



## Weed management with pre- and post-emergence herbicides in linseed

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India is an important linseed growing country in the world and it contributes 7% to the world linseed pool. At present, linseed is cultivated in about 500 thousand hectares with a contribution of 130 thousand tones to the annual oilseed production of the country. Its average productivity is 260 kg/ha. Madhya Pradesh has largest growing area (1.26 lakh ha) and production (0.48 lakh tones) with 382 kg/ha productivity (Anonymous 2010). The crop is being grown under input starve condition by the resource poor farmers in Indo-Gangatic plain, central and peninsular region of the country. Weeds are one of the major constraints in linseed production and yield losses due to weed infestation in linseed were 36% (Singh *et al.* 1992). Hence, the present study was aimed to find out the efficacy of pre and post emergence herbicides for weed management in linseed.

A field experiment was conducted during 2013-14 at the research farm of College of Agriculture, JNKVV, Tikamgarh (M.P.) on clay loam soil, which was medium in organic carbon, low in available nitrogen and phosphorus but medium in potassium content having neutral pH and normal electrical conductivity. The experiment was laid out in randomized block design with nine treatments, replicated thrice. The linseed variety “JLT-26” was sown with seed rate of 30 kg/ha in rows 30 cm apart with fertilizer dose of 80:40:20 kg/ha. Pre-emergence herbicides were applied on next day of sowing and post-emergence herbicides were applied at 2-3 leaf stage of weeds. Weed intensity and dry weight was recorded at 40 DAS of crop growth and weed control efficiency was worked out by dry weight of weeds at harvest.

### Weed flora

The prevalence of dicot weeds were found in experimental field constituted the higher relative density (67.7%) as compared to monocot weeds which had only 18.0% relative density. In the dicot

weeds, the intensity of *Chenopodium album* was the highest (22.9%) followed by *Convolvulus arvensis* (13.5%) and *Melilotus officinalis* (10.2%) whereas *Cynodon dactylon* was found as dominant monocot weed in the field with relative density of 19.6%.

### Weed growth

Density and dry weight of weeds were significantly reduced by all the herbicidal treatments and hand weeding over weedy check (5.04 g/m<sup>2</sup>). The significantly lowest weed density and dry weight of weeds was recorded under hand weeding twice at 20 and 40 DAS followed by pendimethalin 1.0 kg/ha + imazethapyr 1.0 kg/ha and pendimethalin 1.0 kg/ha + imazethapyr at 0.75 kg/ha. Application of imazethapyr at 100 g/ha, imazethapyr at 0.75 kg/ha and pendimethalin 1.0 kg/ha registered reduced density and dry weight of weeds over isoproturon at 1.0 kg/ha and clodinafop at 60 g/ha, whereas the highest dry weight of weeds recorded under weedy check (5.04 g/m<sup>2</sup>). The highest weed control efficiency was recorded under hand weeding twice at 20 and 40 DAS (87.2%) followed by pendimethalin 1.0 kg/ha+ imazethapyr 1.0 kg/ha (83.41%) and pendimethalin 1.0 kg/ha + imazethapyr 0.75 kg/ha (Table 1).

### Yield attributes and economics

The highest yield attributes was recorded under hand weeding twice at 20 and 40 DAS followed by pendimethalin 1.0 kg/ha + imazethapyr 1.0 kg/ha and pendimethalin at 0.75 kg/ha + imazethapyr at 0.75 kg/ha apparently owing to higher weed control efficiency under these treatments.

All the weed control treatments recorded significantly higher seed yield over weedy check (1.37 t/ha), whereas the hand weeding twice at 20 and 40 DAS registered significantly the higher seed yield (2.00 t/ha) among all the treatments and was at par with pendimethalin 1.0 kg/ha + imazethapyr 1.0 kg/ha (1.92 t/ha). The results were in line with the findings of Sharma *et al.* (1997) who reported that hand weeding twice reduced the total weed intensity as compared weedy check in linseed.

