

Effect of Nitrogen levels on Growth and Productivity of Mustard (*Brassica juncea* L.) Varieties

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Abstract

The field experiment was conducted during Rabi season of 2018-19 at R.B.S. College, Agriculture Research Farm, Bichpuri, Agra, in sandy loam soil to find out the effect of nitrogen levels on growth and productivity of mustard varieties in North Western Plain Zone. The treatments were consisted of three varieties VIZ. Bharat-1, RH-749 and Hybrid-5222 and four levels of nitrogen as 30, 60, 90, and 120 kg ha⁻¹ in Randomized Block Design with three replications. The result revealed that the maximum seed yield (1637 kg ha⁻¹), gross return (Rs. 74162 ha⁻¹), net return (Rs. 50345 ha⁻¹) and B:C ratio (3.11) was found in variety hybrid-5222 with application of 120 kg nitrogen ha⁻¹ and minimum seed yield (1242 kg ha⁻¹), gross income (Rs. 55624 ha⁻¹), net return (Rs.33080 ha⁻¹) and B:C ratio (2.46) was obtained in variety Bharat-1 with application of 30 kg nitrogen ha⁻¹.

Key words:-mustard varieties, nitrogen levels, yield attributes

Introduction

Vegetable oil is the prime source of fatty acids, which are essential for human nutrition. Oilseed sector plays an important role in agriculture and economy of India. Nitrogen is a major nutrient that provides lush green colour in crop (due to increase in chlorophyll) and its deficiency in arid and semi- arid regions is considerable because the amount of organic matters are the main sources of nitrogen reserves, is very low. Selection of suitable variety plays a vital role in crop production. The choice of right variety of mustard

helps to augment crop productivity by about 20-25%. Any variety of mustard before being recommended for general cultivation for particular region must be judged for its potential, tolerance against disease in general and in particular responsiveness to added water and fertilizer and adaptability to different agro-climatic conditions. Thus, the value of stable and high yielding variety has been universally recognized as an important factor for boosting crop production.

Materials and Methods

The field experiment was conducted to study the effects of nitrogen levels on growth and productivity of mustard at R.B.S.College, Agriculture Research Farm, Bichpuri, Agra during Rabi season of 2018-19. The soil was sandy loam with 8.1 pH, 0.32 % organic carbon, 190.20 kg ha⁻¹ available nitrogen, 28.30 kg ha⁻¹ available phosphorous and

290.00 kg ha⁻¹ available potassium. The experiment was laid out in randomized block design with three replications comprising three varieties (Bharat-1, RH-749, and Hybrid-5222.) and four levels of nitrogen (20, 60, 90 and 120 kg ha⁻¹). The sowing of all the three mustard varieties was done in furrow 5 cm. depth at a distance of 45 cm. apart with the help of

kudali using 5 kg ha⁻¹ seed. Before sowing seed was treated with thiram @2.5 gm kg⁻¹ seed. Half amount of nitrogen with full amount of phosphorous and potassium were applied at the time of sowing by urea, DAP and MOP, respectively. The remaining of nitrogen was applied after first irrigation. The crop was raised under irrigated condition with two irrigations. All the general crop management practices

Result and Discussion

Effect of Nitrogen levels on growth, yield attributes and yield

All the growth and development characters such as, plant height, number of green leaves plant⁻¹, number of primary and secondary branches plant⁻¹ and dry matter accumulation (g) plant⁻¹ were significantly differ much themselves due to different doses of N at various stages of crop growth except germination count and crop stand, (Table 1). The plant height increased significantly with increase in the levels of nitrogen up to 120 kg ha⁻¹. Every increase in the levels of nitrogen significantly increase the green leaves plant⁻¹ up to 90 kg ha⁻¹. When the levels of nitrogen was increased from 90 to 120 kg ha⁻¹, the green leaves plant⁻¹ increased marginally. The number of primary branches, secondary branches and dry

are performed for the better growth and development of crop during experimentation. The data on growth, yield attributing characters and yield was recorded at harvest and economics was computed using the prices of inputs and outputs as per prevailing in local market. Recorded data were analysed as per standard statistical procedure to draw a valid conclusion.

matter accumulation were improved due to application of 60, 90 and 120 kg nitrogenha⁻¹over 30 kg nitrogen ha⁻¹ same findings were observed by many others^[1,2,3,4].

