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Effect of Sowing Dates on the Incidence of Stemphylium Blight of Lentil During 1998-2001

M. Ihsanul Huq[a] and A. Z. M. Nowsher Ali Khan[b]

[a]Plant Pathology Division, RARS, Rahmatpur, Barisal and
[b]Department of Botany, Dhaka, University, Dhaka.

Abstract

Lentils could escape the infection of Stemphylium blight by changing sowing dates. During the periods of studies the trends of disease development were similar. The lowest and the highest severity were noted on November 01 and December 30, respectively. The severity increased progressively with the advancement of sowing date from November 01 to December 30. In case of yield/ha November 01 gave the highest yield followed by November 10. In the sowing of November 01, 10 and 20, lentil could escape the infection of Stemphylium blight. The yield was maximum in the early sown seeds of lentil.

Key words : Stemphylium blight, Sowing dates, Disease incidence, Lentil and Yield

Introduction

Lentil (*Lens culinaris* Medik) is the second most important pulse crop in terms of both area and production and rates the highest consumers' preference. The production of the crop is decreasing every year due to cultural and genetic factors, susceptibility to disease, low acreage and delay in sowing by the farmers (Anonymous, 1989). Among the factors mentioned above susceptibility to disease is very important. As many as 15 pathogens causing 17 diseases of lentil crop have so far been recorded in Bangladesh (Ahmed, 1986). Of the major diseases, Stemphylium blight was recorded in Bangladesh by (Bakr and Zahid, 1986; Kaiser, 1972; Nene *et al*, 1972; Gupta and Das, 1964 and Simay, 1990).

Control of plant diseases becomes successful and economical when management approach involving several methods are employed including chemical means (Bakr and Ahmed, 1992), cultural practices (Howlider *et al.*, 1989) and (Rahman *et al.* 1988) and use of resistant varieties (Ahmed *et al.*, 1949) and (Ahmed, 1986)

Manipulation of sowing time has some effect on the incidence and severity of many diseases. Many field crops can escape various

diseases with the shifting of sowing time (Sud and Singh, 1984). This was supported by (Hedge and Anahosur, 1994).

Materials and Methods

The experiment was conducted during rabi season of 1998-1999, 1999-2000 and 2000-2001. The experiment was laid out in a well managed piece of land using RCB design having three replications. The unit plot size was 4m x 3m with 25cm row to row spacing. The chemical properties and nutritional status of the experimental field were determined. A susceptible genotype L - 81124 was sown on different dates, viz., November 01, 10, 20, 30, December 10, 20 and 30. After completion of the sowing, the experiment was kept under constant watch from sowing up to harvest. The data on meteorological factors such as atmospheric temperature, relative humidity, rainfall and cloudy cover and soil factors such as soil temperature and soil moisture with corresponding sowing dates were recorded. The disease data were recorded from 25 randomly tagged plants/plot on the basis of 1-9 scoring scale and Percent Disease Index (PDI) was computed on the basis of the recorded data according to the formula (Wheeler, 1969)

$$PDI = \frac{\text{Sum of numerical values}}{\text{No. of plant parts observed}} \times \frac{100}{\text{Maximum disease rating}}$$

The data on yield and yield parameters, viz., 1000 seed weight, yield/plant, yield/plot and yield/ha were recorded after necessary sun drying.

All data thus obtained were analyzed statistically and the means of treatment effect were separated for DMRT (Steele and Torrie,

Table I. Effect of sowing dates on disease incidence and yield of lentil during 1998-1999

Treatment	PDI	1000-seed wt. (g)	Yield/plant (g)	Yield/plot (kg)	Yield (kg/ha)
November 01	34.60 d	19.80a	2.60a	1.30a	1083.30a
November 10	40.60 c	19.20a	2.00b	1.20a	1000.0b
November 20	50.70 bc	15.10b	1.50c	0.85b	708.30c
November 30	60.70 b	13.1bc	0.80d	0.68c	566.50d
December 10	77.00 a	13.1bc	0.80d	0.29d	233.80e
December 20	83.30 a	12.5bc	0.6de	0.19d	163.90f
December 30	85.50 a	10.50c	0.20e	0.16d	133.30g
F-test	**	**	**	**	**
CV (%)	5.15	7.72	14.12	6.69	0.36

Mean (s) followed by common letters do not differ significantly at 0.01 level.

In case of PDI, analysis was done after arcsine transformation

1980). All percent data were subjected to arcsine transformation before statistical analysis (Zaman *et al.,* 1982).

Results and Discussion

The results of three consecutive years have been described in Table I-III. Out of seven sowing dates the lowest PDI was shown by November 01 followed by November 10 in all the years of studies and found statistically similar during 1999-2000 and 2000-2001. PDI also differed significantly from November 30, December 10, 20 and 30. November 20 sowing did not vary with November 10 over the years.

