

Effect of variation in the sowing dates on foliar blight of onion

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ABSTRACT

Foliar blight is an important disease of onion which has emerged as a major bottleneck in releasing the full genetic potential of the crop. The experiment was carried out on N-53 variety of onion for two consecutive years under randomized block design with seven replications at the university research farm of SKUAST-Jammu, Chatha. The experiment comprised three sowing dates starting from 14 October and subsequently at fifteen day intervals. In the present study *Alternaria alternata*, *A. porri* and *Stemphylium vesicarium* were observed as the major pathogens whereas *A. tenuissima*, *Cladosporium allii-cepae* and *Colletotrichum circinans* as minor pathogens associated with the disease. Sowing of crop on 1 November resulted in significantly lower disease intensity (42.49 and 35.17% in the first and second year respectively) and recorded higher yield (258.98 and 300.68 q/ha in the first and second year respectively) than sowing on either 14 October or 14 November.

Keywords: Onion; foliar blight; sowing dates; pathogens

INTRODUCTION

India is the second major onion exporting country after China with a production of 163.09 lakh MT from an area of 9.59 lakh hectares (Anon 2015). The productivity of onion is 17.01 tonnes/hectare compared to 22.05 tonnes/hectare in China. In the state of Jammu and Kashmir onion is

grown on an area of 0.54 thousand hectares with a production of 0.46 thousand MT and productivity of 0.85 tonnes/hectare compared to national average of 5.43 tonnes/hectare. Foliar blight is an important disease of onion which has emerged as a major bottleneck in releasing the full genetic potential of the crop. The information on the foliar diseases

affecting onion crop in Jammu and Kashmir in general and Jammu division in particular is very limited and inadequate. Investigations regarding the nature of the causal organisms revealed that foliar blight was caused by more than one pathogen. *Alternaria alternata*, *A porri* and *Stemphylium vesicarium* were observed as the major pathogens whereas *A tenuissima*, *Cladosporium allii-cepae* and *Colletotrichum circinans* as minor pathogens associated with the disease.

MATERIAL and METHODS

Experimental material and site

The experiment on the effect of different sowing dates on the foliar blight of onion with variety N-53 was carried out for two consecutive years under randomized block design with seven replications at the university research farm, Chatha. The experiment comprised three sowing dates starting from 14 October and subsequently at fifteen day interval. The experimental field was located in the subtropical zone of Jammu region at 32°39' N latitude and 74°48' E longitude at an elevation of 296 meters amsl. Before starting the experiment soil samples were collected from 0-15 cm depth of soil as per the procedure of random sampling (Peterson and Calvin

1965). The samples were air-dried, grinded, sieved (2 mm sieve) and analyzed for various physico-chemical properties of soil. The analysis of soil indicated that the soil of the experimental site was loamy in texture, slightly alkaline in pH (7.4), low in organic carbon and available nitrogen but medium in phosphorus and potassium with EC of 0.14 dS/m ie in the safe range.

Observations recorded

Observations on the per cent disease intensity were recorded on the 0-5 scale as described by Sharma (1986) at fifteen day interval starting from the time of transplantation. The bulbs were harvested in the first week of May in each cropping season and yield was recorded for each sowing date. The following scale was used for rating disease intensity (Sharma 1986):

- 0= No disease symptoms
- 1= Few spots towards the tip covering less than 10 per cent leaf area
- 2= Several dark purplish patches covering less than 20 per cent leaf area
- 3= Several patches with paler outer zone covering up to 40 per cent leaf area
- 4= Long streaks covering 75 per cent leaf area or breaking of leaves from centre
- 5= Complete drying of leaves or breaking of leaves from base

$$\text{PDI} = \frac{\text{Total sum of numerical ratings}}{\# \text{ leaves observed} \times \text{Maximum disease rating}} \times 100$$

The per cent disease intensity (PDI) was calculated as given above (Wheeler 1969):

RESULTS and DISCUSSION

A perusal of the data presented in the Table 1 indicates that throughout the growing period the lowest per cent disease intensity was recorded for the second sowing date ie 1 November during both the years followed by first sowing date of 14 October. However there were no significant differences between the two sowing dates in the first year though both the sowing dates differed significantly from the third sowing date ie 14 November.

The per cent disease intensity recorded during the first year (Table 1) was much higher than recorded during the second year. In the first year the lowest disease intensity recorded at the time of 1 SW was in the crop sown on 1 November (3.24%) though it was significantly at par with the disease intensity recorded in the crop sown on 14 October (3.75%) however it differed significantly from the crop sown on 14 November (6.63%). In the 3rd, 5th and 7th standard weeks the disease intensity recorded was 8.97, 9.41 and 15.51 per cent in the crops sown on 14 October; 6.86, 12.27 and 15.28 per cent in the crop sown on 1 November and 12.33, 13.31 and 16.86 per cent in the crop sown on 14 November respectively. In the 9 SW the per cent disease intensity increased to 19.67 per cent (1 sowing

date), 18.51 per cent (2 sowing date) and 22.59 per cent (3 sowing date). The per cent disease intensity recorded in the 11 and 13 SW was 28.15 and 41.77 per cent in the crop sown on 14 October, 21.93 and 36.28 per cent in the crop sown on 1 November and 29.54 and 48.78 per cent in the crop sown on 14 November respectively. At the time of maturity in the 15 SW the disease intensity recorded in the crop sown on 14 October, 1 November and 14 November was 58.45, 42.49 and 61.48 per cent respectively.

