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Efficacy of Herbicides and Cultural Practices on Weed Flora and Weed Density at Different Days after Transplanting in Kharif Brinjal Crop

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ABSTRACT

An experiment was conducted on the efficacy of herbicides and cultural practices on weed flora and weed density at different days after transplanting in kharif brinjal crop under Hyderabad Deccan conditions. The experiment was laid out in randomized block design with thirteen treatments combinations and replicated thrice. Among the different weed species observed, the most dominant species were broad leaved weeds (BLW) viz., Parthenium hysterophorus, Digera arvensis, Euphorbia hirta, Phyllanthus niruri and Amarathus viridis. The important grasses were Cynodon dactylon and Dactyloctenium aegyptium and sedges viz., Cyperus rotundus. Different integrated weed management practices had a significant effect on weed density at all the stages of crop growth and control plot recorded significantly maximum number of broad leaved weeds (BLW), grasses and sedges when compared to treated plots. With respect to weed dry matter per square meter, glyphosate @ 1.5 kg a.i. ha^{-1} directed spray at 25 and 50 DAT and pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT recorded significantly the lowest dry weight of broad leaved weeds, grasses and sedges at all the stages of crop growth.

Key words: *Brinjal plot, Weed flora, Weed density.*

INTRODUCTION

Brinjal (*Solanum melongena* L.), a member of solanaceae family is considered to be one of the most important vegetable crops in the world. Among various factors responsible for low productivity of brinjal, weed menace is considered to be the major one. Weeds compete with crop for nutrients, soil moisture and sun light and results in reduced crop yield. Yield reduction due to weed competition in brinjal has been reported to be 49 - 90 per cent[9]. The use of herbicides such as quizalofop, pendimethalin and alachlor along with cultural practices has been reported to suppress the fast growth of weeds in brinjal[8,6,13]. However, reports on the efficacy of these herbicides and cultural practices on weed flora and growth of the weed at different stages of crop growth in brinjal field were scanty.

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Hence, a field experiment was conducted to test the efficacy of different herbicides and cultural practices on weed flora and weed growth parameters at different days after transplanting in kharif brinjal crop under Hyderabad conditions.

MATERIAL AND METHODS

The field experiment was conducted at Vegetable Research Station, Agriculture Research Institute, Rajendranagar, Hyderabad, during *kharif*. The experimental site comes under sub-tropical zone and is situated at a latitude of 17^0 19^1 N, longitude of 79^0 23^1 E and an altitude of 546.2 m above mean sea level. The received mean annual precipitation on the basis of last ten years is 852 mm mostly received from South-West Monsoon *i.e* June to October. The mean annual minimum and maximum temperatures are 20.2°C and 32.6°C respectively. The humidity ranged from 44.5 per cent in summer and 79.4 per cent in rainy season. Hyderabad thus has hot dry summer and moderate cold winter.

Thirty days old seedlings were transplanted in the main field at a spacing of 60 cm × 50 cm. Different herbicides with thirteen treatments combinations *viz.*, T_1- Pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT, T_2- Oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} + one hand weeding at 45 DAT, T_3- Oxyfluorfen as pre-emergence @ 0.15 kg a.i ha^{-1} + one hand weeding at 45 DAT, T_4-Pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} followed by quizalofop ethyl @ 50 g a.i ha^{-1} at 15 to 20 DAT, T_5- Oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} followed by quizalofop ethyl @ 50 g a.i ha^{-1} at 15 to 20 DAT, T_6-Oxyfluorfen as pre-emergence @ 0.15 kg a.i ha^{-1} followed by quizalofop ethyl @ 50 g a.i ha^{-1} at 15 to 20 DAT, T_7- Pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} followed by propaquiza fop @ 62.5 g a.i ha^{-1} at 15 to 20 DAT, T_8-Oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} followed by propaquiza fop @ 62.5 g a.i ha^{-1} at 15 to 20 DAT, T_9- Oxyfluorfen as pre emergence @ 0.15 kg a.i ha^{-1} followed by propaquiza fop @ 62.5 g a.i ha^{-1} at 15 to 20 DAT, T_{10}- Glyphosate @ 1.5 kg a.i ha^{-1}directed spray at 25 and 50 DAT, T_{11}- Inter cultivation at 25 and 50 DAT, T_{12}-Hand weeding three times at 20, 40 and 60 DAT and T_{13}- Control were tried and replicated thrice.

