Environment & Ecology 27 (3) : 1028–1030, 2009
 ISSN 0970-0420

Effect of Sowing Dates and Nitrogen Levels on Grain Yield and Incidence of *Lipaphis erysimi* (Kalt.) in Mustard Crop

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Abstract

A field experiment was conducted during *rabi* of 2003-04 and 2004-05 to study the effect of sowing dates and nitrogen levels on grain yield and incidence of *Lipaphis erysimi* (Kalt) in mustard crop. Highest grain yield of mustard was obtained from crop sown on 15 October receiving 120 kg N/ha. Two years mean aphid population was maximum (19.7 aphids/5 cm twig) on mustard sown on 15 November and minimum (5.6 aphids/5 cm twig) was recorded in 15 October sown crop. Significant increase in aphid population (9.5 to 15.5 aphids/5 cm twig) was observed with increase in nitrogen application from zero to 120 kg N/ha.
Key words : *Lipaphis erysimi,* Mustard, Sowing dates, Nitrogen levels.

Indian mustard *Brassica juncea* (L) Czernj and Crosson is one of the important oil seed crop grown in Uttar Pradesh. In mid-western plain zone of up, rice-mustard-sugarcane is popular crop rotation. In this crop rotation, mustard sowing is generally delayed due to late harvesting of rice. In such a situation mustard is exposed to low temperature during early vegetative phase and high temperature during reproductive phase, nitrogen level and incidence of aphid are another major limiting factors, which consequently reduces the productivity. These adverse conditions can be mitigated to some extent by providing proper crop management. Hence, the present investigation was undertaken to study the effect of sowing dates and nitrogen levels on grain yield and incidence of *Lipaphis erysimi* (Kalt.) in mustard crop.

Methods

A field experiment was conducted at Research Station Nagina during *rabi* 2003-04 and 2004-05 in split-plot design with three replications. Krishna variety of mustard was sown (15 and 30 October, 15 and 30 November) in different dates in main plots with four levels (0, 40, 80 and 120 kg N/ha) of nitrogen in sub-plots. The soil was sandy loam with pH 7.4. Normal agronomical practices were followed for raising the crop. Plant protection measures were not adopted in experiments. Observation on aphid population were recorded four times in December and January at 10-day intervals from five randomly selected twigs, each of 5 cm length per plot. Mean of four observations for number of aphids/5 cm twig per plot was calculated. The yield data were also recorded at harvest.

Results and Discussion

Grain Yield

Significantly higher grain yield was obtained from crop sown on 15 October than succeeding late sown crop. Joshi et al. (1) Satya Vir et al. (2) and Singh et al. (3) also reported higher reduction in grain yield of mustard due to aphid in the succeeding late sown crop. Mustard sown on 15 October and receiving 120 kg N/ha gave 14.9 and 16.8 q/ha gain yield in *rabi* of 2003-04 and 2004-05 respectively (Table 1). Average grain yield of two years was found to be minimum from crop sown on 30 November. There was a reduction of 1.46, 2.68 and 7.60q/ha in average grain yield due to crop sown on 30 October, 15 and 30 November as compared to crop sown on 15 October. The grain yield obtained from crop sown on 30 October and 15 November was found statistically at par. significant increase in grain yield was found at each succeeding level of nitrogen.

The interaction of sowing dates and nitrogen levels was found to be significant for grain yield. The grain yield was statistically at par with the application of 40 kg N/ha in combination with crop sown on 15 October, as compared to the application of 80 kg

Table 1. Effect of different sowing dates and nitrogen levels on grain yield (q/ha) in mustard crop.

