



Production potential of fenugreek as influenced by weed management practices

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Fenugreek is one of the most important condiment crops of country in general and Rajasthan in particular. The state contributes the major share of India's production, accounting for almost 80%. The state accounts for 82.35 thousand ha area with production of 87.38 thousand tones and the productivity of 1.06 t/ha (National Horticultural Board 2011-12). It is a winter season crop having multiple uses and its every part is consumed in one or the other form. The crop is used as a spice, as a vegetable for human consumption, as forage for cattle and to some extent for medicinal purposes. Weeds have been identified as a serious drawback in achieving its potential yield. Weeds reduce grain yield of this crop upto an extent of 86% (Tripathi and Singh 2008). Scarcity of labour and their increasing wages compel the farmers to opt the alternative of manual weeding. Therefore, the present investigation was under taken to find out the most effective weed management practice in fenugreek.

A field experiment was conducted during *Rabi*, 2011 at Instructional Farm, Rajasthan College of Agriculture, Udaipur (Rajasthan). The soil of the experimental field was clay loam having pH 8.2, organic carbon 0.75% and available N, P and K₂O₅ 87.0, 20.10 and 340.0 kg/ha, respectively. The experiment was laid out in a randomized block design with 12 treatment combinations comprising pendimethalin 1.0 kg/ha (pre-emergence application (PE)), pendimethalin 0.75 kg/ha PE, pendimethalin 0.75 kg/ha PE followed by (*fb*) manual weeding (MW) 40 DAS, metribuzin 0.20 kg/ha PE, metribuzin 0.15 kg/ha PE, metribuzin 0.15 kg/ha PE *fb* MW 40 DAS, oxyfluorfen 0.15 kg/ha PE, oxyfluorfen 0.10 kg/ha PE, oxyfluorfen 0.10 kg/ha PE *fb* MW 40 DAS, one hand weeding (HW) 20 days after seeding (DAS), HW 20 and 40 DAS and weedy check. The treatments were replicated four times. Fenugreek variety '*R.Mt.-1*' was sown on 6 Novem-

ber, 2011 in 5.0 x 3.6 m gross plot size at 30 x 10 cm spacing. The crop was fertilized with uniform dose of 40 kg N and 40 kg P₂O₅/ha through urea and DAP, respectively at the time of sowing. All the herbicidal treatments were applied using 750 liters of water/ha with the help of knapsack sprayer fitted with flat fan nozzle. In each plot, monocot and dicot weeds were counted from two randomly selected area of 0.25 m² using 0.5 x 0.5 m quadrat and converted into one square meter and subjected to square root transformation. At harvest all the weeds of net plot were harvested and categorized as monocot and dicot weeds and were dried in oven to obtain the biomass. Weed control efficiency was calculated on the basis of weed biomass using the standard formula. Observations on other parameters were taken following standard procedures.

Weed flora of experimental field comprised of *Chenopodium album*, *Chenopodium murale*, *Convolvulus arvensis*, *Parthenium hysterophorus*, *Cynodon dactylon* and *Phalaris minor*. Overall the experiment was dominated by dicot weeds.

All the weed management practices significantly reduced density of monocot, dicot and total weeds at 60 DAS compared to weedy check. Similarly, all weed management practices significantly reduced biomass of monocot, dicot and total weed at harvest compared to weedy check (Table 1). The lowest density of monocot (1.87/m²), dicot (3.5/m²) and total weed (3.90/m²) at 60 DAS was recorded in pendimethalin 0.75 kg/ha *fb* manual weeding 40 DAS compared to weedy check wherein density of monocot (3.80/m²), dicot (8.29/m²) and total weeds (9.09/m²) were recorded the highest. However, this treatment was closely and non-significantly followed by two MW at 20 and 40 DAS.

The lowest weed biomass of monocot, dicot and total weeds at harvest (0.16, 0.37 and 0.53 t/ha, respectively) was also recorded with pendimethalin 0.75 kg/ha *fb* MW at 40 DAS compared to weedy check which

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Table 1. Influence of weed management practices on weed density at 60 DAS, weed biomass and WCE at harvest

