



Integrated weed management in sweet corn

V.K. Dobariya*, R.K. Mathukia, B.S. Gohil and S.K. Chhodavadia

College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat 362 001

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Sweet corn (*Zea mays* L. var. *Saccharata* Sturt), is a variety of maize with a high sugar content. It is also called Indian corn, sugar corn and pole corn. Nature of weed problem in *Rabi* maize is quite different from that of the rainy season maize. In the rainy season, emergence of maize and weed start simultaneously in which first 20-30 days are most critical looking to crop-weed competition while in winter maize, weeds emerge most often after the first irrigation. However, wider row spacing and liberal use of irrigation and fertilizers lead to more growth of weeds (Porwal 2000). Therefore, the study was carried out to find economically effective method of weed control for realizing higher productivity and profitability of sweet corn.

The experiment was carried out at Instructional Farm, Department of Agronomy, JAU, Junagadh during *Rabi* 2010-11. The experiment comprised nine treatments, namely, atrazine 0.5 kg/ha as pre-emergence

(PE) + hand weeding (HW) and interculturing (IC) at 30 days after seeding (DAS), pendimethalin 0.9 kg/ha as PE + HW and IC at 30 DAS, oxadiargyl 90 g/ha as PE+ HW and IC at 30 DAS, atrazine PE+ 2,4-D (SS) 0.5 kg/ha at 30 DAS, pendimethalin as PE+ 2,4-D (SS) at 30 DAS, oxadiargyl PE + 2,4-D (SS) at 30 DAS, HW and IC twice, weed free and weedy check. These treatments were replicated three times in RBD. The experimental soil was clayey in texture and low in available N and P, and moderate in available potash. The sweet corn (*Sugar-75*) was sown with seed rate of 15 kg/ha in the rows of 60 cm apart. After uprooting of weeds, the weeds were sun-dried completely till reached to constant weight and finally the weed biomass at harvest was recorded for each treatment and expressed as kg/ha. Weed control efficiency (WCE), weed index (WI) and herbicidal efficiency index (HEI) were also calculated. The crop was harvested in last week of March. Net return and BCR (Benefit cost ratio) were also calculated.

Table 1. Effect of different treatments on cob length and girth, yields, weed indices and economics of sweet corn

Treatment	Cob length (cm)	Cob girth (cm)	Green cob yield (t/ha)	Green fodder yield (t/ha)	WI	WCE	HEI	Cost of cultivation (x10 ³ /ha)	Net return (x10 ³ /ha)	BCR
Atrazine 0.5 kg/ha as PRE + HW and IC at 30 DAS	20.8	14.9	6.27	34.5	18.2	63.4	16.5	34.52	62.76	2.82
Pendimethalin 0.9 kg/ha as PRE + HW and IC at 30 DAS	20.8	13.8	6.29	33.3	18.0	51.1	16.9	35.37	60.87	2.72
Oxadiargyl 90 g/ha as PRE + HW and IC at 30 DAS	20.7	13.4	5.86	28.1	23.6	45.9	8.9	35.17	51.54	2.47
Atrazine 0.5 kg/ha as PRE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	20.6	13.9	6.00	30.3	21.8	53.2	11.4	33.67	56.63	2.68
Pendimethalin 0.9 kg/ha as PRE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	20.6	13.7	6.00	30.3	22.0	50.3	11.2	34.37	55.80	2.62
Oxadiargyl 90 g/ha as PRE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	20.5	13.6	5.80	27.7	24.4	40.5	7.7	34.17	51.52	2.51
HW and IC at 15 and 30 DAS	22.3	15.7	6.64	35.7	13.4	79.2	-	35.27	66.92	2.90
Weed free	22.9	16.2	7.67	37.6	0.0	100	-	36.47	77.93	3.14
Weedy check	17.4	12.7	5.38	25.5	29.8	0.0	0.0	32.87	46.54	2.42
LSD (P=0.05)	NS	2.1	1.19	5.7	10.7	7.4	11.8	5.70	-	-

Note: WI- Weed Index, WCE- Weed Control Efficiency, HEI- Herbicidal Efficiency Index, BCR- Benefit Cost Ratio.

