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Influence of various weed management options on weed density, yield attributes and yield of sweet corn (*Zea mays* L. *saccharata*) under organic production system

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Abstract
A field experiment was conducted at Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during *kharif* 2019. The soil of the experimental site was clayey in texture, neutral in reaction and low in nitrogen, medium in phosphorus and high in potassium. The experiment was laid out in Randomized Block Design with three replications. The treatments were W_1- Hand weeding at 20 and 40 DAS, W_2- One mechanical weeding at 20 DAS + one hand weeding at 40 DAS, W_3 -Intercropping with black gram (1:1), W_4- Stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS, W_5- Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS, W_6- Incorporation of neem cake 15 days before sowing, @ 5 tonnes ha^{-1} + hand weeding at 20 DAS, W_7- Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS, W_8- Mulching with waste polythene bags (ITK- practices) and W_9- Weedy check. The weed flora of the experimental site was dominated with *Echinocloa colona*, *Alternanthera sessilis*, *Parthenium hysterophorus*, *Cyperus iria*. Results revealed that all the yield attributes and green cob yield was highest in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS treatment and it was at par with mulching with waste polythene bags (ITK-practices), hand weeding at 20 and 40 DAS and soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS. Similarly, weed density was also significantly reduced in these treatments over others. However, higher WCE was noticed in these treatment over weedy.

Keywords: Stale seed bed**,** sweet corn (*Zea mays* L. *saccharata*) weed control efficiency, weed density

Introduction

Maize (*Zea mays*) is one of the most important crop in the world. In the world, it keeps third position of most important cereal crop after rice and wheat. Maize is a first cereal grain which domesticated by indigenous peoples in southern Mexico about 10,000 years ago. Asian countries are noteworthy producers of sweet corn and more than 62% of their corn production is consumed in the form of animal feed while the balance is for human consumption. Corn is the major food of a large population of the world's communities and one of the most economically principle crops in the world. Maize is firstly grown for grain purpose and secondly for fodder. It has potential to high production, there is no cereal on the earth which has very high potentiality and because of this reason maize is also called 'Queen of cereals'. Maize is known as "Miracle crop" because it utilizes solar radiation very accurately even at higher radiation intensity as it is a C_4 plant (Mathukia *et al*., 2014) [13]. All these characteristic features make maize a "Miracle crop".

Maize is grown in 9380 thousand hectare area in India and its production is 28753 thousand tonne with productivity of 3065 kg ha^{-1} (Indiastat, 2017-18) [2]. Maize is grown in 133.41 thousand hectare with production and productivity of 317.52 thousand tonne and 2380 kg ha^{-1} respectively in Chhattisgarh (Indiastat, 2017-18) [2].

In the rainy season, emergence of maize and weed start simultaneously and first 20-30 days are most critical considering crop-weed competition. Yield reduction in maize varies from 28 to 93% depending on the weed density, weed flora and duration of crop-weed competition (Sharma *et al*., 1998) [15]. Hand weeding at 20 and 40 DAS may lead to cost effective control of the weeds. The losses caused by weeds exceed the losses from any other category of agricultural pests (Sharma *et al*., 2010) [16]. Weeds compete with the crop plants for sunlight, moisture and nutrients (Kumar *et al*., 2013) [9] and deprive the crops from vital resources (Lehocky and Reisinger, 2003) [10].

As a wide spaced crop, maize suffers from heavy weed infestation during *kharif* season. (DAS *et al*., 2016) [3]. The study was carried out to find economically effective method of weed control for realizing higher productivity and profitability of *kharif* sweet corn.

Materials and Methods

The study was carried out during *kharif* 2019. The experimental site was located at the Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The type of soil of experimental field was clayey in texture with low nitrogen, medium phosphorus and high potassium levels. Sweet corn variety 'sugar-75' was used in the experiment. The mean temperature ranged from 24.39 ºC to 35.67 ºC during *kharif* season. The crop was sown on 15th July with a spacing of 60cm × 20cm except, with spacing of 45cm × 20cm in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS. Standard organic package of practices was followed. The crop was harvested on 3rd and 10th October 2019. The field experiment was carried out in Randomized Block Design with three replications. The treatment comprised of nine weed management practices; W_1- Hand weeding at 20 and 40 DAS, W_2- One mechanical weeding at 20 DAS + one hand weeding at 40 DAS, W_3 -Intercropping with black gram (1:1), W_4- Stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS, W_5- Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS, W_6- Incorporation of neem cake 15 days before sowing, @ 5 tonnes ha^{-1} + hand weeding at 20 DAS, W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS, W_8- Mulching with waste polythene bags (ITK- practices) and W_9 -Weedy check.

