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Efficacy of Herbicides on Weeds and Seed Yield of Fenugreek (*Trigonella foenum-graecum* L.)

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Fenugreek is one of the important minor spice crops in India. Weeds are important constraint in obtaining good yield. Fenugreek is slow growing crop during its initial stage and gets severe competition from the weeds during this stage. Weeds reduce the seed yield to the tune of 14.2 to 69.0% depending upon their density and duration of competition (Tripathi and Singh, 1993). Lack of adequate and timely availability of labour inputs for weed management causes innumerable yield losses. Therefore, herbicidal weed management seems to be an appropriate proposition.

The present investigation was carried out during **rabi** season of 2003 at Vegetable Research Centre of G. B. Pant University of Agriculture & Technology, Pantnagar. The soil of the experimental plot was sandy loam in texture with pH 7.16, organic matter 0.63%, total nitrogen 0.07%, available phosphorus 65.6 kg ha^{-1} and available potassium 403.9 kg ha^{-1}. A field experiment consisting of 16 treatments (Table 1) was laid out in randomized block design with three replications. Pusa Early Bunching variety of fenugreek was sown at a row spacing of 30 cm on November 22, 2003 and harvested in the month of April, 2004.

The dominant weed species in weedy plots were *Gnaphalium indicum* (47.7%), *Chenopodium album* (9.6%), *Fumaria parviflora* (7.6%), *Anagallis arvensis* (7.0%), *Phalaris minor* (6.4%), *Oxalis corniculata* (5.8%), *Cyperus rotundus* (5.5%), *Melilotus* spp. (2.4%), *Cynodon dactylon* (2.1%), *Solanum nigrum* (1.7%) and other weeds (4.2%).

The density of weeds was significantly reduced due to different weed control treatments except fluchloralin at 0.5 and 0.75 kg ha^{-1} as pre-plant incorporation and metribuzin at 0.25 kg ha^{-1} as pre-

Table 1. Effect of different treatments on weeds and crop

Treatment	Dose (kg ha^{-1})	Stage of application	Total weed density 60 DAS (No. m^{-2})	Weed dry weight 60 DAS (g m^{-2})	No. of branches $plant^{-1}$	No. of pods $plant^{-1}$	Seed yield (kg ha^{-1})
Fluchloralin	0.50	Pre-plant	6.98 (1076)	4.58 (96.5)	3.7	32.0	478
Fluchloralin	0 75	Pre-plant	6.77 (886)	3.72 (46.6)	5.6	37.2	623
Fluchloralin	1.00	Pre-plant	6.36 (590)	2.99 (22.0)	7.2	49.0	1022
Pendimethalin	0.50	Pre-em	6.38 (599)	4.66 (105.0)	5.3	46.5	1030
Pendimethalin	0.75	Pre-em	6.01 (431)	4.35 (77.0)	6.6	54.0	1127
Pendimethalin	1.00	Pre-em	5.70 (303)	3.69 (39.0)	7.1	56.0	1189
Isoproturon	0.50	Pre-em	6.56 (723)	4.93 (138.0)	3.2	30.6	327
Isoproturon	0.75	Pre-em	6.14 (498)	4.61 (10.0)	4.1	32.0	369
Isoproturon	1.00	Pre-em	5.82 (354)	4.16 (68.0)	5.0	36.1	538
Metribuzin+hand weeding	0.15	Pre-em+40 DAS	2.21 (10)	1.17 (2.5)	9.4	55.3	1578
Metribuzin	0.25	Pre-em	6.92 (1020)	4.93 (138.0)	4.3	38.7	603
Metribuzin	0.35	Pre-em	6.27 (532)	4.46 (86.0)	5.8	44.8	683
Metribuzin	0.35	Post-em	3.38 (37)	2.86 (16.6)	4.4	28.6	135
Hand weeding	-	20/40 DAS	3.38 (37)	0.21 (0.2)	8.2	55.9	1523
Weed-free	-	-	0.0(0)	0.0 (0)	10.3	57.8	1691
Weedy	-	-	7.29 (1468)	5.59 (268.0)	2.9	23.8	106
LSD (P=0.05)	-	-	0.70	0.52	1.4	10.29	134

Original values given in parentheses were subjected to log (X+1) transformation.

emergence. Metribuzin at 0.15 kg ha^{-1}+hand weeding at 40 DAS reduced weed density most effectively (Table 1). All the treatments significantly reduced the weed dry matter production as compared to weedy check. Hand weeding at 20 and 40 DAS was most effective in reducing dry matter accumulation followed by metribuzin at 0.15 kg ha^{-1}+hand weeding at 40 DAS. Metribuzin at 0.15 kg ha^{-1} as pre-emergence+hand weeding at 40 DAS being at par with weed-free check increased the number of branches per plant significantly over control. Hand weeding at 20 and 40 DAS, fluchloralin at 1.0 as PPI and pendimethalin at 1.0 kg ha^{-1} as pre-emergence also proved promising in increasing the branches per plant significantly over control. The higher number of pods per plant was recorded in weed-free treatment which was closely followed by pendimethalin at 0.1 kg ha^{-1} as pre-emergence, hand weeding at 20 and 40 DAS and metribuzin at 0.15 kg ha^{-1}+hand weeding at 40 DAS. Increasing dose of herbicides increased the number of branches and number of pods per plant considerably. On an average the uncontrolled growth of weeds resulted in 93.7% reduction in seed yield of fenugreek when compared with weed-free check. Mali and Suwalka (1987) also reported 91.4% yield reduction due to uncontrolled weeds. Metribuzin at 0.15 kg ha^{-1} with weeding at 40 DAS being on par with weed-free treatment provided significantly higher seed yield over rest of the treatments, due to better control of weeds. Two hand weedings at 20 and 40 DAS being on par with metribuzin at 0.15 kg ha^{-1}+hand weeding at 40 DAS also proved effective in increasing seed yield of this crop. Pendimethalin and fluchloralin each at 1.0 kg ha^{-1} also proved promising and increased seed yield significantly over control.

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