

Integrated weed management in okra (*Hibiscus esculentus*)

A.R. SHAIKH, O.G. LOKHANDE AND R.H. BHOSLE

All-India Co-ordinated Research Project on Weed Control, Department of Agronomy,
Marathwada Agricultural University, Parbhani, Maharashtra 431 401

Received: October 2001

ABSTRACT

A field experiment was conducted during the rainy (*kharif*) season of 1998–2000 to find out the efficacy of weed-management practices in okra (*Hibiscus esculentus* L.). The result indicated that, the highest weed-control efficiency was achieved with 2 hand-weedings each followed by hoeing. The next best treatment was Fluchloralin @ 0.90 kg/ha + 1 hand-weeding and hoeing (HW&H) 6 weeks after sowing (WAS). The highest fruit yield was recorded under Fluchloralin 0.90 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing. Similar trend was observed for net monetary returns/ha. Yield reduction to the extent of 68% was recorded due to unchecked weeds.

Key words : Okra, Integrated weed management, Fluchloralin

Okra is one of the important fruit vegetable crops of Maharashtra, grown in monsoon and summer seasons of the year. During the monsoon weeds dominate and become one of the important factors in reduction of productivity of the crop. Labour cost and many times inaccessible field condition become major constraint for physical weeding. Hence integration of chemical and physical methods becomes an important tool for controlling the weeds. The present study was carried out to identify suitable integrated method for effective control of weeds in okra.

MATERIALS AND METHODS

A field experiment was conducted during the monsoon season of 1998, 1999

and 2000 at Marathwada Agricultural University, Parbhani. The soil was medium black, having 7.5 pH value, low in available N, P and high in K content. 'Parbhani Kranti' okra was dibbled at 60 cm × 30 cm. The NPK was applied @ 100, 50 and 50 kg/ha. The treatments comprised unweeded control (T_1), 2 hand-weedings and hoeing each at 3 and 6 weeks after sowing (T_2); pre-plant incorporation (ppi) of Fluchloralin @ 1.35 kg ai/ha (T_3); ppi of Fluchloralin @ 0.90 kg ai/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing (T_4); pre-emergence (PE) Pendimethalin @ 1.0 kg ai/ha (T_5); PE Pendimethalin @ 0.75 kg ai/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing (T_6); PE

Metolachlor @ 1.5 kg ai/ha (T_7); PE Metolachlor @ 1.0 kg ai/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing (T_8); PE Oxyfluorfen @ 0.15 kg ai/ha (T_9); PE Oxyfluorfen 0.10 kg ai/ha supplemented with 1 hand weeding and hoeing at 6 week after sowing (T_{10}). The data on dry weed weight at harvest (g/m^2) and fruit yield (q/ha) were collected. Different weed species were also recorded. The weed-control efficiency and weed index were calculated as per standard method.

RESULTS AND DISCUSSION

Weed flora

The density of grassy and broad-leaved weeds in experimental field was found 47% and 53% respectively. The dominant grassy weeds were *Cynodon dactylon* (L.) Pers., *Commelina benghalensis* L. and *Brachiaria eruciformis*, *Cyperus rotundus*, while among the broad-leaved weeds, *Acalypha indica*, *Phyllanthus mederaspatensis*, *Parthenium hysterophorus* and *Euphorbia hirta*.

Weed weight and weed-control efficiency

Significant differences were recorded in dry weed weight at harvest. Mean values of 3 years indicated lowest dry weed weight in 2 hand-weedings and hoeing at 3 and 6 weeks after sowing, followed by pre-plant incorporation of Fluchloralin 0.90 kg/ha + 1 hand-weeding and hoeing at 6 weeks after sowing. Saimbhi *et al.* (1994) also reported the lowest dry weed weight with the application of Pendimethalin and Fluchloralin. Weed-control efficiency was found equally superior in 2 hand-weedings and

hoeing at 3 and 6 week after sowing (47%), Fluchloralin 0.90 kg/ha (46%) and Pendimethalin 0.75 kg/ha (44%) each supplemented with hand-weeding and hoeing at 6 weeks after sowing.

Yield attributes : Yield/plant, pods/plant and plant height were significantly influenced by different treatments. Highest yield/plant, pods/plant and plant height were observed in Pendimethalin 0.75 kg/ha supplemented with 1 hand-weeding and hoeing 6 weeks after sowing which was at par with fluchloralin 0.90 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing and 2 hand-weedings and hoeing at 3 and 6 weeks after sowing.

Green-pod yield and monetary returns

In pooled analysis over 3 years, significant differences in fruit yield were recorded due to various treatments. Highest yield was recorded under pre-plant incorporation Fluchloralin 0.90 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing which was on par with Pendimethalin 0.75 kg/ha supplemented with hand-weeding and hoeing at 6 weeks after sowing and significantly superior to rest of the treatments. This has resulted because of effective weed control by these treatments. Sandhu *et al.* (1991) also observed similar trend. Mean yield loss of 68% was recorded due to unchecked weeds.