Treatment	Weed density (m ²)			Weed biomass (t/ha)			Weed control efficiency (%)		
	Monocot	Dicot	Total	Monocot	Dicot	Total	Monocot	Dicot	Total
Pendimethalin 1.0 kg/ha	2.44 (5.5)	4.91(23.7)	5.45(29.2)	0.21	0.45	0.66	47.5	57.6	54.7
Pendimethalin 0.75 kg/ha	2.74 (7.0)	5.27(27.2)	5.89(34.2)	0.23	0.46	0.69	44.1	56.4	52.8
Pendimethalin 0.75 kg/ha <i>fb</i> manual weeding 40 DAS	1.87 (3.0)	3.50(11.7)	3.90(14.7)	0.16	0.37	0.53	60.5	65.1	63.7
Metribuzin 0.20 kg/ha	2.73 (7.0)	5.12(25.7)	5.76(32.7)	0.23	0.46	0.69	43.9	56.3	52.7
Metribuzin 0.15 kg/ha	2.91 (8.0)	5.33(28.0)	6.04(36.0)	0.24	0.48	0.71	41.9	55.1	51.1
Metribuzin 0.15 kg/ha <i>fb</i> manual weeding 40 DAS	2.00 (3.5)	3.93(15.0)	4.34(18.5)	0.18	0.38	0.56	56.9	63.8	61.7
Oxyflourfen 0.15 kg/ha	2.86 (7.7)	5.50(29.2)	6.11(36.9)	0.24	0.47	0.71	41.2	55.7	51.7
Oxyflourfen 0.10 kg/ha	2.95 (8.2)	5.62(31.5)	6.32(39.5)	0.26	0.48	0.74	37.3	54.3	49.4
Oxyflourfen 0.10 kg/ha <i>fb</i> manual weeding at 40 DAS	2.23 (4.5)	4.26(17.7)	4.76(22.2)	0.17	0.40	0.57	57.4	62.1	60.6
HW at 20 DAS	2.64 (6.5)	5.03(25.0)	5.64(31.5)	0.22	0.46	0.69	45.1	56.1	52.9
HW at 20 and 40 DAS	2.05 (3.7)	3.56(12.2)	4.05(15.9)	0.16	0.38	0.54	61.0	64.0	63.0
Weedy check	3.80(14.0)	8.29(68.2)	9.09(82.2)	0.41	1.06	1.47	-	-	-
LSD (P=0.05)	0.64	0.58	0.58	0.05	0.06	0.09	-	-	-

Figures in parentheses are mean of original values; Data subjected to square root transformation

Table 2. Influence of weed management practices on yield, yield attributes, net returns, B:C ratio in fgenugreek

Treatment	Pods/ plant	Seeds/ pod	Test weight (g)	Seed yield (t/ha)	Haulm yield (t/ha)	Harvest index (%)	Net returns (x10 ³ /ha)	B:C ratio
Pendimethalin 1.0 kg/ha	34.14	13.24	11.81	1.32	2.14	38.19	29.20	2.37
Pendimethalin 0.75 kg/ha	33.26	12.34	10.93	1.26	2.07	37.78	27.39	2.31
Pendimethalin 0.75 kg/ha <i>fb</i> manual weeding 40 DAS	39.24	15.10	13.04	1.64	2.50	39.55	39.58	2.74
Metribuzin 0.20 kg/ha	33.32	12.28	11.23	1.20	2.09	36.66	26.04	2.29
Metribuzin 0.15 kg/ha	32.47	11.57	11.01	1.19	2.01	37.11	25.47	2.27
Metribuzin 0.15 kg/ha <i>fb</i> manual weeding 40 DAS	35.33	13.70	12.16	1.42	2.39	37.16	32.65	2.49
Oxyflourfen 0.15 kg/ha	31.46	11.91	10.69	1.16	1.99	37.02	24.13	2.17
Oxyflourfen 0.10 kg/ha	30.63	11.64	10.25	1.13	1.92	37.14	23.04	2.13
Oxyflourfen 0.10 kg/ha <i>fb</i> manual weeding at 40 DAS	33.87	13.23	12.35	1.38	2.28	37.72	30.82	2.39
HW at 20 DAS	32.46	11.97	10.76	1.21	1.97	37.96	23.74	2.06
HW at 20 and 40 DAS	37.27	14.19	12.44	1.51	2.42	38.43	32.25	2.27
Weedy check	28.83	10.21	9.29	0.89	1.54	36.56	14.86	1.76
LSD (P=0.05)	3.13	1.42	0.88	0.21	0.29	NS	-	-

was at par with MW carried out at 20 and 40 DAS. The results are analogous to those reported by Sharma (2009). Heavy weed density and biomass of weed under weedy check were reported earlier by Bodake *et al.* (2012). The highest total weed control efficiency (63.7%) was also recorded with application of pendimethalin 0.75 kg/ha integrated with MW at 40 DAS followed by two manual weeding (63.0%), while minimum (49.4%) with oxyflourfen 0.10 kg/ha PE.

Among weed management practices, application of pendimethalin 0.75 kg/ha *fb* MW carried out at 40 DAS as well as two manual weeding carried out at 20 and 40 DAS being at par significantly increased

Pods/plant, seeds/pod, 1000-seed weight, seed, haulm and biological yield compared to weedy check (Table 2). The highest yield and yield attributes under these treatments were attributed due to lower crop-weed competition. The maximum seed (1.64 t/ha) and haulm yield (2.50 t/ha) were obtained under application of pendimethalin 0.75 kg/ha *fb* MW carried out at 40 DAS which was at par with manual weeding carried out at 20 and 40 DAS (1.51 t/ha and 2.42 t/ha, respectively).

Harvest index did not significantly influence by any weed management practices. Recorded higher

yield and yield attributes under influence of pendimethalin 0.75 kg/ha fb MW carried out at 40 DAS and two manual weeding carried out at 20 and 40 DAS corroborates with the findings of Mehta *et al.* (2010) and Choudhary *et al.* (2012). Maximum net return (₹ 39,582 /ha) and benefit : cost ratio (2.74) were obtained with application of pendimethalin 0.75 kg/ha fb MW carried out at 40 DAS which was followed by metribuzin 0.15 kg/ha fb manual weeding at 40 DAS.

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