The required amount of herbicides for the experimentation was calculated by using the following formula.

$$\text{Commercial herbicide} = \frac{RA}{C} \times 100$$

Here, R = Recommended dose of herbicide per hectare
A = Area (hectares)
C = Concentration of herbicide

Thus calculated amount of herbicide was sprayed to each treatmental plot at a volume of 600 litre of water per hectare. The quantity of herbicide per plot (4.2 m x 4 m) was calculated by using above formula and dissolved in water and spread over an area of 16.8 m^2 according to different treatments by using knapsack sprayer with flat pan nozzle.

Weed flora were observed in each plot at 30, 60, 90 days interval with visual observation and noted accordingly. Weed count in each experimental plot two quadrates of 1 x 1m were selected in the middle of plot and the weeds from each quadrate were counted species wise at an interval of 30 days from transplanting to harvest. The weed population from each quadrate was recorded as monocots, dicots and sedges. The weed density was expressed as number per square metre. For calculating weed dry weight, weed samples were taken from the sampling area and dried in shade for 2 days, followed by sun drying for 3 days. After sun drying, the samples were kept in oven at 70^0C till they

recorded the constant weight and dry weight of weeds was recorded for each treatment and expressed in g m^{-2}.

RESULTS AND DISCUSSION

Weed flora

The weed species observed in the experimental plot and are presented in Table 5. The most dominant species among them were broad leaved weeds (BLW) *viz., Parthenium hysterophorus, Digera arvensis, Euphorbia hirta, Phyllanthus niruri* and *Amarathus viridis.* The important grasses were *Cynodon dactylon* and *Dactyloctenium aegyptium* whereas *Cyperus rotundus.* Among the sedges.

Weed density

Different integrated weed management practices had a significant effect on weed density at all the stages of crop growth. In general, control plot recorded significantly maximum number of broad leaved weeds (BLW) when compared to treated plots (Table 1 and 2).

Among different integrated weed management practices, application of glyphosate (T_{10}) recorded lowest BLW at all the stages of crop growth. It may be due to the fact that Glyphosate is a broad spectrum systemic herbicide that kills the weeds, especially annual broad leaved weeds and grasses. It inhibits an enzyme involved in the synthesis of the aromatic amino acids like tyrosine, tryptophan and phynylalanine. It is absorbed through foliage and translocated to growing points. Because of its mode of action it is effective only on actively growing plants. Similar results were also reported by Damodaram and Rao[1] and Mandira Chakrabarti and Sansamma George[7].

At 30 DAT lowest BLW density was recorded in oxyfluorfen as pre-emergence @ 0.15 kg a.i ha^{-1} followed by quizalofop-ethyl @ 50 g a.i ha^{-1} at 15 to 20 DAT (T_6) because of the use of pre and post emergent herbicides. Quizalofop ethyl having systemic action, which translocates throughout the plant via xylem and phloem and accumulates in the meristematic tissue which inhibits the Acetyl CoA carboxylase synthesis in sensitive plants, which is required for synthesis of fatty acids. Inhibition of Acetyl CoA carboxylase would deprive the plant of a key intermediate (malonyl Co A) essential to both lipid and flavonoid (Gibberellins, abscisic acid, carotenoids) biosynthesis and would lead to phytotoxic effects[2].