The highest monetary return was recorded under Fluchloralin 0.90 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing (Table 2). This treatment was on par with treatment PE-Pendimethalin @ 0.75 kg ai/ha supple-

Table 1. Effect of weed-control treatments on green pod yield, dry weed weight weed-control efficiency in okra

Treatment	Green fruit yield (q/ha)				Dry weed weight (g/m ²)				Weed index	Weed-control efficiency
	1998	1999	2000	Pooled mean	1998	1999	2000	Mean		
Unweeded control (T ₁)	25.5	20.7	40.6	29.0	10.3	35.1	8.9	18.9	68	-
2 hand-weedings and hoeing at 3 and 6 weeks after sowing (T ₂)	94.3	100	77.8	85.7	3.1	19.5	6.6	9.6	5.0	47
PPI of Fluchloralin 1.35 kg ai/ha (T ₃)	78.9	82.7	75.8	79.2	5.1	21.7	6.8	11.2	12.5	37
PPI of Fluchloralin 0.90 kg/ha + 2 hand-weedings and hoeing at 6 weeks after sowing (T ₄)	91.5	96.6	83.7	90.6	3.3	19.6	6.5	9.7	-	46
PE Pendimethalin @ 1.0 kg ai/ha (T ₅)	74.7	88.0	79.1	80.6	5.4	22.4	7.4	11.7	11.0	33
PE Pendimethalin 0.75 kg/ha + 1 hand-weeding and hoeing at 6 weeks after sowing (T ₆)	88.5	93.3	82.7	88.2	3.7	19.8	6.8	10.1	2.0	44
PE Metolachlor @ 1.5 kg ai/ha (T ₇)	48.6	72.9	57.7	59.8	6.0	23.1	7.3	12.1	34.0	31
PE Metolachlor 1.0 kg/ha 1 hand-weeding and hoeing at 6 weeks after sowing (T ₈)	59.1	80.5	65.5	71.1	4.7	20.4	7.1	10.7	22.0	39
PE Oxyfluorfen @ 0.15 kg ai/ha (T ₉)	52.7	59.0	29.6	47.1	5.7	27.2	7.5	13.5	48.0	27
PE Oxyfluorfen 0.10 kg/ha + 1 hand-weeding and hoeing at 6 WAS (T ₁₀)	64.8	65.8	49.7	60.1	4.4	23.9	7.2	11.8	34.0	36
CD (P=0.05)	20.0	11.8	9.0	7.0	0.6	3.0	1.4			-

Transformed value = X+0.5

Table 2. Yield-contributing character of okra

Treatment	Fruit yield (g/plant)	Pods/plant	Plant height (cm)
Unweeded control (T ₁)	50.8	6.4	62
2 hand-weedings and hoeing at 3 and 6 weeks after sowing (T ₂)	172.4	12.2	86
PPI of Fluchloralin 1.35 kg ai/ha (T ₃)	168.7	12.0	82
PPI of Fluchloralin 0.90 kg/ha + 2 hand-weeding and hoeing at 6 weeks after sowing (T ₄)	175.0	13.0	88
PE Pendimethalin @ 1.0 kg ai/ha (T ₅)	168.0	12.0	78
PE Pendimethalin 0.75 kg/ha + 1 hand-weeding and hoeing at 6 weeks after sowing (T ₆)	173.6	13.2	89
PE Metolachlor @ 1.5 kg ai/ha (T ₇)	98.8	11.0	80
PE Metolachlor 1.0 kg/ha 1 hand-weeding and hoeing at 6 weeks after sowing (T ₈)	107.5	11.5	85
PE Oxyfluorfen @ 0.15 kg ai/ha (T ₉)	100.5	9.09	64
PE Oxyfluorfen 0.10 kg/ha + 1 hand-weeding and hoeing at 6 WAS (T ₁₀)	101.4	11.5	68
CD (P=0.05)	13.5	0.88	7.0

Table 3. Economics of weed-control treatments in okra

Treatment	Net monetary returns			Pooled mean	Benefit : cost ratio	NMR over control
	1998	1999	2000			
T ₁	7674	6,220	12,197	8,697	-	-
T ₂	2,1479	27,729	21,028	23,412	6.3	14,715
T ₃	2,2384	23,443	21,369	22,399	9.9	13,702
T ₄	5,2292	26,837	22,958	25,029	7.5	16,332
T ₅	2,0832	24,825	22,152	22,603	8.8	13,960
T ₆	2,4166	25,598	22,435	24,066	6.4	15,369
T ₇	1,2925	20,191	15,633	16,250	4.5	7,553
T ₈	1,5369	24,206	17,304	18,959	4.4	10,262
T ₉	1,4866	16,775	7,956	1,319	4.8	4,502
T ₁₀	1,7593	17,896	13,017	16,169	4.0	7,472
CD (P=0.05)	5,599	3,530	2,680	2,378	-	-

Prevailing prices: Herbicides rate (Rs/kg) : Fluchloralin, 380; Pendimethalin, 400; Oxyfluorfen, 1080; Metolachlor, 180

Labour charges : Male/female Rs 39/day; Bullock pair, 50/day; Spray pump, 10/day

Labor requirement: Weeding, 25 females , Spraying, 6 females

mented with 1 hand-weeding and hoeing at 6 weeks after sowing (T₆), and 2 hand-weedings and hoeing each at 3 and 6 weeks after sowing (T₂). Similar trend was recorded in additional net monetary returns due to weed-control treatments over the control.

Thus the pre-plant incorporation of Fluchloralin 0.90 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks after sowing or pre-emergence application of Pendimethalin 0.75 kg/ha supplemented with 1 hand-weeding and hoeing at 6 weeks

after sowing are the best treatment 8 for control of weeds and obtaining higher net monetary returns in okra.

REFERENCES

- Saimbhi M.S., Sandhu, K.S., Singh, D., Kooner, K.S. and Dhillon, N.P.S. 1994. Chemical weed control studies in okra. *Journal of Research, Punjab Agricultural University, Ludhiana* 31(1) : 38-41.
- Sandhu, K.S., Singh, Tarlok and Singh T. 1991. Chemical weed control in okra for seed. *Journal of Research, Punjab Agricultural University, Ludhiana* 28: 4.: