6.5 (2.64)			
April 22nd	-	-	77.1	0 (0.71)	76.4	0 (0.71)			
May 7th	-	-	76.6	0 (0.71)	63.5	3.0 (1.87)			
May 22nd	-	-	63.8	0 (0.71)	60.9	5.0 (2.34)			
June 7th	-	-	71.1	0 (0.71)	65.8	6.5 (2.64)			
June 22nd	-	-	77.2	0 (0.71)	55.8	3.0 (1.87)			
July 7th	-	-	58.9	0 (0.71)	75.5	32.5 (5.74)			
July 22nd	66.3	19.5 (4.47)	-	-	66.6	16.5 (4.12)			
August 7th	75.9	27.3 (5.27)	-	-	65.6	17.0 (4.18)			
August 22nd	79.4	33.3 (5.81)	-	-	89.1	41.5 (6.48)			
September 7th	89.1	27.7 (5.31)	89.6	40.8 (6.42)	-	-			
September 22nd	95.0	32.7 (5.76)	93.1	32.1 (5.70)	-	-			
October 7th	94.5	38.8 (6.26)	96.1	42.1 (6.51)	-	-			
October 22nd	92.4	38.6 (6.26)	93.1	38.7 (6.26)	-	-			
November 7th	92.2	30.8 (5.59)	92.5	11.2 (3.42)	-	-			
November 22nd	94.4	55.2 (7.46)	88.3	18.0 (4.30)	-	-			
December 7th	92.6	63.8 (7.36)	89.1	56.5 (7.54)	-	-			
December 22nd	93.6	42.2 (6.53)	90.2	63.0 (7.96)	-	-			

C. D. for 1978-79 (22-7-78 to 7-7-77) = (1.49) C. D. for 1979-80 (7-9-79 to 22-8-80) = (3.76)  
 Figures in parenthesis are transformed values