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Weed management in tuberose (*Polianthes tuberose* L.) cv. Prajwal

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Abstract
Weed management is the important aspect in tuberose cultivation. A study was conducted during 2017 - 2018, 2018-2019 at farmer's field Chinnapudur, Dharmapuri (dit) to know the weed management in tuberose. The result revealed that pre-emergence application of pendimethalin at 3 days after planting *fb* hand hoeing + pendimethalin at the rate of 1.5 kg ha^{-1} on 30, 90, 150, 210 days after planting significantly reduced the weed growth and recorded higher spike weight (29.22 and 30.43 g), florets per spike (56.16 and 53.12, flower yield (13.30 and 13.23 t ha^{-1}) was registered in both years. Control plot caused the reduction in flower yield of tuberose. Thus the adoption of proper weed management provided the suitable environment for tuberose cultivation.

Keywords: Weed management, pre-emergence, tuberose, yield

Introduction
Flowers have been grown since ancient times and form an integral part of our heritage and culture since ancient time. Floriculture is the art of growing of flower crops. In India floriculture is one of the important commercial trades in agriculture. Lot of significance has been given to this sector due to employment, aesthetic needs and foreign exchange. Traditional agriculture with regular cultivation of cereals and pulses facing lot of problems in cultivation. Now a day commercial floriculture is gaining more importance. More particularly they are being used as raw materials for perfumes, confectioneries and medicinal industries. Among the different flower crops tuberose is one of the important flower crop grown in tropical regions. It is bulbous crop belongs to the family of amaryllidaceae and origin of Mexico. The flower blooms all over the year. Florets remain fresh long time and stand for distance transportation. Tuberose has the great economic potential for cut flower and perfume industry (Panwar *et al.*, 2010) [1].

Growth of flower is affected by different factors like pest, disease and weed infestation. Due to these factors the yield of the flower is drastically reduced. Among these factor weed infestation is the major problem in tuberose cultivation since it is used for both the flower and bulb production. In general weeds can be removed manually but it is time consuming and increased cost of cultivation. Under this condition alternate way to control the weed is chemical weed control integration with hand weeding to provide season long weed control. Herbicides include pre and post emergence to control the weeds. Use of pre- emergence herbicides offered the alternate way to control the weeds during the early growth stages. The selection of post-emergence herbicides is limited in tuberose cultivation. Therefore suitable method should be followed to control the weeds. Integrated use of pre and post emergence herbicides during crop period would pave the way for reducing weed competition and increase the flower yield. So, keeping these all this in concern the study was conducted with different pre and post emergence herbicides integrated with hand weeding.

Materials and Method
A field experiment was carried out during *kharif* season during 2017-2018, 2018-2019 at farmer's field Chinnapudur, Dharmapuri (dit) to know the effect of chemical weed management in tuberose. The experiment was laid out in randomized block design and replicated thrice. The treatments comprised of ten different weed management practices *viz.*, T_1-Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* Paraquat 1.0 kg ha^{-1} on 30 & 150 DAP + quizalofop-ethyl 50g ha^{-1} on 90 and 210 DAP, T_2 - Pendimethalin @ 1.0 kg ha 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90, 150, 210 DAP, T_3 - Pendimethalin @ 1.0 kg

ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + Pendimethalin @1.5 kg ha^{-1} on 90 and 210 DAP. T_4 - Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* Paraquat 1.0 kg ha^{-1} 120 DAP *fb* quizalofop-ethyl 50g ha^{-1} on 210 DAP, T_5 Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 120, 210 DAP, T_6 - Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* Hand hoeing + Pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* Hand hoeing + Alachlor @ 1.5 kg ha^{-1} on 120 DAP *fb* hand hoeing + Pendimethalin @ 1.5 kg ha^{-1} on 210 DAP, T_7 - Atrazine @ 1 kg ha^{-1} on 3 DAP, T8 - Hand weeding at 30, 90, 150 and 210 DAP, T_9 - Weed free check, T_{10} - Control. The soil type of the experimental field is sandy clay loam in texture, neutral in pH 7.30 and 7.03 low Ec (0.44, 0.48 dSm^{-1}), low organic carbon (0.27, 0.23 per cent) medium in available N (234.26, 223.8) and in available P (15.80, 14.62) and K content (282.52, 273.41) recorded in both the years. Need based plant protection measures were given as per the crop protection guide. The growth attributes were recorded from five selected plants in each plot. Observations on weeds were recorded with the help of a quadrate (0.5 m x 0.5 m) placed randomly at two places (outside the net plot area) in each treatment. The data on weeds were subjected to square root transformation ("X+2) to normalize their distribution.

Results and Discussion

Effect of weed management practices on weed parameters

In the experimental field, different types of weeds like broad leaved weeds (*Commelina benghalensis, Convolvulus arvensis, Cleome viscosa, Trianthema portulacastrum* and *Phyllanthus niruri*), sedges (*Cyperus rotundus*) and grass (*Dactyloctenium aegyptium, Cynodon dactylon*) were dominated throughout the growing period. Similarly in tuberose different kinds of weeds like *Cyperus rotundus, Trianthema portulacastrum* and *Dactyloctenium aegyptium* was reported by Ramesh Kumar *et al.* (2011) [2]. Weed population and weed dry matter was recorded at different interval 30, 90, 150 and 210 DAP recorded in both the years (Table 1 & 2) chemical weed management significantly reduced the weed population and dry weight of weeds compared to the other weed control treatments. These might be due to effective control of weeds by the different herbicide combinations. Similar results were recorded in chrysanthemum reported by Tripathy *et al* (2015) [3].

