

Effect of Phosphorus Levels on Yield Attributes and yield of Lentil Varieties

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Abstract

The results of the study revealed that application of phosphorus upto 50 kg P₂O₅ ha⁻¹ enhanced the pods plant⁻¹ and weight of pods plant⁻¹, Number of grains pod⁻¹ and 1000 grain weight of lentil varieties. The biological, seed and straw yield also increased upto 50 kg P₂O₅ ha⁻¹ application. The increase in seed yield with 25, 50 and 75 kg P₂O₅ ha⁻¹ was to the tune of 18.02, 31.41 and 35.41 percent, respectively over control treatment. Variety KLS-93 proved superior over all varieties regarding production with 50 kg P₂O₅ ha⁻¹ application.

Key words : Phosphorus levels, yield attributes yield, lentil varieties

Introduction

Most of the pulse growing soils are deficient in available phosphorus status. Lentil is one of the important pulse crops grown in India. This crop can fix atmospheric nitrogen through root nodules in association with rhizohium bacteria. This crop improves physical, chemical and biological properties of the soil^[2]. Phosphorus plays an important role in the nutrition of lentil and improves biological nitrogen fixation and quality of grains.

Materials and Method

A field experiment was conducted during Rabi season of 2018-19 at Agricultural Research Farm of R.B.S.

Results and Discussion

It was noted from table 1 that variety KLS-93 had appreciably more number and weight of pods plant⁻¹ and

College, Bichpuri, Agra. The soil was low in nitrogen (174.40 kg N ha⁻¹), medium in available phosphorus (25.8 Kg P₂O₅ ha⁻¹) and sufficient in available potash (220.70 kg K₂O ha⁻¹). This experiment consisted of four variables of varieties of legume KLB-303 (V₁), KLS-93 (V₂), KL-320 (V₃) and K-75 (V₄) and four levels of phosphorus [0(P₀), 25 (P₁), 50 (P₂) and 75 (P₃) kg P₂O₅ ha⁻¹]. In all sixteen treatment combinations were tested factorial randomized block design with four replications. Data on yield attributes and yield of legume were recorded and analysed statistically.

number of grains pod⁻¹ and marginal improvement in 1000 grain weight than rest of the varieties.

Table 1 : Yield contributing characters as influenced by varieties and levels of phosphorus application

Treatments	Number of pods plant ⁻¹	Weight of pods plant ⁻¹ (g)	Number of grains pod ⁻¹	1000 grain weight (g)
Varieties				
KLB-303 (V ₁)	12.07	3.39	6.78	28.68
KLS-93 (V ₂)	13.95	3.90	7.80	29.55
KL-320 (V ₃)	10.50	2.95	5.92	28.37
K-75 (V ₄)	12.70	3.60	7.20	28.12
SEm±	0.390	0.169	0.310	0.60
CD (p=0.05)	0.73	0.35	0.62	NS
Levels of phosphorus (kg P₂O₅ ha⁻¹)				
0 (P ₀)	8.95	2.90	4.03	27.93
25 (P ₁)	11.86	3.56	6.29	28.37
50 (P ₂)	14.90	3.90	7.80	28.82
75 (P ₃)	15.06	4.21	7.90	29.60
SEm±	0.349	0.169	0.309	0.60
CD (p=0.05)	0.70	0.35	0.66	1.23

The data given in table 1 further indicated that almost all the yield contributing characters namely number of pods plant⁻¹, weight of pods plant⁻¹, number of grains pod⁻¹ and 1000 grain weight were improved appreciably with increasing levels of phosphorus upto 50 kg P₂O₅ ha⁻¹, except 1000 grain weight where differences with 25, 50 and 75 kg P₂O₅ ha⁻¹ were at par among themselves. Similar observations were reported in the past also^[1, 3 and 4].

It is noted from table 2 that variety KLS-93 recorded higher biological yield than other varieties. As regard to seed yield of lentil, variety KLS-93 had more yield than rest of the varieties. Similar trends were noted in case of straw yield. Variety KLS-93 produced significantly higher grain yield by 17.36, 14.67 and 46.30 percent respectively when compared with KLB-303, KL-320 and K-75.

Table 2 : Biological, Seed, Straw yield and harvest index as influenced by varieties and levels of phosphorus application

Treatments	Biological yield (q ha ⁻¹)	Seed yield (q ha ⁻¹)	Straw yield (q ha ⁻¹)	Harvest Index (%)
Varieties				
KLB-303 (V ₁)	33.00	13.89	19.11	42.09
KLS-93 (V ₂)	35.41	16.29	19.12	46.02
KL-320 (V ₃)	32.93	14.07	18.86	42.72
K-75 (V ₄)	28.79	11.25	17.54	39.07
SEm±	1.39	0.93	0.69	0.69
CD (p=0.05)	2.76	1.83	1.36	1.36
Levels of phosphorus (kg P₂O₅ ha⁻¹)				
0 (P ₀)	28.14	11.81	16.33	41.96
25 (P ₁)	28.75	12.45	16.30	43.30
50 (P ₂)	34.40	15.63	18.87	45.43
75 (P ₃)	35.14	16.22	18.92	46.15
SEm±	1.39	0.92	0.66	0.67
CD (p=0.05)	2.74	1.80	1.32	1.34

A perusal of data of table 2 further revealed that application of phosphorus significantly increased grain and straw yield of lentil over control the magnitude of increase in grain yield was to the tune of 18.02, 34.41 and 35.41 percent with 25, 50 and 75 kg P₂O₅ ha⁻¹ application, respectively over control. Variety KLS-93

References

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gave significantly higher harvest index as compared to all other varieties application of 75 kg P₂O₅ ha⁻¹ resulted significantly higher harvest index when compared with control. The differences between 50 and 75 kg P₂O₅ ha⁻¹ levels were marginal and could not reach to the level of significance.