Different weed management practices exhibited significant effect on weed density of grasses at all the stages of crop growth. In general all the weed control treatments recorded significantly lower grassy weed as compared to the control plot. Among different integrated weed management practices, application of glyphosate recorded the lowest weed density at 30, 90 and at harvesting stage. But 60 DAT, pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_1) recorded the lowest weed density which was on par with pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_2) and oxyfluorfen pre-emergence @ 0.15 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_3) because of the pre emergence herbicide followed by hand weeding at 45 DAT. Pendimethalin C.S inhibits the tubulin formation which prevents cell division within the plant[4]. Oxadiargyl inhibits the action of protoporphyrinogen oxidase (PPO) and acts on germinating weeds as the shoots come into contact with herbicide treated soil. The product has both pre and early post emergent weed activity on both grass and broad leaved weeds[3]. Oxyfluorfen herbicide has the inhibitor effect on protoporphyrinogen oxidase mode of action which causes the membrane disruption through the lipid peroxidation. It can also dissociate to enter the soil water and kill weed seedlings. Similar results were reported by Sukhadia *et al.,* [12] Sharma and Khandwe[11].

With respect to sedges, significant effect was found at all the stages of crop growth. Among the treatments, glyphosate @ 1.5 kg a.i ha^{-1} as directed spray at 25 and 50 DAT (T_{10}) recorded the lowest sedge density at 30 DAT and at final harvesting stage. At 60

and 90 DAT pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_1) recorded lower sedge density on par with Oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} + one hand weeding at 45 DAT (T_2) and oxyfluorfen pre-emergence @ 0.15 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_3).

Different integrated weed management practices exhibited significant effect on total weed population at all the stages of crop growth. Among all the treatments, pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_1) recorded the lowest weed population at all the stages of crop growth except at 30 DAT. At 30 DAT, glyphosate @ 1.5 kg a.i ha^{-1} directed spray at 25 and 50 DAT (T_{10}) recorded the lowest weed density. Similar results were reported by Sukhadia *et al.*[12].

Weed dry matter

Integrated weed management practices showed significant reduction in weed dry matter per square metre at all the stages of crop growth (Table 3 and 4). Among the treatments, glyphosate @ 1.5 kg a.i. ha^{-1} directed spray at 25 and 50 DAT (T_{10}) recorded significantly the lowest dry weight of BLW at all the stages of crop growth except at 60 DAT. But at 60 DAT pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_1) recorded the lowest BLW which was on par with oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} + one hand weeding at 45 DAT (T_2) and oxyfluorfen pre-emergence @ 0.15 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_3). Similar results were recorded by Karle *et al.*[5] and Sha and Karuppaiah[10].

With respect to grass dry weight, lowest grass dry weight was recorded in glyphosate @ 1.5 kg a.i ha^{-1} directed spray at 25 and 50 DAT (T_{10}) at 30 DAT. At 60 and 90 DAT, pendimethalin C.S as pre-emergence @ 0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_1) recorded the lowest grass dry weight which was on par with oxadiargyl as pre-emergence @ 90 g a.i ha^{-1} + one hand weeding at 45 DAT (T_2) and oxyfluorfen pre-emergence @ 0.15 kg a.i ha^{-1} + one hand weeding at 45 DAT (T_3). Similar results were reported by Karle *et al.*[5] and Sha and Karuppaiah[10].

Among all the different treatments significantly lower sedge dry weight was recorded in glyphosate @ 1.5 kg a.i ha^{-1} directed spray at 25 and 50 DAT (T_{10}) at 30 DAT, whereas at 60 DAT, the treatment T1 (Pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT) recorded the lowest sedge dry weight (0.24 g m^{-2}). The treatment T_{12} (Hand weeding three times at 20, 40 and 60DAT) noticed significantly lowest sedge dry weight at 90 DAT and at final harvest stage. Similar results were recorded by Karle *et al.*[5] and Sha and Karuppaiah[10].