Yield attributes as well as cob and stover yields were recorded at harvest of the crop. Number of weeds (grasses, broad leaf weeds and sedges) was counted at 20, 40, 60 DAS and at harvest. Weed control efficiency and weed index (WI) were calculated by the formulae suggested by Mani *et al*. (1973).

$$\text{Weed control efficiency (WCE \%)} = \frac{WD_c - WD_t \times 100}{WD_c}$$

Where,

WCE =Weed control efficiency (%)

WD_c=Weed density of weedy check plot (Number m^{-2})

WD_t=Weed density of treated plot (Number m^{-2})

Weed index was expressed in % and worked out by using the formulae given below (Gill and Kumar, 1969).

$$\text{Weed index (\%)} = \frac{\text{Maximum cob yield} - \text{Cob yield from treated plot} \times 100}{\text{Maximum cob yield}}$$

The data obtained on various parameters were tabulated and subjected to statistical analysis. The data on weed density was subjected to square root transformation i.e. before carrying analysis of variance. The levels of treatment was tested with 'F' test showing their significance, the levels of treatment were compared by critical difference at 5% level of probability (Gomez and Gomez, 1984) [6].

Results and Discussion

1. Yield attributes and yield

Yield attributes as well as green cob and stover yield were significantly influenced by different weed control options (Table 1). Result showed that significantly the highest cob length, cob diameter, number of cobs $plant^{-1}$, cob weight, number of rows cob^{-1}, number of grain $rows^{-1}$, number of grains cob^{-1}, green cob yield (7.63 t ha^{-1}) and stover yield(19.03 t ha^{-1}) were recorded in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS which was found to be at par with mulching with waste polythene bags (ITK-practices), hand weeding at 20 and 40 DAS and soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS. The significantly higher yield attributes and green cob yield under these treatments might be due lower weed density per unit area which resulted in reduced crop- weed competition at appropriate critical period. These findings are in close conformity with those reported by Sinha *et al*., 2000, Kolage *et al*., 2004, Mandal *et al*., 2004, Kamble *et al*.2005 and Desmukh *et al*. 2009 [8, 11, 7]. Similarly, mulched biomass added large quantity of nutrients and the additional nutrients over that applied through manure might have contributed to the increased yield of maize (Sharma and Achrya, 2000 and Sharma *et al*., 2010) [17-18].

2. Weed flora

The weed flora observed in the experimental field mainly comprised of *Echinocloa colona*, *Alternanthera sessilis*, *Parthenium hysterophorus* and *Cyperus iria*. Weeds present in less number were listed in others category.

Weed parametrs

The weed management treatments significantly influenced the weed density (Table 7). Weed density at initial stage of 20 DAS was significantly lower in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS followed by soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS treatment. Rest of the treatments gave almost similar weed density of weeds. At 40 DAS onwards the density of *Echinocloa colona*, *Alternanthera sessilis*, *Parthenium hysterophorus* and *Cyperus iria* as well as other weeds and total weed density were significantly lower in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS followed by hand weeding twice at 20 and 40 DAS, mulching with waste polythene bags and solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS. The highest weed density was observed in weedy check at all the observational stages. Data presented in Table 8 on weed index indicate that the highest reduction in yield due to weeds was recorded in weedy check to the tune of 83.49%, whereas the treatment which reduced the weed density resulted in very less reduction in yield to the tune of 2.36% to 3.93%. Similar findings were also reported by Adekalu *et al*. (2008) [1] which stated that mulching promote crop development and early harvests and increase yields. The weedy check recorded significantly the highest weed density owing to uncontrolled condition favoured luxurious weed growth leading increased density (Table3, 4, 5 and 6). Similarly weed infestation during germination to 45 days after sowing (DAS) cause maximum reduction yield Das *et al*. (2016) [3].

