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Effect of Pre-emergence Orifan on *Lens culinaris* Medic. Under Varying Levels of Phosphorus

Shazia Fazal, Muhammad Sadiq, Muzammil Saleem and Azeem Khalid*
Department of Botany, *Department of Soil Science,
University of Agriculture, Faisalabad-38040, Pakistan

Abstract

In a field trial conducted at University of Agriculture, Faisalabad during 1996-97, two varieties of lentil (*Lens culinaris* Medi viz. Masoor 93 and 91517 were treated with pre-emergence Orifan coupled with three phosphorus levels. Herbicid treatment reduced weed population and weed biomass as compared to control. Both the inputs increased vario parameters including yield components. Phosphorus @ 60 kg ha^{-1} and Orifan @ 3.0 l ha^{-1} proved better than their low rates and brought about an overall increase of 58 per cent over control, attributable to the two inputs in about 1:4 rat respectively. The two varieties showed non significant difference for various parameters.

Introduction

Lentil is an important legume crop. Despite its huge importance average yield in Pakistan is very low (508 kg ha^{-1}) as compared to other countries of the world (Anonymous, 1996). There are many reasons for low yield but weed infestation is major constraint limiting lentil yield because of its poor competitive ability. Chemical weed control being easy and effective, is getting popularity in Pakistan . Type of herbicide, its dose, time and method of application influence its effectiveness. The rate of a herbicide is of tremendous importance, because different rates of the same herbicide produced variable results (Malik and Smith, 1990).

The wide gap between average yield and potential yield of lentil is also partly attributed to lack of existence of advanced production technology which calls for the balanced use of fertilizer. Soil of many lentil growing areas is characterized by low available phosphorus contents and positive response to phosphorus application. The past experience indicates that in soils with deficient phosphorus input, the crop growth is adversely affected. Excess quantities of phosphorus are also not useful for the crop production. There is an optimum limit beyond which it will be either detrimental to the crop or would be an economic loss. Therefore, phosphorus must be applied at the proper rates. Dawood (1994) stated that highest values of yield and its components in lentil were obtained for plants receiving 20 to 30 kg P_2O_5 while Azad *et al.* (1991) reported 60 kg ha^{-1} as proper rate. The present study was carried out to assess the appropriate doses of phosphorus and herbicide Orifan for better lentil yield. Materials and Methods

The study was carried out during 1996-97 on two lentil varieties namely Masoor 93 and 91517. The experiment was laid out in a split plot design with varieties in main plots and treatments in sub plots. The experiment comprised of nine treatments replicated thrice for each cultivar. Phosphorus fertilizer was added at three levels i.e 0, 30 and 60 kg ha^{-1} with first irrigation and Orifan w sprayed with knap sack sprayers as pre-emergen treatment just after sowing at three different rates i.e. 1.5 (half of recommended rate), and 3.0 litre h (recommended rate), to each level of phosphorus fertiliz All other cultural practices were common for vario treatments.

Herbicidal activity index (HAI) value was calculated fo days after herbicide spray. The data for various parame of lentil crop were collected and analyzed using analysis variance techniques and Duncan's Multiple Range Test w used to compare treatment means (Steel and Torrie, 198

Results and Discussion

The experimental field was infested by both dicot a monocot weeds. More prevalent weeds in order of th frequency in weedy check were *Anagallis arvens Coronopus didymus, Cyperus rotundus, Euphorbia prosta Melilotus parviflora* and *Poa annua,* respectively. We population got reduced by herbicide application at both t rates (Table 1). Herbicide activity index (HAI) value rang from 34 to 63 per cent in various treatments and t recommended rate of Orifan showed significantly bet control of weeds than the half rate, confirming ma previous reports (Ahuja and Yaduraju, 1995). Decrease weed population reduced weed biomass by 36-76 per ce resulting in decreased intensity of weed-crop competit and overall improvement in lentil crop.