Date of sowing	Nitrogen application (kg N/ha) 0	40	80	120	Average	Reduction in grain over 15 Oct (q/ha)
Rabi 2003-2004						
15 Oct	7.30	10.81	14.03	14.91	11.76	–
30 Oct	6.72	9.64	11.98	13.15	10.37	1.39
15 Nov	6.13	8.76	10.52	11.40	9.20	2.56
30 Nov	3.06	3.50	5.26	6.13	4.49	7.27
Average	5.80	8.18	10.44	11.40		
CD (P=0.05)						
Sowing dates-	1.10					
N-levels-	0.37					
D × N						
(1)	0.75					
(2)	1.28					
Rabi 2004-2005						
15 Oct	6.72	11.84	15.63	16.80	12.75	–
30 Oct	5.99	10.52	13.44	14.90	11.21	1.54
15 Nov	5.40	9.64	11.83	12.86	9.93	2.82
30 Nov	2.77	3.94	5.69	6.86	4.82	7.93
Average	5.22	8.98	11.65	12.86		
CD (P=0.05)						
Sowing dates-	1.17					
N-levels-	0.69					
D × N						
(1)	1.39					
(2)	1.67					
Average of Two Years						
15 Oct	7.01	11.32	14.63	15,85	12.25	–
30 Oct	6.35	10.08	12.71	14.02	10.79	1.46
15 Nov	5.77	9.20	11.17	12.13	9.57	2.68
30 Nov	2.92	3.72	5.47	6.50	4.65	7.60
Average	5.51	8.58	11.04	12.12		
CD (P=0.05)						
Sowing dates-	1.14					
N-levels	0.43					
D × N						
(1)	0.86					
(2)	1.35					

Table 2. Effect of different sowing dates and nitrogen levels on average number of aphids 5 cm twig in mustard crop.

Date of sowing	Nitrogen application (kg N/ha) 0	40	80	120	Average
Rabi 2003-2004					
15 Oct	4.8	5.3	5.4	5.5	5.2
30 Oct	7.2	8.0	9.3	9.5	8.5
15 Nov	12.0	16.2	21.3	22.7	18.0
30 Nov	11.2	14.6	18.6	19.5	15.9
Average	8.8	11.0	13.6	14.3	
CD (P=0.05)					
Sowing dates-	0.91				
N-levels	0.29				
D × N					
(1)	0.59				
(2)	1.04				
Rabi 2004-2005					
15 Oct	5.5	6.1	6.1	6.3	6.0
30 Oct	8.0	9.0	10.6	10.8	9.6
15 Nov	14.2	19.1	25.4	27.2	21.5
30 Nov	13.3	17.3	22.3	23.1	19.0
Average	10.2	12.9	16.1	16.8	
CD (P=0.05)					
Sowing dates-	1.10				
N-levels-	0.41				
D × N					
(1)	0.82				
(2)	1.31				
Mean of Two Years					
15 Oct	5.1	5.7	5.7	5.9	5.6
30 Oct	7.6	8.5	9.9	10.1	9.0
15 Nov	13.1	17.6	23.3	24.9	19.7
30 Nov	12.2	15.9	20.4	21.3	17.5
Average	9.5	11.9	14.8	15.5	
CD (P=0.05)					
Sowing dates-	1.01				
N-levels-	0.35				
D × N					
(1)	0.51				
(2)	1.18				

N/ha with crop sown on 15 November. Similar trend was found with the application of 80 kg N/ha in combination with crop sown on 15 October as compared to the application of 120 kg N/ha with crop sown on 30 October.

Aphid Population

Significant differences were observed in aphid population on crop sown on different dates and at

various levels of nitrogen in both years (Table 2). Bhadauria and Jakhmola (4) also reported progressive increase in aphid population in succeeding late sown crop. Two years mean aphid population was minimum (5.6 aphids/5 cm twig) on crop sown on 15 October and maximum aphid population (19.7aphis/twig) was recorded in crop sown on 15 November. However, reduction (2.2 aphids/5 cm twig) in aphid population was recorded in crop sown on 30 November. Significant increase in aphid population (9.5 to 15.5 aphids/5cm twig) was observed with increase in nitrogen application from zero to 120 kg/N/ha. Interaction of sowing dates and nitrogen levels was observed for aphid population on mustard crop. Aphid population was significantly higher with the application of 80 kg N/ha in combination with crop sown on 15 November, as compared to the application of 120 kg N/ha with crop sown on 30 November.

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