The weed control efficiency on the basis of density of weed was recorded at 20, 40, 60 DAS and at harvest. Weed control efficiency computed at 20 DAS revealed that maximum weed control efficiency was recorded in stale seed bed + reduced

spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS (67.2%) followed by mulching with waste polythene bags (ITK-practices)(63.4%)over weedy check. At 40 DAS, among various weed management practices the highest weed control efficiency was marked in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + 20 DAS hand weeding (89.0%) followed by soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS (78.4%), mulching with waste polythene bags (77.9%) and hand weeding twice at 20 and 40 DAS (77.0%). While, at 60 DAS highest WCE was recorded in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS (90.0%) followed one mechanical weeding at 20 DAS + one hand weeding at 40 DAS (89.4%). Further at harvest, similar results were observed and the highest WCE was recorded in stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS (90.5%) followed by hand weeding at 20 and 40 DAS(89.8%) and one mechanical weeding at 20 DAS + one hand weeding at 40 DAS (89.1%) over weedy check. The above treatments showed maximum weed control efficiency due to effective weed management practices. In the similar way, plastic mulched plots increased the soil temperature 6-8ºC higher as compared to un-mulched plots resulting in modification of crop ecology and increasing the efficiency (87.8%) attained by hand weeding twice as stated by Tripathi *et al*. (2003) [20].

Table 1: Yield parameters of *kharif* sweet corn as influenced by various weed management options

Treatments	Number of cobs palnt^{-1}	Cob length (cm)	Green cob diameter (cm)	Cob weight (g)	Number of rows cob^{-1}	Number of grains row^{-1}	Number of grains cob^{-1}	Green cob yield (t ha^{-1})	Stover yield (t ha^{-1})
W_1	1.5	16.5	4.1	157.2	15.4	28.6	477.3	7.33	17.52
W_2	1.3	13.7	3.7	145.2	14.3	27.6	425.6	6.37	15.06
W_3	1.1	10.5	3.6	92.5	12.1	23.7	313.6	4.97	11.37
W_4	1.6	17.1	4.2	164.4	15.5	32.2	489.0	7.63	19.03
W_5	1.2	12.7	3.7	112.7	13.2	25.8	380.5	5.86	13.10
W_6	1.3	13.1	3.7	138.4	13.3	26.1	391.6	5.88	13.28
W_7	1.5	16.1	4.0	154.4	14.8	27.9	449.1	6.94	15.91
W_8	1.5	16.6	4.2	160.6	15.4	31.4	483.7	7.45	17.81
W_9	1.0	7.3	3.3	73.5	11.6	18.0	212.7	1.26	2.80
SEm ±	0.05	0.34	0.13	3.39	0.25	1.51	14.47	0.35	1.05
CD(P=0.05)	0.15	1.01	0.38	10.45	0.75	4.53	43.38	1.05	3.15

Note: W_1- Hand weeding at 20 and 40 DAS, W_2- One mechanical weeding at 20 DAS + one hand weeding at 40 DAS, W_3 -Intercropping with black gram(1:1), W_4- Stale seed bed + reduced spacing (up to 25%) + mulching with paddy straw + hand weeding at 20 DAS, W_5- Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS, W_6- Incorporation of neem cake 15 days before sowing, @ 5 tonnes/ha + hand weeding at 20 DAS, W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS, W_8- Mulching with waste polythene bags (ITK- practices) and weedy check.

Table 2: Weed flora of k*harif sweet* corn at experimental field

S.N.	Type of weed	Dominant weed	Family	Other weed	Family
1.	Grass	*Echinochloa colona*	Poaceae	*Cynodon dactylon*	Poaceae
2.	Broad leaf	*Alternanthera sessilis*	*Amaranthaceae*	*Commelina benghalensis,*	Commelinaceae
		Parthenium hysterophorus	*Asteraceae*	*Euphorbia hirta,*	Euphorbiaceae
				Convolvulus arvensis	Convolvulaceae
3.	Sedge	*Cyperus iria*	*Cyperaceae*		

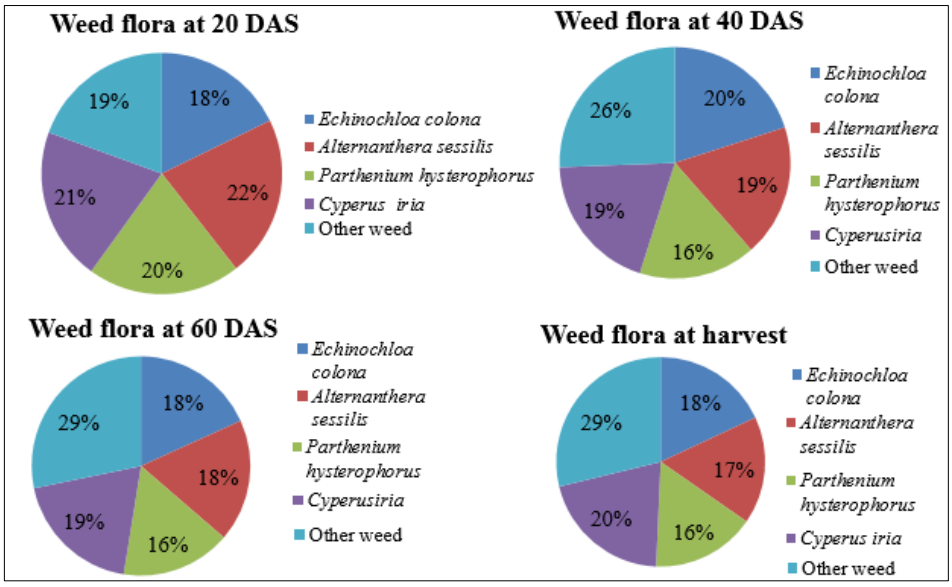

Fig 1: Pie chart on weed flora distribution in experimental field at different crop growth stages

Table 3: Weed density in *kharif* sweet corn as influenced by various weed management practices at 20 DAS

Treatments	Weed density (No. m^{-2}), 20DAS					
	Echinochloa colona	*Alternanthera Sessilis*	*Parthenium hysterophorus*	*Cyperus iria*	Others	Total
W_1-Hand weeding at 20 and 40 DAS.	2.92	3.13	2.67	3.18	2.79	6.44
	(8.03)	(9.33)	(6.67)	(9.67)	(7.29)	(40.99)
W_2-One mechanical weeding at 20 DAS + one hand weeding at 40DAS.	2.57	3.02	2.61	3.53	2.82	6.41
	(6.11)	(8.67)	(6.33)	(12.00)	(7.43)	(40.54)
W_3-Intercropping with black gram (1:1).	1.98	3.08	2.67	2.97	2.85	5.96
	(3.43)	(9.00)	(6.67)	(8.33)	(7.63)	(35.06)
W_4-Stale seed bed + reduced spacing (upto 25%) + mulching with Paddy straw + hand weeding at 20 DAS.	1.59	2.19	1.63	1.78	2.14	3.95
	(2.03)	(4.33)	(2.17)	(2.67)	(4.07)	(15.11)
W_5-Locally available weed mulch (*Lantana camera*) + one hand Pulling at 20 DAS.	2.48	2.91	2.61	2.91	2.76	5.97
	(5.67)	(8.00)	(6.33)	(8.00)	(7.13)	(35.13)
W_6-Incorporation of neem cake 15 days before sowing, 5 tonnes ha^{-1} + hand weeding at 20 DAS.	2.80	3.08	2.73	3.18	2.86	6.42
	(7.33)	(9.00)	(7.00)	(9.67)	(7.73)	(40.73)
W_7-Soil solarization with 25µ polythene mulch during summer + one Hand weeding at 20 DAS.	1.87	2.48	1.95	2.73	2.68	5.12
	(3.00)	(5.67)	(3.33)	(7.00)	(6.67)	(25.67)
W_8-Mulching with waste polythene bags (ITK-practices).	1.60	1.95	1.68	2.14	2.35	4.16
	(2.07)	(3.33)	(2.33)	(4.10)	(5.00)	(16.83)
W_9-Weedy check.	2.61	3.18	3.02	3.62	2.86	6.82
	(6.33)	(9.67)	(8.67)	(12.67)	(7.69)	(46.03)
SEm±	0.20	0.18	0.19	0.15	0.13	0.09
CD(P=0.05)	0.60	0.53	0.58	0.46	0.38	0.27

