

Cultural and chemical weed control in Indian mustard (*Brassica juncea*)

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ABSTRACT

A field experiment was carried out during 1990 and 1991 to study cultural and chemical weed control in Indian mustard (*Brassica juncea* (L.) Czernj. & Cosson) at Gwalior. All the herbicides and cultural treatments significantly reduced dry-matter production by weeds over the control. The highest seed yield was obtained in weed-free treatment, followed by 2 hand-weedings (at 30 and 45 days after sowing) and in plots treated with fluchloralin @ 0.75 kg ai/ha at pre-planting.

Weeds cause enormous damage to crop, depending on weed population in the field. The higher fertilizer and irrigation to crops favour high intensity of infestation of weed species. Manual weeding is costly due to scarcity of labour at the time of weeding. The present investigation was planned to get a comparable information on chemical and mechanical measures to control the weeds in Indian mustard (*Brassica juncea* (L.) Czernj. & Cosson).

MATERIALS AND METHODS

An experiment was conducted during 1990 and 1991 at Gwalior, Madhya Pradesh. The experiment comprising 6 treatments, viz. weed-free, 1 hand-weeding at 30 days after sowing, 2 hand-weedings at 30 and 45 days, fluchloralin application @ 0.75 kg ai/ha at pre-planting stage, pendimethalin @ 0.75 kg ai/ha at pre-emergence stage and weedy check. The treatments were replicated 4 times in randomized block design. The soil of the experimental field was sandy loam containing

available N 103 kg/ha, available P_2O_5 25.8 kg/ha and available K 263.5 kg/ha, with pH 7.6 and organic carbon 0.42%. 'Pusa Bold' Indian mustard was sown between 15 and 20 October using 4 kg seed/ha. The crop received a basal dose of 40 kg N, 40 kg P_2O_5 and 20 K_2O /ha. Nitrogen @ 40 kg/ha was top-dressed at first irrigation (30 DAS).

RESULTS AND DISCUSSION

Weed flora

On the basis 2-year average important weed species in descending order of their relative intensity of infestation basis in weedy check were: *Asphodelus tenuifolius* Cav. (31.15%), *Cyperus rotundus* L. (23.30%), *Cynodon dactylon* (L.) Pers. (22.10%), *Chenopodium album* L. (14.22%) and *Melilotus indica* All. (7.03%). Total dry-weed weight was more in 1990 than that in 1991 (Table 1).

Effect on weed

The maximum dry weight of weed was recorded at harvest in the weedy check in

Table 1. Density (No./m²) and dry weight (g/m²) of weeds at harvest as influenced by weed-control treatments

Treatment	<i>Cyperus rotundus</i>		<i>Cynodon dactylon</i>		<i>Asphodelus tenuifolius</i>		<i>Chenopodium album</i>		<i>Melilotus indica</i>		Total dry-weed weight (g)	
	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
Weed-free	0	0	0	0	0	0	0	0	0	0	0	0
1 hand-weeding at 30 DAS	21 (48)	21 (35)	42 (105)	37 (90)	25 (80)	37 (70)	18 (57)	11 (27)	3 (10)	1 (4)	315	240
2 hand-weedings at 30, 45 DAS	15 (39)	14 (25)	33 (78)	26 (32)	19 (35)	29 (44)	2 (5)	6 (7)	2 (5)	1 (2)	185	120
Fluchloralin @ 0.75 kg ai/ha as pre-planting	28 (62)	33 (48)	16 (36)	28 (41)	29 (65)	17 (25)	8 (18)	5 (8)	3 (7)	2 (3)	220	145
Pendimethalin @ 0.75 kg ai/ha as pre-emergence	32 (75)	33 (52)	21 (49)	24 (38)	30 (71)	25 (40)	2 (4)	6 (9)	5 (11)	1 (2)	232	157
Weedy check (control)	22 (142)	24 (125)	24 (155)	20 (102)	28 (180)	34 (170)	14 (92)	14 (72)	8 (55)	5 (28)	640	512
CD (P = 0.05)	9.01	11.52	24.0	6.81	21.35	13.58	6.01	0.9	0.75	0.48	120	117