Table 1: Weed density (number m^{-2}) at 30 and 60 DAT as influenced by different weed management practices in brinjal

Treatments	30DAT				60 DAT			
	BLW	Grasses	Sedges	Total	BLW	Grasses	Sedges	Total
T_1	6.33 (2.69)	9.00 (3.16)	9.66 (3.26)	24.99 (5.08)	2.66 (1.99)	2.33 (1.82)	1.66 (1.62)	6.65 (2.75)
T_2	7.33 (2.88)	8.33 (3.05)	9.33 (3.20)	24.99 (5.09)	3.00 (1.98)	2.66 (1.91)	2.33 (1.82)	7.99 (2.99)
T_3	6.66 (2.74)	7.33 (2.88)	10.66 (3.41)	24.65 (5.04)	3.66 (2.15)	1.66 (1.62)	2.66 (1.91)	7.98 (2.97)
T_4	6.66 (2.76)	2.33 (1.82)	10.33 (3.36)	19.32 (4.35)	7.33 (2.88)	(4.33 (2.30)	12.33 (3.65)	23.99 (4.90)
T_5	7.33 (2.88)	2.00 (1.73)	10.66 (3.41)	19.99 (4.39)	8.33 (3.05)	4.66 (2.37)	12.66 (3.69)	25.65 (5.05)
T_6	5.66	1.66	10.00	17.32	7.00	(3.66)	11.66	22.32

	(2.58)	(1.62)	(3.31)	(4.08)	(2.82)	2.15	(3.55)	(4.71)
T_7	6.33 (2.58)	3.33 (2.07)	10.66 (3.41)	20.32 (4.51)	7.33 (2.88)	(5.33) 2.51	12.66 (3.69)	25.32 (5.05)
T_8	5.66 (2.58)	3.00 (1.980	10.33 (3.36)	18.99 (4.35)	7.66 (2.94)	(5.00) 2.44	11.330 (3.51)	23.99 (4.93)
T_9	4.33 (2.38)	4.00 (2.18)	11.66 (3.55)	19.99 (4.44)	6.00 (2.64)	(6.00) 2.61	12.33 (3.66)	24.33 (4.96)
T_{10}	1.00 (1.41)	1.33 (1.52)	2.33 (1.82)	4.66 (2.35)	2.33 (1.82)	2.66) (1.90)	4.66 (2.37)	9.65 (3.23)
T_{11}	2.00 (1.71)	3.66 (2.13)	2.66 (1.91)	8.32 (3.03)	2.00 (1.71)	2.00 (1.91)	4.33 (2.29)	10.66 (3.37)
T_{12}	1.33 (1.52)	1.66 (1.62)	2.33 (1.82)	5.32 (2.50)	3.33 (2.07)	2.66 (1.91)	4.00 (2.23)	9.99 (3.30)
T_{13}	25.33 (5.13)	13.00 (3.74)	12.33 (3.65)	50.66 (7.08)	29.66 (5.53)	15.00 (3.99)	14.00 (3.87)	58.66 (7.60)
S.Em ±	0.91	0.12	0.08	0.49	0.09	0.11	0.08	0.46
CD (5%)	0.26	0.37	0.26	1.45	0.28	0.33	0.24	1.36

Data transformed to square root transformation. Figures in parentheses are indicating original values.
DAT-days after transplanting

Table 2: Weed density (number m^{-2}) at 90 DAT and at final harvest as influenced by different weed management practices in brinjal