Note:* Data in parenthesis are pre transformed original value, which were transformed to (√x+0.5) and analysed statistically

Table 4: Weed density in *kharif* sweet corn as influenced by various weed management practices at 40 DAS

Treatments	Weed density (No. m^{-2}), 40DAS					
	Echinochloa Colona	*Alternanthera sessilis*	*Parthenium hysterophorus*	*Cyperus iria*	Others	Total
W_1-Hand weeding at 20 and 40 DAS.	1.78	2.04	1.95	2.48	2.16	4.47
	(2.67)	(3.67)	(3.33)	(5.67)	(4.19)	(19.53)
W_2-One mechanical weeding at 20 DAS + one hand weeding at 40DAS.	2.04	2.34	1.87	2.61	2.17	4.76
	(3.67)	(5.00)	(3.00)	(6.33)	(4.22)	(22.22)
W_3-Intercropping with black gram (1:1).	3.76	3.34	3.13	3.76	3.66	7.79
	(13.67)	(10.67)	(9.33)	(13.67)	(12.90)	(60.24)
W_4-Stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS.	1.52	1.08	1.35	1.87	1.73	3.13
	(1.83)	(0.67)	(1.33)	(3.00)	(2.50)	(9.33)
W_5-Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS.	2.48	2.58	2.27	2.79	2.23	5.37
	(5.67)	(6.17)	(4.67)	(7.33)	(4.50)	(28.34)
W_6-Incorporation of neem cake 15 days before sowing, 5 tonnes ha^{-1} + hand weeding at 20 DAS.	2.19	2.41	2.19	2.76	2.29	5.13
	(4.33)	(5.33)	(4.33)	(7.13)	(4.75)	(25.87)
W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS.	1.95	1.95	1.78	2.20	2.27	4.34
	(3.33)	(3.33)	(2.67)	(4.33)	(4.69)	(18.35)
W_8-Mulching with waste polythene bags (ITK-practice).	1.78	1.96	1.87	2.20	2.36	4.38
	(2.67)	(3.37)	(3.00)	(4.33)	(5.08)	(18.75)
W_9-Weedy check.	4.14	3.82	3.39	4.02	5.29	9.24
	(16.67)	(14.13)	(11.00)	(15.73)	(27.50)	(85.03)
SEm±	0.15	0.14	0.22	0.12	0.19	0.18
CD(P=0.05)	0.46	0.43	0.67	0.37	0.57	0.54

Note:* Data in parenthesis are pre transformed original value, which were transformed to (√x+0.5) and analysed statistically

Table 5: Weed density in *kharif* sweet corn as influenced by various weed management practices at 60 DAS

Treatments	Weed density (No. m^{-2}), 60 DAS					
	Echinochloa colona	*Alternanthera sessilis*	*Parthenium hysterophorus*	*Cyperus iria*	Others	Total
W_1-Hand weeding at 20 and 40 DAS.	1.61	1.52	1.49	2.20	1.78	3.67
	(2.10)	(2.17)	(1.73)	(4.37)	(2.67)	(13.04)
W_2-One mechanical weeding at 20 DAS + one hand weeding at 40DAS.	1.88	1.50	1.60	1.88	1.49	3.56
	(3.07)	(2.27)	(2.07)	(3.07)	(1.73)	(12.21)
W_3-Intercropping with black gram (1:1).	3.94	3.43	3.54	3.80	5.12	8.87
	(15.07)	(11.33)	(12.10)	(14.000	(25.80)	(78.30)
Stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS.	1.68	1.22	1.47	2.06	1.82	3.47
	(2.33)	(1.00)	(1.67)	(3.77)	(2.83)	(11.60)
-Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS.	2.70	2.72	2.32	2.87	3.11	6.01
	(6.80)	(7.00)	(4.90)	(7.77)	(9.23)	(35.70)

