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Integrated Weed Management in Rabi Maize

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The integrated weed management study in rabi maize revealed that weed free treatment produced highest grain yield and net profit (45.6 q/ha & Rs. 18400 /ha) followed by atrazin 1. kg + H. W. 45 DAS (42.8 q / ha Rs. 17900 / ha) with 2.23 C. BR.

Maize is sensitive to weed competition and yield losses due to weeds may range from 29 to 70 % (Mani *et al.*, 1968). For harvesting reasonably maize yield effective weed management can be had by using chemicals, manual methods or by integrating them. Further Johenson *et al.* (1998) have reported that it possible to reduce quantity of herbicides in having effective weed management by 50 % if there are integrated with cultivation practices. Integrated weed management (IWM) can be thought of as a component of Integrated Pest Management (IPM). Now a days development and implementation of IWM Strategies are becoming more important, considering recent environmental and social realities associated with traditional cropping system. The key IWM programme is to substitute ecological principles and bio economics for weedicide use (Elmore, 1996). The present study was carried out to eieit the effect of IWM on grain production of rabi maize.

A field experiment was carried out at the Main Maize Research Station, Gujarat Agricultural University, Godhra during *rabi* 1994 to 1996, in a randomized block design with fifteen treatments. Maize variety Ganga Safed-2 was sown on No. 16, 1994, No. 8, 1995 and Oct. - 25, 1996. A basal dose of 50 kg N, 50 kg P_2O_5/ha was applied at sowing and 50 kg N/ha was applied in two equal splits (at knee height and tasselling stages). All the herbicides were applied in a spray volume of 500 litre of water / ha using knapasack sprayer fitted with a flat fan nozzle a pre-emergence within two days after sowing except 2-4 D (30 DAS) as per treatments.

Weed population

The crop was infested with Manocot and Dicot weeds viz., Tandulja (*Ameranthus polygeimus* L.), Chil (*Chenopodium album*, L.), Arotaro (*Digitaria sanguinalis*), Chidhi (*Cyperus rotundus*), Dharo (*Cynodon dactylon*), Bhangra (*Ecliptaalba, Dhudheli*), (*Euphoribia pilulifera*, L.) and Luni (*Portulaca oleracea*) were pre domunant weed species.

All these herbicides were effective against different weed species. Application of atrazine 1.0 kg / ha + hand weeding at 45 DAS was the most effective in reducing the total number of weeds. HW at 15, 30, 45 and 60 (weed free check) was also effective to reduce the weed population.

TABLE 1

Effect of integrated weed management on growth, yield attributes and net profit in maize crops.

Sr. No.	*Treatments*	*Cobs (000/ha.)*	*Plant height (cm)*	*Dry weed wt. (kg/ha)*	*Grain yield (a/ha)*	*Fodder yield (a/ha)*	*WCF (%)*	*Net profit 1000 Rs./ha*	*CBR*
1.	Atrazine 0.5 kg/ha pre. em.	66.7	150	654	22.8	32.0	47.2	6.5	0.88
2.	Atrazine 0.5 kg/ha + H. W. 45 DAS	64.2	158	181	33.3	44.2	85.4	11.8	1.44
3.	Atrazine 1.0 kg/ h pre. em.	61.7	157	194	36.1	50.6	84.3	14.2	1.85
4.	Atrazine 1.0 kg. ha + H. W. 45 DAS	70.0	170	98	42.8	59.9	92.1	17.9	2.23
5.	Pendimethalin 0.5 kg/ha pre em.	55.0	144	635	23.3	32.0	48.8	6.5	0.85
6.	Pendimethalin 0.5 kg/ + H. W. 45 DAS	63.3	147	296	30.1	42.0	76.1	9.6	1.11
7.	Pendimethalin 0 kg/ ha pre. em.	62.5	159	329	28.1	39.0	73.4	8.8	1.07
8.	Pendimethalin 1.0 kg/ha + H. W. 45 DAS	64.2	164	198	37.3	51.0	84.0	13.8	1.58
9.	Atrazine 0.5 kg/ha + Pendimethalin 0.5 kg/ha preem.	61.7	165	296	29.4	41.1	76.1	9.8	1.24
10.	Atrazine 0.5 kg/ha + pendimethalin	67.5	170	319	34.3	48.1	7[illegible].2	12.2	1.42
11.	2-4 D 0.5 kg/ha 30 DAS	60.8	165	380	33.2	46.9	69.[illegible]	12.5	1.66
12.	Local practice (2 H.W. + 2 H.H.)	61.7	155	637	27.7	39.8	48.6	8.9	1.12
13.	2 H. W (3 & 6 weeks)	61.7	149	621	23.5	33.0	49.9	5.8	0.67
14.	Weed free (15, 30 45 & 60 DAS)	61.7	157	22	45.6	53.9	98.2	18.4	2.01
15.	Weedy check	50.0	130	1240	13.3	16.7	-	0.9	0.13
	C.D. at 5%	9.1	19.9	80.4	3.8	5.8	-	-	-

Cost of labour Rs. 34/-
Common cost Rs. 6950/-
Atrazine Rs. 320/kg
Pendimethalin Rs. 390/ kg.
2-4 D Rs. 350 /kg
Bullock pair / Rs. 100/day with hoeing
Maize grain price Rs. 5 / kg.
Maize fodder price 0.75 / kg.
WCE : Weed Control Efficiency.

Dry matter production by weeds

Dry matter accumulation by weeds was minimum in weed free check (22 kg / ha) having weed control efficiency of 98.2%. Atrazine 1.0 kg/ ha + H. W. at 45 DAS also proved effective with WCE of 92.1 % as against weed biomass under unweeded (1240 kg/ha) plot. Singh and Prasad (1991) also reported similar results.

Yield and yield attributes

On the basis of pooled data for grain yield, the loss in grain under weedy control was 32.4 q/ha compared with weed free. The results are in conformity with the findings of Varshney (1991). Highest grain yield of maize (45.69/ha) was recorded from weed free treatment, which was at par to atrazine 1.0 kg/ha + H. W. at 45 DAS (42.8 q/ha) Dixit and Gautam (1996) revealed that atrazine as pre emergence effectively controlled the weeds, resulting in 70 % increase in winter maize grain yield over weedy check. The lowest grain yield of 13.3 g/ha was recorded in weedy check.

The yield components viz. cobs/ ha and plant highest were considerably improved under weed control treatments. Atrazine 1.0 kg/ha + H. W. at 45 DAS was found effective in increasing the number of cobs / ha (70,000) and plant height (170 cm) similar to weed free treatment. Varshney (1991) also obtained similar results.

The higher net profit of Rs. 18400/ha was obtained in weed free treatment, followed by atrazine 1.0 kg/ ha + H. W. at 45 DAS (Rs. 17900 / ha) with highest cost benifit ratio of 1:2.23. Weedy check resulted in a net loss of Rs. 900/ha.

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