In case of 1000-seed weight, November 01 and November 10 were found statistically similar during 1998-1999 and 1999-2000. But November 01 gave the highest yield among the sowing dates. December 10, 20 and 30 were statistically similar except that in the year of 1999-2000. In respect of single plant yield, November 01 gave the highest yield among the treatments and which was followed by November 10 and differed significantly from other treatments except that of 1999-2000. November 20 showed no variation with November 10 during 1999-2000 and 2000-2001. The yield per plot exhibited that November 01 gave the highest yield among the treatments during the period of study and followed by November 10. The sowing dates were found statistically similar in 1998-1999 and 1999-2000. In the year of 1999-2000 and 2000-2001, November 10 and November 20 had no significant difference between them.

In case of yield/ha November 01 gave the highest yield followed by November 10 and differed significantly from other treatments

Table II. Effect of sowing dates on disease incidence and yield of lentil during 1999-2000

Treatment	PDI	1000-seed wt. (g)	Yield/plant (g)	Yield/plot (kg)	Yield (kg/ha)
November 01	23.50d	19.00a	2.20a	1.29a	1030.0a
November 10	33.3cd	19.00a	2.00a	1.23a	911.0b
November 20	42.30c	18.00a	1.5ab	1.09ab	813.9c
November 30	66.20b	15.06b	1.0bc	0.97b	586.1d
December 10	77.1ab	14.60b	0.73c	0.64c	424.9e
December 20	77.9ab	14.60b	0.60c	0.51cd	304.9f
December 30	78.40a	12.00c	0.50c	0.36d	300.0g
F-test	**	**	**	**	**
CV (%)	5.65	4.82	23.5	9.44	0.30

Mean (s) followed by common letters do not differ significantly at 0.01level.

In case of PDI, analysis was done after arcsine transformation

Table III. Effect of sowing dates on disease incidence and yield of lentil during 2000-2001

Treatment	PDI	1000-seed wt. (g)	Yield/plant (g)	Yield/plot (kg)	Yield (kg/ha)
November 01	21.30d	21.00e	2.10a	1.27a	1058.3a
November 10	24.2cd	19.30a	1.73b	1.09b	908.3b
November 20	30.50c	17.7ab	1.57b	1.02b	850.0c
November 30	65.60b	16.0bc	1.03c	0.94c	783.3d
December 10	70.9ab	14.3cd	0.90cd	0.83d	691.6e
December 20	77.20a	12.30d	0.70d	0.74e	616.7f
December 30	80.80a	13.30d	0.73d	0.67e	558.3g
F-test	**	**	**	**	**
CV (%)	5.95	5.69	7.72	3.68	0.30

Mean (s) followed by common letter (s) do not differ significantly at 0.01 level.
In case of PDI, analysis was done after arcsine transformation

in the year of studies. Here, all the treatments also varied statistically among themselves.

The trends of disease incidence and its effect on yield were almost similar during the study period. Gradual increase in disease severity along with the advancement of sowing dates resulted into reduction in yield.

From the observation of three experiments conducted in three years it is clear that Percent Disease Index (PDI) was less in the early sowing compared to that of the late sowing. In the sowing of November 01, 10 and 20, lentil could escape the infection of Stemphylium blight significantly. Among the cultural practices, manipulation of sowing time had some effect on the incidence and severity of many diseases. Many field crops can escape various diseases with the shifting of sowing time (Sud and Singh, 1984 and Singh and Agrawal, 1986).

Time of sowing had marked effect upon level of disease incidence and thus manipulating the sowing time infection may be avoided (Hedge and Anahosur, 1994). Effect of sowing date on yield of lentil on November 01 showed significantly the lowest PDI and the highest yield followed by November 10 and November 20. Sowing on early November could avoid disease significantly and increase yield. This was confirmed by (Jain, *et al.*, 1987)

Sinha and Singh (1991) reported that early appearance of Stemphylium blight caused alarming yield loss in lentil. It is reflected from the study that yield gradually reduced and PDI increased with delayed sowing (after second week of November). This is probably because of the change in environmental condition, which might be congenial for disease development.

In the present investigation the findings of three consecutive years showed almost similar trends regarding yield and disease severity. Thus it is recommended that lentil may be sown before November 20 for maximum yield by the reduction of disease severity significantly.

It is noted that yield was decreased with increase in PDI. Of the three years of study, maximum increase in PDI and decrease in yield was recorded during 1998-1999 followed by 1999-2000. In the present investigation the findings of three consecutive years showed almost similar trends regarding yield and disease severity. Thus it is recommended that lentil may be sown before November 20 for maximum yield by the reduction of disease severity significantly.

Relationship between yield and Percent Disease Index (PDI) over the years

A linear negative correlation between yield and PDI was observed during 1998-1999, 1999-2000 and 2000-2001. Where the equations y = 18.999x+ 1729.2, y = 12.532x + 1338.2, and y = 6.116x + 1104.4 and value of coefficient of regressions were R2= 0.992, R2 = 0.9708 and R2= 0.8555, respectively (Figs. 1-3) gave the best fit. It is noted that yield was decreased with increase in PDI. Of the three years of study, maximum increase in PDI and decrease in yield was recorded during 1998 -1999 followed by 1999-2000.

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