corporation of neem cake 15 days before sowing, 5 tonnes ha^{-1} hand weeding at 20 DAS.	2.48	2.64	2.31	2.85	3.04	5.84
	(5.70)	(6.67)	(4.87)	(7.67)	(8.77)	(33.68)
W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS.	2.00	2.22	1.89	2.34	2.54	4.77
	(3.50)	(4.67)	(3.10)	(5.00)	(6.00)	(22.27)
W_8-Mulching with waste polythene bags (ITK-practice).	1.80	2.06	2.04	2.27	2.48	4.58
	(2.77)	(3.77)	(3.67)	(4.67)	(5.67)	(20.55)
W_9-Weedy check.	4.37	4.33	3.89	4.60	6.77	10.77
	(18.67)	(16.23)	(14.67)	(20.67)	(45.37)	(115.64)
SEm±	0.20	0.19	0.15	0.16	0.22	0.38
CD(P=0.05)	0.61	0.58	0.44	0.49	0.67	1.13

Note:* Data in parenthesis are pre transformed original value, which were transformed to (√x+0.5) and analysed statistically

Table 6: Weed density in *kharif* sweet corn as influenced by various weed management practices at harvest

Treatments	Weed density (No. m^{-2}), at harvest					
	Echinochloa Colona	*Alternanthera sessilis*	*Parthenium hysterophorus*	*Cyperus iria*	Others	Total
W_1-Hand weeding at 20 and 40 DAS.	1.77	1.67	1.47	2.27	1.89	3.85
	(2.63)	(2.30)	(1.67)	(4.67)	(3.10)	(14.37)
W_2-One mechanical weeding at 20 DAS + one hand weeding at 40DAS.	2.10	1.97	1.58	2.04	1.69	3.97
	(3.90)	(3.40)	(2.00)	(3.67)	(2.37)	(15.34)
W_3-Intercropping with black gram (1:1).	4.27	3.68	3.80	4.27	5.50	9.63
	(17.70)	(13.10)	(14.00)	(17.77)	(29.80)	(92.37)
W_4-Stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS.	1.79	1.35	1.58	2.21	1.87	3.73
	(2.70)	(1.33)	(2.00)	(4.40)	(3.03)	(13.46)
W_5-Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS.	2.79	2.85	2.37	3.03	3.26	6.28
	(7.27)	(7.67)	(5.13)	(8.70)	(10.17)	(38.94)
W_6-Incorporation of neem cake 15 days before sowing, 5 tonnes ha^{-1} + hand weeding at 20 DAS.	2.61	2.75	2.36	2.82	3.14	5.98
	(6.30)	(7.10)	(5.07)	(7.50)	(9.40)	(35.37)
W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS.	2.04	2.36	1.87	2.61	2.72	5.04
	(3.67)	(5.07)	(3.03)	(6.33)	(6.90)	(25.00)
W_8-Mulching with waste polythene bags (ITK-practice).	1.94	2.09	2.19	2.34	2.56	4.81
	(3.27)	(3.90)	(4.33)	(5.00)	(6.07)	(22.71)
W_9-Weedy check.	4.71	4.33	4.19	5.35	7.51	11.90
	(21.67)	(18.30)	(17.07)	(28.13)	(56.03)	(141.20)
SEm±	0.19	0.22	0.22	0.17	0.26	0.38
CD(P=0.05)	0.56	0.67	0.66	0.51	0.78	1.16

Note:* Data in parenthesis are pre transformed original value, which were transformed to (√x+0.5) and analysed statistically

Table 7: Total weed density in *kharif* sweet corn as influenced by various weed management practices at different time interval