Treatments	**90DAT**				**Final harvest**			
	BLW	**Grasses**	**Sedges**	**Total**	**BLW**	**Grasses**	**Sedges**	**Total**
T_1	5.66 (2.58)	4.33 (2.30)	4.66 (2.37)	14.65 (3.95)	7.00 (2.82)	7.33 (2.87)	6.66 (2.76)	20.99 (4.68)
T_2	6.00 (2.64)	4.66 (2.37)	5.33 (2.51)	15.99 (3.99)	7.33 (2.94)	7.66 (2.94)	7.33 (2.87)	22.32 (4.82)
T_3	5.66 (2.58)	3.66 (2.15)	4.66 (2.37)	13.98 (3.86)	7.33 (2.88)	7.33 (2.88)	7.33 (2.87)	21.99 (4.79)
T_4	9.66 (3.26)	6.33 (2.70)	14.33 (3.91)	30.32 (5.52)	11.66 (3.55)	8.33 (3.05)	15.33 (4.03)	35.32 (5.98)
T_5	10.33 (3.36)	6.66 (2.76)	15.66 (4.08)	32.65 (5.72)	12.00 (3.60)	8.66 (3.10)	16.33 (4.16)	36.99 (6.11)
T_6	8.66 (3.18)	5.66 (2.58)	14.00 (3.87)	28.32 (5.33)	11.33 (3.51)	9.00 (3.16)	14.66 (3.95)	34.99 (5.97)
T_7	9.33 (3.21)	7.33 (2.88)	14.66 (3.95)	31.32 (5.63)	12.33 (3.65)	9.33 (3.21)	15.66 (4.07)	37.32 (6.15)
T_8	9.66 (3.26)	7.00 (2.82)	13.66 (3.82)	30.32 (5.54)	12.66 (3.69)	9.66 (3.26)	14.66 (3.95)	36.98 (6.14)
T_9	8.00 (2.99)	8.00 (2.97)	14.66 (3.95)	30.66 (5.56)	13.33 (3.78)	10.33 (3.36)	15.33 (4.03)	38.99 (6.30)
T_{10}	4.66 (2.30)	4.66 (2.37)	6.66 (2.76)	15.98 (4.11)	6.66 (2.75)	6.00 (2.57)	6.66 (2.76)	19.32 (4.54)
T_{11}	4.33 (2.38)	6.33 (2.70)	6.33 (2.69)	16.99 (4.22)	5.33 (2.51)	6.33 (2.71)	6.00 (2.64)	17.66 (4.31)
T_{12}	4.00 (2.23)	4.00 (2.23)	4.00 (2.23)	12. 00 (3.46)	4.66 (2.37)	6.00 (2.57)	5.66 (2.57)	16.32 (4.16)
T_{13}	35.66 (6.05)	17.66 (4.32)	22.33 (4.83)	75.65 (8.66)	39.33 (5.03)	19.33 (4.51)	25.00 (5.09)	83.66 (9.10)
S.Em ±	0.08	0.09	0.07	0.39	0.07	0.06	0.11	0.34
CD (5%)	0.24	0.28	0.22	1.14	0.20	0.19	0.33	1.01

Data transformed to square root transformation. Figures in parentheses are indicating original values.
DAT-days after transplanting

Table 3: Dry matter of weed (g m^{-2}) at 30 and 60 DAT as influenced by different weed management practices in brinjal

