



# Integrated weed management in fenugreek (*Trigonella foenum graecum* L.) in semi arid regions of Rajasthan

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**Abstract :** A Field experiments was conducted during *Rabi* seasons of 2008-09 and 2009-10 to study the effect of integrated weed management practices on yield and yield attributes of fenugreek (*Trigonella foenum graecum* L.). Results revealed that two hand weedings at 25 and 45 days after sowing (DAS) recorded minimum dry matter yield of weeds, maximum weed control efficiency (94.5 %). Among the herbicides, pre-emergence application of pendimethaline @ 0.5 kg ai/ha + 1 hand weeding at 35DAS was most effective in reducing dry matter yield of weeds. It had positive effect on yield attributes which resulted into significantly higher seed (1573 kg/ha) and straw yield (4587 kg/ha), which were statistically at par with yields obtained under two hand weeding. The improvement in seed yield (41.20%) and additional returns by Rs. 5076 per hectare due to pre-emergence application of pendimethaline @ 0.5 kg ai/ha + 1 hand weeding at 35 DAS over weedy check.

**Key Words :** Fenugreek, Pendimethalin, Pod yield, B: C ratio

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## INTRODUCTION

Fenugreek (*Trigonella foenum graecum* L.) is a leguminous seed spices in North-Western India as an important condiment crop during winter season. It is a multipurpose crop and has several medicinal uses. It's seeds substantially contain the steroid substances diosgenin which is used as a base material in the synthesis of sex hormones in oral contraceptive. Weeds have been identified as an important constraint in realizing the genetic yield potential of this valuable crop through creating biotic stress. Tripathi and Singh (1994) concluded that the weeds offered maximum competition upto 25-30 days of sowing in fenugreek resulting in drastic reduction in seed yield. The reduction in growth and yield of fenugreek due to weeds was reported upto 91.4 % (Mali and Suwalka, 1987). Therefore, the present investigation was undertaken to find out the most effective weed control practice for fenugreek crop.

## MATERIAL AND METHODS

The field experiment was conducted during *Rabi* season of 2008-09 and 2009-10 at research farm of Rajasthan Agricultural Research Institute, Durgapura, Jaipur (Rajasthan) situated in the semi arid eastern plain zone of the state of Rajasthan. The soil of the experimental field was loamy sand in texture and alkaline in reaction (pH, 8.15) with low available (N 134.0 kg/ha) and medium in available phosphorus (26 kg P<sub>2</sub>O<sub>5</sub>/ha) and potash (170 kg K<sub>2</sub>O /ha). The field experiment, comprising combinations of three dates of planting viz., 17<sup>th</sup> October, 1<sup>st</sup> November and 16<sup>th</sup> November allotted to main plots and 9 weed control treatments allotted to sub-plots was laid out in split-plot design with four replications. Weed control treatments consisted of weedy check, one hoeing at 25 DAS, two hoeing at 25 and 45 DAS, pre plant incorporation of fluchloralin and pre emergence application of pendimethalin @ 0.75 and 1.0 kg/ha as sole herbicides and @ 0.5 kg / ha in integration with hoeing at 35 DAS. The crop was raised with

recommended package of practices. The treatments were evaluated in terms of weed dry matter production at 60 and 90 DAS, yield attributes (number of pods/plant, seeds/pod and test weight) and seed and straw yield. Besides, weed index weed control efficiency and economics of each treatment was also computed. Weed control efficiency was calculated as per the formulae given below as suggested by Patil and Patil (1983).

$$\text{WEC}(\%) = \frac{\text{DMC} - \text{DMT}}{\text{DMC}} \times 100$$

where, DMC is dry matter weight of weeds in control plot and DMT is dry matter weight of weeds in treated plot.

The weed index was calculated as per the formulae suggested by Gill and Kumar (1969).

$$\text{WI}(\%) = \frac{X - Y}{X} \times 100$$

where X is yield from weed free plot and Y is yield from treated plot.

## RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

### Effect on weed dry matter:

The weed control treatments achieved significant control of weeds at both the stages under study (60 and 90 DAS) compared to weedy check (Table 1).