Treatments	Total weed density (No. m^{-2})			
	20 DAS	40 DAS	60 DAS	At harvest
W_1-Hand weeding at 20 and 40 DAS.				
	6.44	4.47	3.67	3.85
W_2-One mechanical weeding at 20 DAS + one hand weeding at 40DAS.	(40.99)	(19.53)	(13.04)	(14.37)
	6.41	4.76	3.56	3.97
W_3-Intercropping with black gram (1:1).	(40.54)	(22.22)	(12.21)	(15.34)
	5.96	7.79	8.87	9.63
W_4-Stale seed bed + reduced spacing (upto 25%) + mulching with paddy Straw + hand weeding at 20 DAS.	(35.06)	(60.24)	(78.30)	(92.37)
	3.95	3.13	3.47	3.73
W_5-Locally available weed mulch (*Lantana camera*) + one hand Weeding at 20 DAS.	(15.11)	(9.33)	(11.60)	(13.46)
	5.97	5.37	6.01	6.28
W_6-Incorporation of neem cake 15 days before sowing, 5 tonnes ha^{-1}+ hand Weeding at 20 DAS.	(35.13)	(28.34)	(35.70)	(38.94)
	6.42	5.13	5.84	5.98
W_7-Soil solarization with 25µ polythene mulch during summer + one hand Weeding at 20 DAS.	(40.73)	(25.87)	(33.68)	(35.37)
	5.12	4.34	4.77	5.04
W_8-Mulching with waste polythene bags (ITK-practice).	(25.67)	(18.35)	(22.27)	(25.00)
	4.16	4.38	4.58	4.81
W_9-Weedy check.	(16.83)	(18.75)	(20.55)	(22.71)
	6.82	9.24	10.77	11.90
SEm±	(46.03)	(85.03)	(115.64)	(141.20)
CD(P=0.05)	0.09	0.18	0.38	0.38
	0.27	0.54	1.13	1.16

Note:* Data in parenthesis are pre transformed original value, which were transformed to (√x+0.5) and analysed statistically

Table 8: Weed index and weed control efficiency as influenced by various weed management practices in sweet corn at time interval

Treatments	Weed Index (%)	Weed control efficiency (%)			
		20DAS	40DAS	60DAS	at harvest
W_1	3.93	10.9	77.0	88.7	89.8
W_2	16.51	11.9	73.9	89.4	89.1
W_3	34.86	23.8	29.2	32.3	34.6
W_4	-	67.2	89.0	90.0	90.5
W_5	23.20	23.7	66.7	69.1	72.4
W_6	22.94	11.5	69.6	70.9	75.0
W_7	9.04	44.2	78.4	80.7	82.3
W_8	2.36	63.4	77.9	82.2	83.9
W_9	83.49	-	-	-	-

Note: W_1- Hand weeding at 20 and 40 DAS, W_2- One mechanical weeding at 20 DAS + one hand weeding at 40 DAS, W_3 -Intercropping with black gram(1:1), W_4- Stale seed bed + reduced spacing (up to 25%) + mulching with paddy straw + hand weeding at 20 DAS, W_5- Locally available weed mulch (*Lantana camera*) + one hand pulling at 20 DAS, W_6- Incorporation of neem cake 15 days before sowing, @ 5 tonnes/ha + hand weeding at 20 DAS, W_7-Soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS, W_8- Mulching with waste polythene bags (ITK- practices) and weedy check.

Conclusions

On the basis of the result obtained from presented field study, it can be concluded that among the various weed management practices the significantly higher yield attributes, green cob and stover yield were registered under the stale seed bed + reduced spacing (up to 25%) + mulching with paddy straw + hand weeding at 20 DAS which was found at par with mulching with waste polythene bags mulch(ITK-practices), hand weeding at 20 and 40 DAS and soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS. As regards to the various weed management practices the stale seed bed + reduced spacing (upto 25%) + mulching with paddy straw + hand weeding at 20 DAS treatment showed maximum weed control efficiency and minimum weed index which was followed by mulching with waste polythene bags mulch (ITK-practices), hand weeding at 20 and 40 DAS and soil solarization with 25µ polythene mulch during summer + one hand weeding at 20 DAS. The yield was positively related to percent reduction of weed density and weed control efficiency. Similarly, Sanodiya *et al*. (2013) stated that the maximum green cob yield and stover yield were recorded under two hand weeding at 20 and 40 DAS followed by atarzine 1.0 kg ha^{-1} + hand weeding at 30 DAS than the other treatments.

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