Treatments	30DAT				60 DAT			
	BLW	Grasses	Sedges	Total	BLW	Grasses	Sedges	Total
T_1	3.25 (2.06)	2.92 (1.98)	2.40 (1.84)	8.57 (3.09)	0.47 (1.21)	0.95 (1.39)	0.24 (1.11)	1.66 (1.61)
T_2	3.44 (2.10)	2.65 (1.91)	2.67 (1.91)	8.76 (3.12)	1.15 (1.46)	1.14 (1.46)	0.44 (1.20)	2.73 (1.91)
T_3	3.34 (2.08)	2.57 (1.88)	2.73 (1.93)	8.64 (3.10)	1.23 (1.49)	0.90 (1.38)	0.54 (1.24)	2.67 (1.90)
T_4	3.40 (2.09)	0.81 (1.34)	2.13 (1.77)	6.34 (2.70)	3.92 (2.21)	1.55 (1.59)	2.84 (1.96)	8.31 (3.01)
T_5	3.60 (2.14)	0.88 (1.37)	2.27 (1.80)	6.75 (2.78)	4.53 (2.35)	1.74 (1.65)	2.95 (1.68)	9.22 (3.15)
T_6	2.86 (1.96)	0.55 (1.24)	1.93 (1.71)	5.34 (2.44)	3.53 (2.13)	1.27 (1.50)	2.56 (1.88)	7.36 (2.84)
T_7	3.27 (2.06)	1.16 (1.47)	2.34 (1.82)	6.77 (2.74)	3.64 (2.15)	2.26 (1.80)	2.88 (1.97)	8.78 (3.11)
T_8	3.15 (2.03)	1.05 (1.43)	2.26 (1.80)	6.46 (2.68)	3.91 (2.21)	2.15 (1.77)	2.44 (1.85)	8.50 (3.06)
T_9	2.89 (1.97)	1.92 (1.70)	2.30 (1.81)	6.43 (2.70)	3.17 (2.04)	2.83 (1.95)	2.74 (1.93)	8.74 (3.12)
T_{10}	1.09 (1.44)	0.39 (1.14)	0.34 (1.15)	1.74 (1.62)	1.93 (1.71)	1.26 (1.50)	1.27 (1.50)	4.46 (2.32)
T_{11}	1.43 (1.56)	1.26 (1.50)	0.44 (1.20)	3.13 (2.00)	1.95 (1.71)	1.94 (1.71)	1.14 (1.46)	5.03 (2.44)
T_{12}	1.12 (1.45)	0.49 (1.22)	0.36 (1.16)	1.97 (1.70)	1.69 (1.64)	1.27 (1.50)	0.96 (1.40)	3.92 (2.21)
T_{13}	5.33 (2.50)	5.33 (2.51)	3.00 (1.98)	13.63 (3.80)	13.66 (3.82)	6.33 (2.54)	3.66 (2.15)	23.65 (4.80)
S.Em ±	0.04	0.03	0.04	0.20	0.04	0.04	0.04	0.26
CD (5%)	0.14	0.11	0.12	0.59	0.12	0.13	0.12	0.78

Data transformed to square root transformation. Figures in parentheses are indicating original values.
DAT-days after transplanting

Table 4: Dry matter of weed (g m^{-2}) at 90 and final harvest as influenced by different weed management practices in brinjal

Treatments	90DAT				Final harvest			
	BLW	Grasses	Sedges	Total	BLW	Grasses	Sedges	Total
T_1	2.66 (1.91)	2.44 (1.85)	1.56 (1.60)	6.66 (2.75)	4.26 (2.29)	3.86 (2.20)	2.66 (1.91)	10.78 (3.42)
T_2	2.76 (1.94)	2.64 (1.91)	1.68 (1.63)	7.08 (2.83)	4.30 (2.30)	3.95 (2.22)	2.81 (1.95)	11.06 (3.46)
T_3	2.87 (1.96)	2.66 (1.91)	1.57 (1.60)	7.10 (2.82)	4.53 (2.35)	3.83 (2.19)	2.84 (1.96)	11.20 (3.48)
T_4	5.89 (2.62)	3.54 (2.13)	3.26 (2.06)	12.69 (3.67)	6.15 (2.67)	4.62 (2.37)	4.57 (2.36)	15.34 (4.03)
T_5	6.17 (2.67)	3.65 (2.15)	3.84 (2.20)	13.66 (3.80)	6.54 (2.74)	4.76 (2.40)	4.89 (2.42)	16.19 (4.13)