The lowest weed dry matter (25.8 and 125 kg/ha) were recorded with two hand weeding at 25 and 45 DAS, while the highest dry matter of weeds (1222.8 and 2258 kg/ha) was recorded under weedy check at 60 and 90 DAS, respectively. Among the treatments, pre emergence application of pendimethalin @ 0.5 kg/ha + one hoeing at 35 DAS was next effective treatment (63.2 and 208 kg/ha) after two hand weeding.

Weed control efficiency (WCE) was highest with two hand weeding closely followed by pre emergence application of pendimethalin + one hoeing (90.8%) as both the treatments provided weed free situation during the critical periods of crop weed completion upto 60 days.

Similarly the weed index values were lowest (0.94) under pre emergence application of pendimethalin + one hoeing at 35 DAS followed by pre emergence application of pendimethalin @ 1.0 kg/ha (6.86). The results are in conformity with the findings of Sharma (2009) who also reported promising control of weeds in fenugreek with hand weeding twice and penmdimethalin applied alone or in combination with one hand weeding.

Table 1: Effect of weed control treatments on weed dry matter, yield attributes and productivity of fenugreek (pooled over 2008-09 and 2009-10)

Treatments	Weed dry matter yield kg/ha (pooled)		Yield attributes (Pooled)				Plant stand (Pooled) At harvest	Seed yield kg/ha Pooled	Straw yield kg/ha Pooled	Net return (Rs./ha)	Weed index Mean	Additional returns over control
	60 DAS	90 DAS	WCE	Fods/plant	Seeds/pod	Weight test						
Weedy check	1222.8	2258	.	12.83	11.21	12.23	7.98	1114	3126	8643	29.85	-
One hoeing at 25 DAS	234.0	84.0	62.8	17.53	12.18	12.45	8.58	1254	3629	9865	21.03	1222
Two hoeing at 25 and 45 DAS	25.3	125	94.5	23.67	13.43	13.00	9.67	1388	4631	13917	-	5274
Fluchloralin @ 0.75 kg/ha	456.7	1081	52.1	17.18	12.23	12.47	8.55	1227	3611	9621	22.73	978
Fluchloralin @ 1.0 kg/ha	422.8	1064	52.9	18.11	12.46	12.57	8.77	1306	3802	10517	17.76	1874
Fluchloralin @ 0.75 kg/ha- One hoeing at 35 DAS	80.5	468	79.3	19.28	12.67	12.73	9.10	1414	4097	11651	10.96	3008
Pendimethalin @ 0.75 kg/ha	429.5	973	56.9	18.81	12.56	12.55	8.97	1377	3968	11280	13.29	2637
Pendimethalin @ 1.0 kg/ha	406.5	959	57.5	21.08	12.92	12.73	9.31	1479	4281	12404	6.86	3761
Pendimethalin @ 0.5 kg/ha+ One hoeing at 35 DAS	63.2	208	90.8	23.20	13.35	12.98	9.63	1573	4587	13719	0.94	5076
S.E. +	10.78	15.5	.	0.26	0.18	0.18	0.18	30	87	188	-	-
C.D. (P=0.05)	30.12	43.3	.	0.72	0.50	NS	0.50	85	243	525	-	-

DAS= Days after sowing, NS= Non-significant, WCE= Weed control efficiency

**Effect on crops:**

All the weed control measures significantly influenced yield attributes, seed and straw yield of fenugreek over weedy check (Table 1). Significantly the lowest values of the number of pods/plant (12.83), seeds /pod (11.21), test weight (12.23 g), seed yield (1114 kg/ha) and straw yield (3126 kg/ha) were recorded under weedy check. Thus when compared with a pooled mean yield of 1114 kg/ha recorded under weedy check, hand weeding twice, pre emergence application of pendimethalin @ 0.5 kg/ha applied in integration with one hand weeding enhanced the seed yield significantly by 42.55 and 41.20 per cent and additional return by Rs. 5274 and Rs. 5076 per hectare, respectively.

Similarly, pendimethalin applied alone @ 1.0 kg/ha, despite achieving moderate control of weeds was found to be more effective than other sole herbicides or one hand weeding improved seed yield and net returns substantially by 32.8% and Rs. 3761 per hectare, respectively over weedy check.

Better yield attributes and seed yield of fenugreek under these treatments is probably due to effective control of weeds which reduced competition for light, nutrient and

water thereby enabling the crop to absorb more nutrients and water. Similar results were also reported by Mehta *et al.* (2010) and Sharma (2009).

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