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Short comunication

Evaluation of post-emergence herbicides for weed control in lentil

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Lentil is one of the important *rabi* pulse crops of India. Heavy infestation of weeds has become a serious problem for increasing and sustaining productivity of lentil. Weeds compete with crop for natural resources during cultivation and reduce the yield of lentil up to 87% (Punia *et al.* 2003). The degree of reduction depends upon the density and duration of infestation of weed species and fertility status of soil. For weed control in lentil, herbicides like pendimethalin (PE) and fluchloralin (PPI) have been used commercially. There is no herbicide available for use as post-emergence, therefore, there is necessity of a herbicide which may be used as post-emergence, if a farmer has missed early application. In north western plain zone of country where *Phalaris minor* is the major weed in *rabi* season, such a new herbicide has great importance. In cognizance of the above, the present investigation was undertaken.

A field experiment was conducted during winter season of 2003 at Crop Research Centre of Govind Ballabh Pant University of Agriculture & Technology, Pantnagar (Uttarakhand). The soil of the experimental site was loamy in texture with neutral soil reaction (pH 7.4) having high organic carbon (0.8%), available phosphorus (32.1 kg/ha) and available potash (185.7 kg/ha). Ten treatments (Table 1) were evaluated in randomized block design with three replications. The sowing of lentil variety 'DPL-58' was done in rows 30 cm apart on December 3, 2003 and harvested manually on April 9, 2004. Fluchloralin (1000 and 750 g/ha) as pre-plant incorporation, pendimethalin (1000 and 750 g/ha) as pre-emergence, fenoxaprop-p-ethyl (60 g/ha) and clodinafop-propargyl (40 and 60 g/ha) were sprayed at 35 days after sowing (DAS) as per treatment.

The major weeds in the experimental fields were: *Phalaris minor, Medicago denticulata, Melilotus indica, Coronopus didymus* and *Vicia sativa*. The other weeds were *Chenopodium album, Rumex acetosella, Anagallis arvensis, Vicia hirsuta* and *Fumaria parviflora.*

The lowest density of weed at 60 DAS was found with pendimethalin 1000 g/ha *fb* clodinafop-propargyl 60 g/ha except weed free. Higher dose of pendimethalin and clodinafop-propargyl significantly reduced weed density as compared to its lower doses (Table 1). Fenoxaprop-p-ethyl at 60 g/ha and clodinafop-propargyl at 40 g/ha had more weed dry matter and weed density among the herbicide treatments. This may be due to more number of broad leaf weed infestations. Yadav and Singh (1988) and Malik *et al.* (2001) also reported the promising effect of

Table 1. Effect of treatment on weed density, dry weight of weed (60 DAS), grain and straw yield of lentil

Treatment	Dose (g/ha)	Weed density (No/m^2)	Weed dry weight (g/m^2)	Grain yield (kg/ha)	Straw yield (kg/ha)
Fenoxaprop-p-ethyl	60	6.43 (623)	5.68 (343.5)	273	408
Clodinafop-propargyl	40	6.40 (599)	5.13 (172.5)	312	508
Pendimethalin fb clodinafop-propargyl	1000 fb 60	4.35 (77)	3.92 (60.0)	755	1378
Pendimethalin fb clodinafop-propargyl	750 fb 60	5.17 (180)	4.94 (142.9)	501	744
Fluchloralin fb clodinafop-propargyl	1000 fb 60	5.66 (287)	5.35 (210.6)	493	871
Fluchloralin fb clodinafop-propargyl	750 fb 60	6.05 (423)	5.72 (310.5)	426	645
Pendimethalin	1000	4.73 (115)	5.60 (274.3)	544	775
Fluchloralin	1000	5.66 (291)	5.72 (310.6)	413	599
Weedy check	-	6.67 (791)	6.06 (434.4)	169	321
Weed-free check	-	0.00 (0)	0.00 (0.0)	1338	2008
LSD (P=0.05)		0.76	0.70	112	209

Original values given in the parentheses were subjected to log $\sqrt{x+1}$ transformation before analysis
DAS – Days after sowing

these two herbicides in reducing the population of grassy weeds, but these were ineffective against broad leaf weeds.

The lowest total weed dry matter was observed under pendimethalin at 1000 g/ha *fb* clodinafop-propargyl at 60 g/ha in the herbicidal treatments. Pendimethalin at 750 g/ha *fb* clodinafop-propargyl at 60 g/ha being at par with clodinafop at 40 g/ha and fluchloralin at 1000 g/ha *fb* clodinafop-propargyl at 60 g/ha recorded significantly lower weed dry matter than other herbicide treatments and weedy check. Among the herbicide treatments, highest grain yield and straw yield were found with pendimethalin at 1000 g/ha *fb* clodinafop-propargyl at 60 g/ha. It was due to good control of weed mixture. Fluchloralin was not found as effective as pendimethalin in increasing the grain and straw yield of lentil. Superiority of pendimethalin over fluchloralin was also reported by Dungarwal (2002).

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