Among the different weed control treatments pre emergence application of pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90, 150, 210 DAP (T_2) recorded reduced weed population and dry weight in both the years. The next best treatment was application of pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP (T_3) registered reduced weed density in both the years. The highest weed density were recorded in unweeded check (T_{10}). These might be due the presence of weeds throughout the crop growth. Similar results were recorded in Kishan Swaroop *et al*. (2017) [4] in gladiolus.

Table 1: Effect of weed control treatments on total weed density (No.m^{-2}) during 2017-2018

T. No	Treatments	Total weed density (No.m^{-2})	Total weed dry weight (kg ha^{-1})	Weed control efficiency (%)	Weed Index (%)
T_1	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 30 & 150 DAP + quizalofop-ethyl @ 50g ha^{-1} on 90 and 210 DAP	64.47 (4.60)	453.13 (12.06)	77.27	36.04
T_2	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90,150, 210 DAP	29.64 (3.25)	240.82 (8.98)	89.55	7.44
T_3	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP	34.52 (3.43)	261.22 (9.35)	87.83	13.5
T_4	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 120 DAP *fb* quizalofop-ethyl @ 50g ha^{-1} on 210 DAP.	62.04 (4.52)	420.41 (11.62)	78.13	36.32
T_5	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 120, 210 DAP.	53.59 (4.24)	314.51 (10.23)	81.1	21.5
T_6	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 120 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 210 DAP.	59.00 (4.45)	353.74 (10.82)	73.32	31.66
T_7	Atrazine @ 1.0 kg ha^{-1} on 3 DAP.	123.04 (6.15)	452.47 (12.25)	56.62	47.25
T_8	Hand weeding at 30,90,150 and 210 DAP	116.50 (5.77)	437.03 (11.18)	58.93	27.41
T_9	Weed free check	0.0 (0.71)	0.0 (0.71)	100	0
T_{10}	Unweeded check	283.68 (9.44)	1090.79 (18.91)	0	57.68
	S.Ed	0.54	0.94	-	-
	CD(P= 0.05)	1.12	1.95	-	-

Data were subjected to √(X + 0.5) transformation. Figures in parenthesis are means of transformed values

Table 2: Effect of weed control treatments on total weed density (No.m^{-2}) during 2018-2019

T. No	Treatments	Total weed density (No.m^{-2})	Total weed dry weight (kg ha^{-1})	Weed control efficiency (%)	Weed Index (%)
T_1	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 30 & 150 DAP + quizalofop-ethyl @ 50g ha^{-1} on 90 and 210 DAP	72.98 (4.84)	429.60 (11.90)	72.44	36.76
T_2	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90,150, 210 DAP	31.44 (3.30)	231.34 (8.84)	87.62	9.25
T_3	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP	34.58 (3.43)	244.25 (9.04)	86.39	12.13
T_4	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 120 DAP *fb* quizalofop-ethyl @ 50g ha^{-1} on 210 DAP.	67.78 (4.76)	358.85 (11.04)	71.59	34.84
T_5	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 120, 210 DAP.	56.28 (4.35)	305.51 (10.04)	77.85	16.8
T_6	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 120 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 210 DAP.	62.72 (4.58)	357.01 (10.86)	70.82	35.73
T_7	Atrazine @ 1.0 kg ha^{-1} on 3 DAP.	132.65 (6.20)	418.77 (11.89)	47.8	45.74
T_8	Hand weeding at 30,90,150 and 210 DAP	129.89 (5.89)	386.33 (10.99)	48.88	21.39
T_9	Weed free check	0.0 (0.71)	0.0 (0.71)	100	0
T_{10}	Unweeded check	254.12 (9.20)	1044.12 (18.49)	0	51.16
	S.Ed	0.56	0.82	-	-
	CD(P= 0.05)	1.17	1.70	-	-

Data were subjected to $\sqrt{(X + 0.5)}$ transformation. Figures in parenthesis are means of transformed values

Table 3: Effect of weed control treatments on plant height (cm) during 2017-2018

T. No	Treatments	Plant height (cm)	Days required for emergence of spike	Days required for emergence of rachis	Length of spike (cm)
T_1	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 30 & 150 DAP + quizalofop-ethyl @ 50g ha^{-1} on 90 and 210 DAP	32.16	71.63	86.17	97.07
T_2	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90,150, 210 DAP	62.23	62.07	74.33	115.13
T_3	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP	60.67	66.27	78.25	107.60
T_4	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 120 DAP *fb* quizalofop-ethyl @ 50g ha^{-1} on 210 DAP.	35.89	70.60	83.50	98.87
T_5	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 120, 210 DAP.	50.90	67.33	75.17	102.40
T_6	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 120 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 210 DAP.	38.67	68.23	82.57	100.53
T_7	Atrazine @ 1.0 kg ha^{-1} on 3 DAP.	32.27	75.03	83.78	91.47
T_8	Hand weeding at 30,90,150 and 210 DAP	41.87	66.90	74.87	105.61
T_9	Weed free check	62.51	61.83	64.36	117.20
T_{10}	Unweeded check	22.50	79.61	100.35	81.57
	S.Ed	1.81	2.82	3.30	4.67
	CD(P= 0.05)	3.77	5.85	6.86	9.70

