

Efficacy of pre and post emergence herbicides on weed flora of urd bean under rainfed subtropical Shiwalik foothills of Jammu & Kashmir

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ABSTRACT

An experiment was conducted during *rabi* seasons of 2006 and 2007 at Pulses Research Sub-Station Samba, SKUAST-Jammu to study the efficacy of pre and post emergence herbicides in controlling weed flora of urd bean (*Vigna mungo* L.) under rainfed subtropical conditions of Jammu. The weed free treatment produced the highest seed yield and was at par with imazethapyr 250 ml/ha (post-emergence) after 15-20 days sowing. However, among the other treatments, pendimethalin (pre-emergence) 1.0 kg/ha fb 1 HW at 30 DAS was found superior in controlling the weed flora and increasing the seed yield. Unweeded check produced the lowest seed yield.

Key words: Urd bean, Pre-emergence, Post-emergence, Subtropical conditions

Urd bean (*Vigna mungo* L.) is the major *kharif* pulse crop of rainfed subtropical Shiwalik foothill conditions of Jammu & Kashmir. It is a rich source of vegetarian protein (24%), carbohydrates (60%), fat (1-5%), amino acids, vitamins and minerals. The sowing of crop is done immediately after the onset of monsoon. With the emergence of crop, weeds also emerge due to favourable environmental conditions. The weeds are reported to cause 77-85% yield loss (Singh *et al.* 1982) in the crop. The control of weeds during the critical period of crop-weed competition is very important to avoid yield losses. Moreover, the availability of labour in time and field accessibility during *kharif* season becomes the constraint in timely control of weeds. Hence selective herbicide can be one of the best alternatives for economical and timely weed control in urd bean. bio-efficacy of different pre and post emergence herbicides in comparison to hand weeding and hoeing.

MATERIALS AND METHODS

The experiment was conducted at the Pulses Research Sub-Station, Samba of SKUAST-Jammu in the *kharif* seasons of 2006 and 2007. The soil of the experimental site was sandy loam in texture, low in organic carbon (0.42%), medium in available phosphorus (14 kg/ha) and potassium (182 kg/ha) with a pH of 7.2. Nine treatments comprising weedy check, hand weeding twice at 20 and 40 days after sowing (DAS), pendimethalin 1.0 kg/ha as pre emergence, quizalofop-p-ethyl 37.5 g/ha chlorimuron ethyl 4.0 g/ha fenoxaprop-p-ethyl 50 g/ha quizalofop-p-ethyl 37.5 g/ha chlorimuron ethyl 6.0 g/ha fenoxaprop-p-ethyl 50 g/ha + chlorimuron ethyl 6.0 g/ha and imazethapyr 250 ml/ha post emergence (POE) at 15-20 DAS were evaluated in randomized block

design with three replications. The cultivar 'Uttara' was sown on 7th July 2006 in first year and on 16th July 2007 during second year at a row spacing of 30 cm. Uniform doses of 20 kg nitrogen, 17 kg phosphorus and 16 kg potassium were applied to all the plots at sowing. The recommended cultural practices and plant protection measures were followed to raise the healthy crop. Two quadrats of 25 x 25 cm were placed randomly in each plot and weeds within the quadrates were removed and after drying in hot air oven ($70 \pm 1^{\circ}\text{C}$ for 72 h), weed dry weight was recorded. Effects of crop weed competition on yield and yield attributes were also recorded for proper estimation of the treatments effect.

RESULTS AND DISCUSSION

Weed population

The predominant weed flora comprised of *Echinochloa colona* (80%), *Cynodon dactylon* (15%) and *Cyperus rotundus* (5%) in monocots whereas among dicot weeds, *Commalina bengalensis* (75%) and *Ageratum conyzoides* (15%) were predominant. All weed control treatments significantly lowered the weed population (Table 1). Among different treatments, POE application of imazethapyr 250 ml/ha at 15-20 DAS significantly controlled the weeds during both the years which was at par with two hand weeding (HW) at 20 and 40 DAS. Balyan *et al.* (1988) also reported the same finding. However, the efficacy of pendimethalin in controlling weeds in urd bean was less which might be due to continuous use of pendimethalin for last 10 years. This might have developed some localized resistance. The highest weed control efficiency (WCE) of 90.48% was also obtained with application of imazethapyr 250 ml/ha at 15-20 DAS (Table 1).

