Indian J. Weed Sci. **36** (3 & 4) : 287-289 (2004) *Short Communication*

Evaluation of Alachlor, Metolachlor and Pendimethalin for Weed Control in Rajmash *(Phaseolus vulgaris* L.*)* in Cold Desert of North-Western Himalayas

G. D. Sharma[1], J. J. Sharma[2] and Sonia Sood[3]
Highland Agricultural Research and Extension Centre, Kukumseri-175 142 (H. P.), India

In spite of congenial climatic conditions for the cultivation of high value crops, growing of rajmash (*Phaseolus vulgaris* L.) has been an important component of subsistence farming in Lahaul valley of Himachal Pradesh. Of late, the area under the crop has increased and the produce has now found place in local as well as outside markets due to its good cooking quality and taste which fetch good premium to the farmers in the market. Besides, it provides nutritious fodder to animals in this fodder scarce area where only stall feeding can be done during winter due to heavy snowfall. Due to low rainfall, course textured and low water holding capacity soils, like other crops, rajmash is also grown only under frequently irrigated conditions, resulting in severe weed infestation. Lack of adequate and timely weed management has been found to cause innumerable yield loss due to non-availability of labour inputs in time. Therefore, herbicidal weed management seems to be an appropriate proposition.

Field experiment was conducted for three consecutive summer seasons (1996-98) at Highland Agricultural Research and Extension Centre, Kukumseri, situated at an elevation of 2772 m asl representing cold deserts in high hills dry temperate area of Himachal Pradesh to evaluate weed control efficiency of herbicides in rajmash. The soil of the experimental field was loamy sand in texture, neutral in reaction, medium in available N and K and high in P content.

The herbicidal treatments constituting of pre-emergence application of alachlor and metolachlor each at 1.0 and 1.5 kg ha^{-1} and pendimethalin at 0.9 and 1.2 kg ha^{-1} were compared with hand weeding and hoeing twice (20 and 40 DAS), farmers' practice (hand weeding and hoeing 25-30 DAS) and weedy check.

The experiment was laid out in randomized block design with three replications. The rajmash cv. Triloki was sown in the last week of May each year and was raised with recommended package of practices under irrigated agro-ecosystem. The mean maximum and minimum temperatures during the crop season ranged between 22.5-31.5°C and 10.5-18.1°C, respectively. A snowfall of 15 cm was recorded on June 11 in 1998.

The experimental field was infested with *Chenopodium album* L., *C. schraderanum* Roem. and Schult., *C. bonus-henricus* L., *Althaea ludwigii* L., *Amaranthus* spp., *Digitaria sanguinalis* (L.) Scop. and *Eleusine indica* (L.) Gaertn.

Alachlor and metolachlor proved more effective on grassy weeds and significantly reduced their density as compared to pendimethalin. Higher doses of herbicides failed to cause significant reduction in grassy weed density over their respective lower doses at 55 days after sowing.

Though the total weed density was lowest in alachlor at 1.5 kg ha^{-1} treated plots but it was statistically at par with metolachlor at 1.5 kg and pendimethalin at 1.2 kg ha^{-1} (Table 1).

Significant variation in number of pods per plant, number of grains per pod and test weight was obtained due to various treatments. However, the differences were non-significant between higher doses of alachlor and metolachlor with pendimethalin at both the doses of application. Competition with weeds throughout the growth period reduced the seed yield by 41.4, 37.1 and 34% as compared to application of pendimethalin at 1.2 kg ha^{-1}, alachlor and metolachlor both at 1.5 kg ha^{-1}, respectively.

Present Address : [1, 2]Department of Agronomy; [3] Department of Vegetable Sciences, Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062 (H. P.), India.

Table 1. Effect of treatments on weeds, rajmash, cost of cultivation and net return (Three years pooled)

Treatment	Dose (kg ha^{-1})	Weed density (No. m^{-2}) at 55 DAS		Weed dry weight (g m^{-2})	No. of pods plant^{-1}	No. of grains pod^{-1}	1000-seed weight (g)	Yield (kg ha^{-1})	Cost of cultivation	Net returns
		Broad leaf	Grasses	at 55 DAS					(Rs. ha^{-1})	(Rs. ha^{-1})
Alachlor	1.0	3.69 (13.3)	1.17 (1.0)	12.0	8.3	3.9	420	2500	14870	52130
Alachlor	1.5	2.64 (6.7)	0.88 (0.3)	8.7	10.2	4.8	438	2835	15845	60955
Metolachlor	1.0	3.94 (15.3)	1.27 (1.3)	13.0	8.6	3.8	419	2436	14740	50585
Metolachlor	1.5	2.90 (8.3)	0.88 (0.3)	8.0	10.0	4.8	437	2699	15600	57545
Pendimethalin	0.9	2.64 (6.3)	2.57 (6.3)	11.3	9.3	4.4	425	2613	16125	54300
Pendimethalin	1.2	2.08 (4.0)	2.24 (4.7)	7.0	10.5	5.1	447	3040	17550	64675
Farmer's practice (Hand weeding and hoeing 25-30 DAS)		1.00 (0.7)	0.88 (0.3)	9.0	8.0	3.8	409	2100	14570	42130
Hand weeding and hoeing (20 and 40 DAS)		1.17 (1.0)	1.00 (0.7)	3.7	9.0	4.0	413	2570	16160	52890
Weedy		5.42 (29.3)	3.51 (12.0)	60.0	5.3	3.1	384	1782	12630	35370
LSD (P=0.05)		0.58	0.42	6.77	1.41	0.4	18.7	173	-	-

Figures in parentheses are the original values.

Variable input cost (Rs. l^{-1}) : Lasso (Alachlor 50 EC) 320; Dual (Metolachlor 50 EC) 320; Stomp (Pendimethalin 30 EC) 550; Hand weeding and hoeing (Per man day) 65

The highest net return (Rs. 64675 ha^{-1}) was obtained with pendimethalin at 1.2 kg ha^{-1} which was followed by alachlor at 1.5 kg ha^{-1} (Rs. 60955 ha^{-1}) and metolachlor (Rs. 57545 ha^{-1}) but the net return per rupee invested was maximum (3.85) in alachlor 1.5 kg ha^{-1} followed by metolachlor 1.5 kg ha^{-1} and pendimethalin 1.2 kg ha^{-1}.