DAS, Days after sowing

Figures in parentheses are actual weed density (No./m²)

Table 2. Yield, yield attributes and quality characters of Indian mustard as influenced by weed-control treatments

Treatment	Siliquae/ plant		Siliqua length (cm)		Seeds/ siliqua		1,000-seed weight (g)		Yield (q/ha)	
	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
Weed-free	257.41	337.30	4.85	5.10	14.83	15.25	5.32	5.44	18.84	22.49
1 hand-weeding at 30 DAS	135.00	216.25	4.43	4.68	12.33	12.75	4.96	5.08	15.30	15.05
2 hand-weedings 30 and 45 DAS	227.50	307.50	4.81	5.06	12.95	13.37	5.27	5.39	16.79	18.35
Fluchloralin @ 0.75 kg ai/ha as pre-planting	207.35	287.50	4.72	4.97	12.13	12.55	5.17	5.29	16.75	18.17
Pendimethalin @ 0.75 kg ai/ha as pre-emergence	168.18	248.32	4.50	4.75	12.28	12.70	4.98	5.10	16.70	15.40
Weedy check (control)	85.32	142.50	4.33	4.58	10.80	11.30	4.01	4.13	14.00	12.12
CD (P = 0.05)	24.10	28.52	0.12	0.90	1.04	0.98	0.09	0.11	2.04	2.55

both the years, as the weeds were allowed to grow unchecked in these plots. All the herbicides and cultural operations decreased the dry matter and weed density than the weedy check. Weed-free treatment was most effective in reducing the dry-matter production as well as weed density. Next in order was 2 hand-weedings at 30 and 45 days after sowing and fluchloralin @ 0.75 kg ai/ha as pre-planting application compared with 1 hand-weeding at 30 days and pendimethalin @ 0.75 kg ai/ha as pre-emergence in both the years (Table 1). Two hand-weedings at 30 and 45 days significantly reduced the dry matter of all types of weed and weed densities except in case of *Cyprus rotundus* and *Cynodon dactylon*, which showed pre-emergence of the population in the treatment plots. Pre-planting application of fluchloralin @ 0.75 kg ai/ha was more found effective than pendimethalin @ 0.75 kg ai/ha as pre-emergence.

Effect on crop

There were significant differences in respect of number of siliquae/plant, length of siliqua (cm), number of seeds/siliqua and 1,000-seed weight (g) due to various weed-control treatments (Table 2). Maximum values of yield-attributing characters were recorded in weed-free treatments, closely followed by 2 hand-weedings at 30 and 45 days and fluchloralin @ 0.75 kg ai/ha as pre-

planting application, and the minimum in the weedy check. All the weed-control treatments caused significant improvement in grain yield over the weedy check except in 1 hand-weeding at 30 days only in 1990. Besides weed-free treatment, other treatments were equally effective in increasing the seed yield (q/ha) over the weedy check in 1990. During 1991, 1 hand-weeding at 30 days and pendimethalin @ 0.75 kg ai/ha resulted in less yields than the other treatments except in the weedy check. The higher yields in these treatments were due to satisfactory control of most of the weed species occurring in the experimental plots. Similar results were also obtained by Gill *et al.* (1984), De and Reddy (1987) and Mishra *et al.* (1990).

REFERENCES

- De, G. C. and Reddy, A. P. K. 1987. Effect of different herbicides in controlling weeds in yellow sarson (c.v. B-9). *Indian Journal of Weed Science* **19** (3, 4) : 123-128.
- Gill, H. S., Sandhu, K. S., Mehra, S. P. and Singh, Tarlik. 1984. Studies of chemicals on weeds in Indian mustard (*Brassica juncea*). *Indian Journal of Weed Science* **16** (3) : 171-175.
- Mishra, V. K., Kurchania, S. P. and Tiwari, T. P. 1990. Effect of cultural and herbicidal methods of weed control in mustard (*Brassica juncea*) Var. Varuna. Paper presented in *Biennial Conference of ISWS-ICAR*, held during March 4-5 at Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh, 80 pp.