Table 1. Weed population, weed dry weight and weed control efficiency (%) as influenced by the weed control treatments in urd bean

S. No.	Treatments	Weed population		Weed dry weight		Weed control efficiency(%)	
		2006	2007	2006	2007	2006	2007
1.	Hand weeding twice at 20 and 40 DAS	3.6(12)	3.3(10)	2.7(6.4)	2.7(6.5)	80.0	81.5
2.	Pendimethalin 1.0 kg/ha as pre-emergence	5.2(26)	4.7(21)	3.2(9.1)	3.0(8.2)	66.7	69.8
3.	Quizalofop-p-ethyl 37.5 g/ha as post-emergence at 15-20 DAS for grassy weeds	8.1(65)	8.3(68)	4.5(19.1)	4.9(22.5)	38.1	40.5
4.	Chlorimuron ethyl 4.0 g/ha as post-emergence at 15-20 DAS for broad leaf weeds	8.9(78)	8.5(72)	5.8(32.4)	5.5(29.3)	25.7	26.8
5.	Fenoxaprop-p-ethyl 50 g/ha as post-emergence at 15-20 DAS for grassy weeds	6.5(41)	7.0(48)	5.2(26.5)	5.5(29.0)	60.95	62.5
6.	Quizalofop-p-ethyl 37.5 g/ha + chlorimuron ethyl 6.0 g/ha at 15-20 DAS	9.0(80)	8.5(72)	4.2(16.4)	4.4(18.4)	23.8	25.0
7.	Fenoxaprop-p-ethyl 50 g/ha + chlorimuron ethyl 6.0 g/ha at 15-20 DAS	8.5(71)	8.7(75)	3.7(12.5)	4.2(16.2)	32.5	25.2
8.	Imazethapyr 250ml/ha (post-emergence) after 15-20 days after sowing	3.3(10)	3.0(8)	2.3(4.2)	2.1(3.5)	90.4	91.2
9.	Weedy check, LSD (P=0.05)	10.3(105) 2.5	9.9(98) 1.8	8.9(77.7) 1.3	8.4(68.9) 1.0	- -	- -

Table 2. Seed yield and net returns as influenced by the weed control treatments in urd bean

S. No.	Treatments	Seed yield (kg/ha)		Net return (Rs/ha)	
		2006	2007	2006	2007
1.	Hand weeding twice at 20 and 40 DAS	735.6	732.6	19710	20580
2.	Pendimethalin 1.0 kg/ha as pre-emergence	633.5	630.2	17010	17724
3.	Quizalofop-p-ethyl 37.5 g/ha as post-emergence at 15-20 DAS	583.8	580.3	15660	16240
4.	Chlorimuron ethyl 4.0 g /ha as post-emergence at 15-20 DAS	539.5	536.0	14310	15092
5.	Fenoxaprop-p-ethyl 50 g/ha as post-emergence at 15-20 DAS	603.1	600.2	16200	16884
6.	Quizalofop-p-ethyl 37.5 g/ha + chlorimuron ethyl 6.0 g/ha 15-20 DAS	581.0	578.9	15660	16240
7.	Fenoxaprop-p-ethyl 50 g/ha + chlorimuron ethyl 6.0 g/ha 15-20 DAS	569.9	568.5	15120	15960
8.	Imazethapyr 250ml/ha (post-emergence) at 15-20 days after sowing	736.9	735.8	19710	20720
9.	Weedy check, LSD (P=0.05)	423.3 96.7	426.2 92.8	11610 -	11844 -

Weed dry weight

All the weed control treatments significantly decreased the weed dry weight. Imazethapyr application 250 ml/ha at 15-20 showed significantly lower weed dry weight (4.2g) which was at par with two (6.4g) treatment. The maximum weed dry weight was recorded in weedy check plot (77.7g) (Table 1).

Yield attributes and yield

The number of pods of urdbean/plant were observed to be the highest to the tune of 24.5 in 2006 and 23.5 in 2007 with imazethapyr 250 ml/ha at 15-20 which was at par with that of two at 20 and 40. Effective weed control in early stage of crop growth resulted in increased number of pods/plant and improvement in other yield characters of urdbean. The results were in close proximity of Srinivasan *et al.* (1992) and Ramanathan and Chandrashekhar (1998). Imazethapyr 250 ml/ha at 15-20 DAS produced significantly highest seed yield of urdbean followed by hand weeding twice at 20 and 40 DAS (Table 2).

Net profit

Highest net returns amongst the weed management

treatments in urdbean during both the years were recorded with imazethapyr 250 ml/ha at 15-20 DAS and was followed by HW twice at 20 and 40 DAS.

It can be concluded the POE application of imazethapyr 250 ml/ha at 15-20 DAS proved superior to all other options and was economically viable under rainfed subtropical conditions of Jammu & Kashmir.

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