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**Table 1. Effect of herbicides on weed intensity, weed dry weight, weed control efficiency, yield attributes, seed yield and economics of linseed**

Treatment	Weed intensity (no./m <sup>2</sup> )	Weed dry weight (g/m <sup>2</sup> )	Weed control efficiency (%)	Number of capsules/plant	Number of seeds capsule	Test weight (g)	Seed yield (t/ha)	Net monetary return (x10 <sup>3</sup> /ha)	B:C ratio
Pendimethalin at 1.0 kg/ha (pre-emergence)	3.63 (12.71)	2.70 (6.83)	69.60	142.53	7.60	6.07	1.69	54.05	4.03
Pendimethalin at 1.0 kg/ha + imazethapyr at 0.75 kg/ha (pre-emergence)	2.85 (7.67)	1.83 (2.85)	82.71	153.53	8.10	6.20	1.85	54.69	2.82
Pendimethalin at 1.0 kg/ha + imazethapyr at 1.0 kg/ha (pre-emergence)	2.65 (6.61)	1.67 (2.30)	83.41	153.67	8.40	6.50	1.92	56.03	2.68
Isoproturon at 1.0 kg/ha at 2-3 leaf stage of weeds	4.43 (19.11)	3.55 (12.13)	61.57	135.33	7.20	6.00	1.63	52.49	4.10
Clodinafop at 60 g/ha at 2-3 leaf stage of weeds	4.80(22.54)	4.13 (16.52)	51.66	127.6	7.00	5.69	1.61	50.87	3.77
Imazethapyr at 75 g/ha at 2-3 leaf stage of weeds	3.63(12.71)	2.52 (5.89)	73.30	142.53	7.60	6.27	1.71	55.43	4.23
Imazethapyr at 100 g/ha at 2-3 leaf stage of weeds	3.49 (11.71)	2.51 (5.84)	77.72	152.6	8.00	6.38	1.75	56.58	4.24
Weedy check	5.76 (32.68)	5.04 (24.86)	0.00	99.33	6.00	5.25	1.37	42.95	3.67
Hand weeding twice at 20 and 40 DAS	2.01 (3.54)	1.25 (1.07)	87.21	155.13	9.10	7.00	2.00	60.93	3.18
LSD (P=0.05)	0.39	0.20	5.27	4.3	0.74	0.91	0.12	-	-

\*The data is subjected to square root transformation. Values in parentheses are original values.

Application of pendimethalin + imazethapyr 0.75 kg/ha yielded significantly more than alone application of pre-emergence pendimethalin, post-emergence isoproturon, clodinafop and imazethapyr 75 g/ha but was at par with imazethapyr 100 g/ha. Singh *et al.* (2014) also reported that imazethapyr at 100 g/ha significantly reduced the weed density in linseed. The weed control efficiency of clodinafop and isoproturon as post-emergence was recorded lower (61.6 and 51.7%) than pendimethalin and imazethapyr due to grass weed killers may not able to kill broad leaved weeds which were present in higher density in the field of linseed. These results were in close conformity with Kapur and Singh (1992). The net monetary return was the highest under hand weeding twice (₹ 60930/ha) followed by imazethapyr at 100 g/ha (₹ 56580/ha) but B:C ratio was maximum under imazethapyr at 100 g/ha (4.24) followed by imazethapyr at 75 g/ha (4.23).

### SUMMARY

Field experiment was conducted at Research farm, College of Agriculture, JNKVV, Tikamgarh during *Kharif* 2013-14 to study the effect of herbicides for controlling weeds in linseed. There was prevalence of dicot weeds in experimental field as these weeds constituted the higher relative density (67.8%) at harvest as compared to monocot weeds which had only 18.04% relative density. On the basis of results, it can be concluded that hand weeding twice at 20 and 40 DAS recorded significantly the

lowest weed density as well as weed dry weight followed by pre-emergence application of pendimethalin at 1.0 kg + imazethapyr at 1.0 kg/ha. The seed and straw yields of linseed was significantly higher under twice hand weeding at 20 and 40 DAS followed by pre-emergence application of pendimethalin at 1 kg/ha + imazethapyr at 1 kg/ha, pendimethalin at 0.75 kg/ha + imazethapyr at 1.0 kg/ha and post-emergence application of imazethapyr at 100 g/ha. The highest net monetary return obtained with twice hand weeding whereas the B:C ratio was the highest with the application of imazethapyr at 100 g/ha followed by imazethapyr at 75 g/ha.

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