All the yield parameters i.e. number of siliqua plant⁻¹, length of siliqua, number of seed siliqua⁻¹ and test weight increased with the increase in the levels of nitrogen up to 120 kgha⁻¹ (Table 2). The biomass production, seed and stower yield considerably with every increase in levels of nitrogen up to 120 kg ha⁻¹. Application of 60, 90 and 120 kg nitrogen ha⁻¹ resulted a increased in seed yield producing nearly 24.82, 28.62 and 37.89 percent more yield ha⁻¹ respectively, over application of30 kg nitrogen ha⁻¹. These results were in close proximity with the results reported in the past^[1,2].

Table 1 Growth parameters of mustard as influenced by varieties and levels of nitrogen at 120 DAS

Treatments	Plant height (cm)	No. of green leaves plant ⁻¹	No. of primary branches plant ⁻¹	No. of secondary branches plant ⁻¹	Dry matter accumulation(g) plant ⁻¹
Varieties					
Bharat-1	181.14	7.95	5.19	14.50	35.41
RH-749	187.13	8.74	5.64	14.85	42.58
Hybrid-5222	204.04	9.85	6.32	16.88	43.51
SEm±	2.44	0.32	0.20	0.40	0.97
CD at 5%	7.02	0.84	0.50	1.14	2.76
Nitrogen levels (kg ha ⁻¹)					
30	181.59	7.47	5.15	14.42	36.66
60	191.00	8.39	5.77	15.46	41.46
90	194.96	9.17	5.85	15.80	42.19
120	198.04	9.39	5.92	15.95	41.67
SEm±	2.11	0.27	0.16	0.34	0.83
CDat 5%	6.02	0.72	0.43	0.98	2.36

Effect of varieties on growth, yield attributes and yield

Among the all varieties, variety Hybrid-5222 produced significantly highest no. of siliqua plant⁻¹, length of siliqua (cm), no. of seeds siliqua⁻¹ and test weight followed by RH-749, while minimum was recorded in Bhrat-1 (Table 2). The biological yield (kg ha⁻¹) and seed

yield (kg ha⁻¹) was significantly superior in variety Hybrid-5222 than other varieties while stover yield was significantly superior in Hybrid-5222 than Bharat-1 and marginally superior than RH-749. Harvest index was marginally superior in variety Hybrid-5222 than other varieties^[5,6].

Table 2 Yield attributes and yield of mustard as influenced by varieties and levels of nitrogen

Treatments	No. of siliqua plant ⁻¹	Length of siliqua (cm)	No. of seeds siliqua ⁻¹	1000-seed weight (g)	Biological yield (kg ⁻¹)	Seed yield (kg ⁻¹)	Stover yield (kg ⁻¹)	Harvest index (%)
Varieties								
Bharat-1	187.89	5.12	11.82	4.82	4160	1242	2918	29.85
RH-749	194.40	5.18	12.47	4.90	4860	1410	3442	29.01
Hybrid-5222	206.85	5.28	13.54	5.42	5079	1637	3450	32.23
SEm±	2.72	0.13	0.22	0.16	2.11	0.69	1.25	1.19
CD at 5%	7.06	NS	0.60	0.43	5.88	1.41	3.53	NS
Nitrogen levels (kg ha⁻¹)								
30	181.85	4.91	11.84	4.57	3984	1132	2852	28.41
60	195.04	5.26	12.45	4.87	4779	1413	3366	29.56
90	201.25	5.29	12.58	5.24	4852	1456	3396	30.00
120	202.57	5.31	12.94	5.52	5115	1561	3554	30.51
SEm±	2.11	0.10	0.19	0.13	1.77	0.44	1.11	1.09
CD at 5%	6.05	0.26	0.52	0.35	5.04	1.21	3.02	NS

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