

Effect of Nitrogen and Phosphorus Levels on Yield Contributing Parameters of Canola (*Brassica napus*)

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ABSTRACT

The field trial was conducted to determine the effect of NP doses on the overall performance of canola at Student's Experimental Farm, Sindh Agriculture University Tandojam, Pakistan. Two varieties (Shirallee and Wester) and six NP levels (Control, 56-28, 84-42, 112-56, 140-70 and 164-84 kg NP ha⁻¹) were tested. The results revealed that branches, siliqua number, seeds in siliqua, seed index and seed yield were significantly affected by varieties and fertilizer doses and also all the traits increased significantly with the increasing NP levels. Variety Shirallee proved high yielding as compared to Wester. The application of 164-84 and 140-70 kg NP ha⁻¹ produced maximum seed yield than rest of the NP doses.

Key words: Canola, Nitrogen, Phosphorus, growth, yield

INTRODUCTION

The canola (*Brassica napus* L.) is the recent development of agriculture and canola is the source of 30-40% pure sweet oil with 22-23% protein. The oil extracted from canola is very useful as it contains less amounts of erucic acid and glucosinolates. Varieties produce high yield only under appropriate package of technology, among those balance application of major nutrient elements like N and P play vital role in the stability of oilseed crops particularly *Brassica napus*. Panwar and Bhardwaz (1976) observed that increasing nitrogen rates from 0-80 kg ha⁻¹ increased average seed yield from 210-240 kg ha⁻¹ in canola crop. Mudhalker and Ablawat (1981) reported that increasing both nitrogen and phosphorus from 0-80 kg ha⁻¹ increased seed yield of rape significantly. Ali and Rehman (1986) reported that increasing rate of N upto 160 kg ha⁻¹ progressively increased yield of *Brassica campestris*. Qayyum *et al.* (1991) found that increasing nitrogen level upto 120 kg ha⁻¹ linearly boosted yield and yield components of *Brassica napus*. Further more, Kalhoro (1995) reported that differences in plant height, number of branches, pod number, seeds pod⁻¹, seed index, seed weight and oil content of mustard were highly significant over varieties, NP fertilizer levels and their interactions. Plots treated with 125-60 kg NP ha⁻¹ resulted in greater seed yield but, oil content was higher under 150-75 kg NP ha⁻¹, whereas the greater seed yield was associated with significant increase in all yield traits, however, varieties recorded different results for these parameters. Looking the economic importance of the oilseeds in the country, the experiment was laid-out to explore different NP levels and outstanding variety for higher seed yield of canola.

MATERIALS AND METHODS

The field experiment was conducted to assess the effect of different doses of N and P fertilizers on the growth and seed yield of canola at Student's Experimental Farm, Sindh Agriculture University Tandojam, Pakistan. The treatments were different NP levels (Control, 56-28, 84-42, 112-56, 140-70 and 164-84 kg NP ha⁻¹) applied to Shirallee and Wester canola varieties. The fertilizer were applied in the form of Ammonium Nitrate and Single Super Phosphate. The full dose of P with one third of N was incorporated at

the time of final harrowing, while remaining N was split applied in two equal parts at the time of flowering and pod formation periods respectively. For recording various crop parameters, five plants were selected randomly from each treatment. After harvesting and necessary drying, crop was threshed and seed yield was determined. All the collected data were subjected to analysis of variance and means were compared using LSD test.

RESULTS AND DISCUSSION

The data pertaining to yield components and seed yield of two varieties of canola treated with six different NP fertilizer levels are presented in Table 1. It is evident from the results that the branches, siliqua number, seeds siliqua⁻¹, seed index and seed yield were highly influenced by fertilizer levels and varieties. Among the fertilizer levels 140-70 and 164-84 NP kg ha⁻¹ significantly recorded higher values of all the agronomic traits of canola varieties. The result demonstrated that variety Shirallee with NP level of 164-84 kg ha⁻¹ exhibited tall plants, more branches, siliqua, heavy seeds, satisfactory seed index and seed yield as compared to other levels of fertilizers. Similarly, Kalhoro (1995) reported that differences in plant height, branches, pods number, seed index and seed yield were highly significant over varieties, NP fertilizer levels and their interactions. He reported that greater seed yield was associated with significant increase in all yield traits. Furthermore, these results are in agreement with the findings of Kandil (1983) and Mondal and

Table 1: Yield and yield contributing traits of canola varieties as affected by NP levels

Fertilizers (NP kg ha ⁻¹)	Varieties		Mean	Statistics			
	Shirallee	Wester		Variety (V)	Fertilizer (F)	V x F	
Number of branches plant ⁻¹							
Control	7.35	6.20	6.68a				
56-28	11.50	8.95	10.23d	S.E=	0.495	0.857	1.212
84-42	13.50	10.95	12.10c	Cdi=	1.004	1.740	2.460
112-56	15.95	12.40	14.18b	Cdii=	1.351	2.034	3.309
140-70	17.15	13.75	14.45ab				
164-84	19.28	15.10	17.19a				
Mean	14.08a	11.26b					
Number of siliqua plant ⁻¹							
Control	290.35	256.40	273.38a				
56-28	335.40	298.45	316.93d	S.E=	2.581	4.470	3.868
84-42	350.78	310.50	330.64c	Cdi=	5.239	9.075	7.852
112-56	375.20	340.00	357.60b	Cdii=	7.046	12.204	10.560
140-70	390.20	350.00	370.10a				
164-84	398.20	360.15	379.18a				
Mean	356.69a	319.25b					
Number of seeds siliqua ⁻¹							
Control	4.45	4.00	4.23d				
56-28	4.80	4.20	4.50c	S.E=	0.057	0.099	0.140
84-42	4.98	4.35	4.67c	Cdi=	0.116	0.200	0.283
112-56	5.40	4.50	4.95b	Cdii=	0.156	0.269	0.382
140-70	5.90	5.00	4.45a				
164-84	6.10	5.20	5.65a				
Mean	5.27a	4.54b					
Seed index (g)							
Control	8.80	8.28	8.54e				
56-28	13.50	13.00	13.25d	S.E=	0.088	0.153	0.217
84-42	13.80	13.40	13.60c	Cdi=	0.179	0.319	0.440
112-56	14.18	13.80	13.99b	Cdii=	0.241	0.417	0.592
140-70	16.48	14.90	15.69a				
164-84	16.90	15.10	16.00a				
Mean	13.94a	13.08b					
Seed yield (kg ha ⁻¹)							
Control	790.50	680.45	735.48d				
56-28	1120.35	990.48	1055.42c	S.E=	18.478	32.005	45.262
84-42	1240.50	1130.15	1185.33b	Cdi=	37.511	64.970	91.882
112-56	1300.60	1200.20	1250.40b	Cdii=	50.445	87.373	123.565
140-70	1520.80	1300.15	1410.48a				
164-84	1580.50	1370.40	1475.45a				
Mean	1258.87a	1111.97b					

Values followed by similar letter are not significantly different at 5% level of probability

Gaffar (1993) and Sumi *et al.* (1986), who reported significant increase in crop and yield parameters due to increase in fertilizer levels.

It can be concluded that fertilizer levels 140-70 and 164-84 kg ha⁻¹ are economically beneficial in obtaining higher seed yields of canola.

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