Table 4: Effect of weed control treatments on plant height (cm) during 2018-2019

T. No	Treatments	Plant height (cm)	Days required for emergence of spike	Days required for emergence of rachis	Length of spike (cm)
T_1	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 30 & 150 DAP + quizalofop-ethyl @ 50g ha^{-1} on 90 and 210 DAP	31.22	74.05	85.57	96.07
T_2	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90,150, 210 DAP	61.79	62.18	68.55	114.60
T_3	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP	61.52	65.77	73.90	106.63
T_4	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* paraquat @ 1.0 kg ha^{-1} on 120 DAP *fb* quizalofop-ethyl @ 50g ha^{-1} on 210 DAP.	39.80	70.54	85.94	97.37

T_5	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 120, 210 DAP.	49.79	67.67	73.16	103.03
T_6	Pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 120 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 210 DAP.	38.74	69.13	84.41	103.10
T_7	Atrazine @ 1.0 kg ha^{-1} on 3 DAP.	33.12	74.67	85.20	95.40
T_8	Hand weeding at 30,90,150 and 210 DAP	46.19	67.40	75.20	103.13
T_9	Weed free check	62.19	62.17	66.50	120.30
T_{10}	Unweeded check	23.07	79.44	102.90	79.12
	S.Ed	1.84	2.92	3.65	6.15
	CD(P= 0.05)	3.82	6.06	7.57	12.76

Effect on vegetative parameters

Weed management practices have the favourable effect on vegetative parameters like plant height, no leaves plant^{-1}, days required for emergence of rachis, length of spike and rachis length in irrigated tuberose. In present investigation all the weed control treatments resulted considerable effect on vegetative parameters compared to the unweeded check (T10). The maximum plant height was recorded in weed free check (T_9). These might be due to the absence of weeds throughout the season and there is no competition of space, light, nutrients. Similar results were recorded in chrysanthemum as reported by (Badhesha 2003) [5]. Among the different weed control treatments pre emergence application of pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90, 150, 210 DAP (T_2) recorded plant height, no leaves plant^{-1}, days required for emergence of rachis, length of spike and rachis length (Table 3 & 4). Use of chemicals not only reduced the weed density but also enhanced the plant growth parameters. These clearly revels the effectiveness of herbicides over the weeds and crop plant. Similar results were recorded in tuberose reported by Murthy and Gowda (1993) [6]. The next best treatment was application of pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + alachlor @ 1.5 kg ha^{-1} on 30 and 150 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 90 and 210 DAP (T_3).

The growth of plant is mainly depends on the photosynthetic activity of the leaves and transport to the developing organs. Leaves are considered as typical source in general. Herbicide treated plots have better source (leaves) and sink (flowers) relationship compared to unweeded check. Since, the weeds are effectively checked with herbicide application.

Conclusion

Therefore from these study it could be concluded that application of pendimethalin @ 1.0 kg ha^{-1} on 3 DAP *fb* hand hoeing + pendimethalin @ 1.5 kg ha^{-1} on 30, 90, 150, 210 DAP (T_2) effectively suppressed the weed growth and resulted higher vegetative and flowering characters.

References

1. Panwar RD, Sindhu SS, Jeetram Sharma, Gupta RB. Weed management studies in tuberose (*Polianthes tuberosa* L.) Cv. Double. Haryana J Hort. Sci. 2010;39(3&4):304-307.
2. Ramesh Kumar S, Geetha Jabarathinam T, Sathappan CT, Suresh Kumar SM, Kathiresan RM. Integrated weed management in flower crops involving goat grazing and polyethylene mulching. In: 23rd Asian-Pacific Weed Science Society Conference. The Sebel Cairns, 2011, 26-29.
3. Tripathy S, Dash K, Dash DK, Murmu S. Effect of chemicals on weed control in spray *chrysanthemum* L. Journal of Crop and Weed. 2015;11:217-219.
4. Kishan Swaroop, Raju DVS, Das TK, Sharma VK, Sunita Dhaker. Assessment of integrated weed management practices on weed flora, flowering, corn yield and net returns in gladiolus Cv. Pusa Srijana under Delhi conditions. Journal of Ornamental Horticulture. 2017;20(1&2):61-68.
5. Badesha GS. Weed control studies in winter annuals for seed production. M.Sc. thesis. Punjab Agricultural University, Ludhiana, India, 2003.
6. Murthy GMA, Gowda JVN. Role of pre-emergence herbicides on the life of cut tuberose flowers. Current Research. 1993l;22:161-162.