Enhancement was observed in various yield components herbicidal application. Highly significant increase was no in number of pods per plant in plots treated by both t rates of herbicide as compared to weedy check. The resu are in agreement with Ahmad *et al.* (1996). Grain yield w increased significantly by both the rates of herbici application as compared to weedy check but recommend rate proved better than the low rate confirming ear studies for lentil crop (Kurmvanshi *et al.*, 1995). Hig rates of herbicides in legumes some times cause detrime

Table 1: Interactive effect of different rates of phosphorus and orifan in lentil crop

P_2O_5 kg ha $^{-1}$	Orifan l ha $^{-1}$	HAI	Weed biomass	Plant height	Plant weight	Pods/ plant	Seeds/ pod	100-seed wt. (g)	Yield/h (kg)
	0 .0	-	28.59 c	39 d	0.23 NS	43 e	1.26 e	2.13 c	662.0f
0	1.5	49	14.42 f	40 cd	0.16	54 de	1. 50 ab	2.13 c	832.0d
	3.0	38	6.76 h	44 abc	0.22	73 ab	1.46 bc	2.25 ab	9.5 b
	0.0	-	31.10 b	44 abc	0.16	55 d	1.36 cd	2.18 bc	683.0f
30	1.5	34	17.04 e	41 bcd	0.27	75 ab	1.50 ab	2.15 c	877.0c
	3.0	63	9.71 g	40 cd	0.20	72 ab	1.42 cd	2.28 b	1023.0a
	0.0	-	32.89 a	45 ab	0.20	57 cd	1.46 bc	2.22 bc	758.0e
60	1.5	35	18.21 d	47 a	0.23	72 ab	1.31 de	2.28 ab	900.0c
	3.0	62	10.57 g	38 d	0.26	67 bc	1.57 a	2.33 a	1048.0a

Table 2. Response of lentil crop to various rates of phosphorus and orifan

	P_2O_5 (kg ha $^{-1}$)			Orifan (l ha $^{-1}$)			
	0	30	60	0	1.5	3.0	SE
Weed Biomass(g)	17.00	20.00	21.00	31.00	17.00	9.00	0.22
Plant Height (cm)	41.00	42.00	44.00	42.00	42.00	41.00	0.79
Dry weight (g)	0.20	0.21	0.23	0.19	0.22	0.23	0.02
Pods/plant	57.00	64.00	65.00	52.00	67.00	71.00	2.10
Seeds/pod	1.39	1.45	1.45	1.36	1.44	1.48	0.04
100-seed wt. (g)	2.17	2.21	2.28	2.18	2.19	2.29	0.018
Yield/ha(kg) 815	861.00	902.00	701.00	869.00	1008.00	7.44	

effects on crop and yield gets reduced as noted by Wall (1995) but lentil has been reported to be showing excellent tolerance to a number of grass control herbicides (Drew, 1982).

Phosphorus application yielded positive results and all the parameters exhibited greater values in both low and high phosphorus levels tried in these studies as compared with control. Significant differences were observed by application of phosphorus over control in yield components as also reported by Hussein *et al.* (1984). Consequently the grain yield got increased by 5.64 and 10.67 per cent as compared with control by low and high phosphorus over zero phosphorus, confirming earlier studies (Singh *et al.*, 1994).

Minimum yield was noted in control receiving zero phosphorus and no herbicidal spray. As it is clear form *Table 2, on individual* basis it was calculated that high rate of phosphorus brought about an increase of 10.7 per cent as compared to zero phosphorus while recommended rate of Orifan enhanced yield by 43.8 per cent over weedy check. Combined application of high phosphorus alongwith pre-emergence spray of Orifan at recommended rate brought about greatest increase of 58 per cent, over control, which can be attributed to be shared by two inputs i.e., phosphorus and herbicide spray in almost 1:4 ratio. The two varieties exhibited statistically non-significant differences in various parameters.

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