T_6	5.84 (2.61)	3.28 (2.06)	3.15 (2.03)	12.27 (3.61)	6.47 (2.73)	5.16 (2.48)	4.77 (2.40)	16.4 (4.16)
T_7	6.25 (2.69)	3.85 (2.20)	3.54 (2.13)	13.64 (3.80)	6.85 (2.80)	5.34 (2.51)	4.40 (2.32)	16.59 (4.18)
T_8	5.53 (2.55)	3.76 (2.18)	2.83 (1.95)	12.12 (3.59)	6.85 (2.80)	5.63 (2.57)	3.89 (2.21)	16.37 (4.14)
T_9	5.26 (2.50)	4.17 (2.27)	3.62 (2.15)	13.05 (3.74)	7.06 (2.84)	6.15 (2.67)	4.48 (2.34)	17.69 (4.30)
T_{10}	2.28 (1.81)	2.53 (1.88)	1.83 (1.68)	6.64 (2.76)	3.56 (2.13)	3.24 (2.05)	2.14 (1.77)	8.94 (3.14)
T_{11}	2.25 (1.80)	2.48 (1.86)	1.75 (1.65)	6.48 (2.73)	3.27 (2.06)	3.43 (2.10)	1.65 (1.62)	8.35 (3.03)
T_{12}	1.90 (1.70)	2.1 (1.76)	1.3 (1.51)	5.30 (2.500	2.66 (1.91)	2.91 (1.97)	1.53 (1.59)	7.1 (2.82)
T_{13}	14.33 (3.90)	8.33 (3.03)	5.33 (2.50)	27.99 (5.28)	16.33 (4.15)	11.33 (3.49)	7.66 (2.93)	35.32 (5.96)
S.Em ±	0.05	0.06	0.04	0.19	0.04	0.07	0.06	0.14
CD (5%)	0.16	0.19	0.14	0.58	0.14	0.21	0.17	0.43

Data transformed to square root transformation. Figures in parentheses are indicating original values.
DAT-days after transplanting

S. No	SCIENTIFIC NAME	COMMON NAME		FAMILY	LIFE CYCLE
		TELUGU	ENGLISH		
	A. Sedges				
1	*Cyperus rotundus* L.	Sakatunga gaddi	Nutsedge	Cyperaceae	Perennial
	B. Grasses				
1	*Cynodon dactylon* L.	Garika gaddi	Doob grass	Poaceae	Perennial

2	*Dactyloctenum aegypticum* L.Beauv.	--	Crow foot grass	Poaceae	Annual
3	*Elusine indica*				
4	*Digitaria sanguinalis* L. Scop.	--	Crab grass	poaceae	Annual
5	*Panicum repens* L.	Karigaddi	Torpedo grass	Poaceae	Annual
C. Broad Leaved Weeds					
1	*Amarathus viridis*	Thotakura	--	Amaranthaceae	Annual
2	*Digera arvensis* Forsk	Chenchali kura	--	Amaranthaceae	Annual
3	*Parthenium hysterophorus*	Picchi machipatri	Congress grass weed	Asteraceae	Annual
4	*Trichodesma indicum* R. Br	--	--	Borajinaceae	Annual
5	*Chenopodium album*	--	Lambs quarter	Chenopodiaceae	Annual
6	*Commelina bengalensis* L.	Amrutha kada	Tropical spider wart	Commelinaceae	Annual
7	*Tridax procumbens* L.	Gaddichamanthi	--	Compositaceae	Annual
8	*Euphorbia hirta* L.	Nanabalu	Pillpod spurge	Euphorbiaceae	Annual
9	*Phyllanthus niruri* L.	Nelavusiri	Niruri	Euphorbiaceae	Annual
10	*Portulaca oleracea*	--	purslane	Portulacaceae	Annual
11	*Argemone mexicana*	--	--	Pyperaceae	Annual

Table 5: Weed flora of the experimental plot

CONCLUSION

From the above study it was concluded that, glyphosate @ 1.5 kg a.i. ha^{-1} directed spray at 25 and 50 DAT and pendimethalin C.S as pre-emergence @0.70 kg a.i ha^{-1} + one hand weeding at 45 DAT recorded significantly the lowest dry weight of BLW, grasses and sedges at all the stages of crop growth.

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