The highest average yield was recorded in the crop sown on 1 November (258.98 q/ha) followed by the crop sown on 14 November (224.18 q/ha) whereas the least average yield was recorded in the crop sown on 14 October (221.16 q/ha).

During the second year (Table 1) in the first standard week the per cent disease intensity recorded in the crop sown on 14 October was 6.23 per cent which was at par with the per cent disease intensity recorded in the crop sown on 1 November (4.32%). It was significantly different from the disease intensity recorded in the crop sown on 14 November (17.29%). In the 3 SW the per cent disease intensity recorded was 9.25 per cent (1 sowing date), 7.86 per cent (2 sowing date) and 18.86 per cent (3 sowing date) whereas during the 5 SW the disease intensity recorded was 11.48, 9.51 and 19.66 per cent in the first, second and third sowing dates respectively. The

Table 1. Effect of sowing dates on the onion foliar blight and yield

Date of sowing	Per cent disease intensity at different standard weeks								Average yield (q/ha)	
	1	3	5	7	9	11	13	15		
First year										
14 October	3.75 (11.17)	8.97 (17.43)	9.41 (17.86)	15.51 (23.19)	19.67 (26.33)	28.15 (32.04)	41.77 (40.26)	58.45 (49.86)	221.16	
1 November	3.24 (10.37)	6.86 (15.18)	12.27 (20.50)	15.28 (23.01)	18.51 (25.48)	21.93 (27.92)	36.28 (37.04)	42.49 (40.68)	258.98	
14 November	6.63 (14.92)	12.33 (20.56)	13.31 (21.40)	16.86 (24.24)	22.59 (28.38)	29.54 (32.92)	48.78 (44.30)	61.48 (51.64)	224.18	
CD _{0.05}	2.31	2.14	1.73	0.49	2.76	3.62	4.13	6.43		
Second year										
14 th October	6.23 (14.45)	9.25 (17.71)	11.48 (19.81)	20.66 (27.03)	20.92 (27.22)	22.52 (28.33)	30.84 (33.73)	37.13 (37.54)	220.63	
1 st November	4.32 (11.99)	7.86 (16.28)	9.51 (17.96)	17.58 (24.79)	20.44 (26.88)	21.19 (27.41)	29.14 (32.67)	35.17 (36.37)	300.68	
14 th November	17.29 (24.57)	18.86 (25.74)	19.66 (26.32)	20.79 (27.13)	24.23 (29.49)	25.24 (30.16)	32.30 (34.63)	38.06 (38.09)	244.44	
CD _{0.05}	5.96	8.96	4.48	1.06	3.37	3.43	2.13	2.98		

Figures given in parentheses are angular transformed values

disease intensity recorded in the 7th SW was 17.58 per cent in the crop sown on 1 November which differed significantly from the disease intensity recorded in the crop sown on 14 October (20.66%) and 14 November (20.79%). Thereafter the per cent disease intensity recorded in the crop sown on 1 November increased from 20.44 per cent (9th SW) and 21.19 per cent (11th SW) to 29.14 per cent (13th SW) and 35.17 per cent in the 15th SW. The per cent disease intensity recorded in the crop sown on 14th October increased from 9th SW (20.92%) to 15th SW (37.13%) while in the crop sown on 14 November it increased from 24.23 per cent in the 9th SW to 38.06 per cent in the 15th SW.

The average yield recorded in the crop sown on 1st November was 300.68 q/ha as compared to 220.63 q/ha in the crop sown on 14 October and 244.44 q/ha in the crop sown on 14 November.

In the present study lowest disease intensity was recorded in the crop sown on 1 November in both the years though the per cent disease intensity recorded in the first year was lower than that recorded during the second year. The results are in conformity with the work of Kumar et al (1998) and Kanwar et al (2000) who reported that sowing on 1 November and transplanting on 15 January gave best survival rate, most vigorous growth, the earliest maturing and heaviest bulbs. However Sandhu et al (1982) reported that

the early sown crop (1 November) was more susceptible to *A porri* than the late sown crop (1 December) which is contrary to present findings. Cramer (2003) reported that earlier seeding dates resulted in larger plants with more leaves than later seeding dates when compared to early in the growing season. By harvest time plants from later seeding dates were comparable in height and had produced more leaves than earlier seeded plants. Jakhar et al (1994) also reported that the *Stemphylium* blight of onion was influenced by sowing date and spacing; it was highest (52.2%) when the crop was sown on 10 September with spacing 45 x 30 cm and lowest when sown on 30 October at 60 x 45 cm.

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