*Corresponding author: sunilchhodavadia@gmail.com

Table 2. Effect of different treatments on weed density at 30, 60 DAS, and at harvest and biomass of weeds at harvest

Treatment	Monocot weeds/m ²		Dicot weeds/m ²		Sedges weeds/m ²		Biomass of weed (kg/ha)
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	
Atrazine 0.5 kg/ha as PE + HW and IC at 30 DAS	2.24 (4.53)	1.83 (2.87)	1.74 (2.53)	1.42 (1.53)	2.52 (5.87)	1.83 (2.87)	322.9
Pendimethalin 0.9 kg/ha as PE + HW and IC at 30 DAS	2.29 (4.77)	1.89 (3.10)	1.80 (2.77)	1.60 (2.10)	2.62 (6.43)	2.05 (3.77)	431.6
Oxadiargyl 90 g/ha as PE + HW and IC at 30 DAS	3.14 (9.54)	2.87 (7.87)	2.74 (7.20)	2.70 (6.87)	3.50 (11.9)	2.87 (7.87)	477.0
Atrazine 0.5 kg/ha as PE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	2.96 (8.46)	2.78 (7.46)	2.64 (6.79)	2.55 (6.46)	3.27 (10.3)	2.96 (8.26)	412.5
Pendimethalin 0.9 kg/ha as PE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	3.04 (8.92)	2.81 (7.58)	2.76 (7.25)	2.53 (6.25)	3.26 (10.3)	3.00 (8.52)	437.8
Oxadiargyl 90 g/ha as PE + 2,4-D (SS) 0.5 kg/ha at 30 DAS	3.81 (14.1)	3.64 (12.8)	3.53 (12.1)	3.36 (10.8)	4.05 (16.1)	3.89 (14.8)	525.0
HW and IC at 15 and 30 DAS	2.20 (4.38)	1.58 (2.04)	1.95 (3.38)	1.34 (1.30)	1.96 (3.38)	1.73 (2.58)	183.3
Weed free	0.71 (0)	0.71 (0)	0.71 (0)	0.71 (0)	0.71 (0)	0.71 (0)	0.0
Weedy check	5.52 (30.1)	6.72 (44.8)	5.05 (25.1)	6.25 (38.8)	6.29 (39.1)	6.80 (45.8)	882.6
LSD (P=0.05)	0.71	0.61	0.76	0.66	0.61	0.56	94.5

Note: DAS= Days after sowing, HW and IC at 15 and 30 DAS= To remove weed flushes in early growth stage of crop, PE= Pre-emergence

Yield attributes as well as cob and fodder yield were significantly influenced with application of different weed control practices (Table 1). Results showed that significantly highest cob length (22.95 cm), cob girth (16.25 cm), cob yield (7.67 t/ha) and green fodder yield (37.65 t/ha) were recorded under weed free, which remained statistically equivalent to HW and IC at 15 and 30 DAS, atrazine 0.5 kg/ha as PE + HW and IC at 30 DAS and pendimethalin 0.9 kg/ha as PE + HW and IC at 30 DAS. The improved growth and yield attributes under these treatments might be due to periodical removal of weeds by hand weeding or pre-emergence herbicide supplemented with manual weeding as evidenced by less number of weeds and biomass of weeds (Table 2), which might have maintained high soil fertility status and moisture content by means of less removal of plant nutrients and moisture through weeds. These findings are in close conformity with Deshmukh *et al.* (2009).

All the treatments significantly reduced the weed density (Table 2) compared to weedy check. Next to the weed free, HW and IC at 15 and 30 DAS recorded significantly the lowest weed density and biomass of weeds due to removal weed flushes in early growth stage of crop, which remained statistically at par with atrazine 0.5 kg/ha as PE + HW and IC at 30 DAS and pendimethalin 0.9 kg/ha as PE + HW and IC at 30

DAS. Weed free, HW and IC at 15 and 30 DAS contained minimum weed Index (WI), while maximum weed control efficiency (WCE) and herbicide efficiency index (HEI), closely followed by pendimethalin 1 kg/ha as PE + HW and IC at 40 DAS and atrazine 0.5 kg/ha as PE + HW and IC at 30 DAS. These findings were in close conformity with Verma *et al.* (2009).

This study revealed that maximum net realization of ` 77,926/ha and BCR of 3.14 were realized with treatment weed free, followed by treatments HW and IC at 15 and 30 DAS and atrazine 0.5 kg/ha as PE + 1 HW and IC at 30 DAS, respectively.

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