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Vipul H Patel
Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India

Gaurang D Patel
Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India

Naren K Patel
Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India

Desai Supal
Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India

Correspondence
Vipul H Patel
Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India

Effect of integrated weed management on growth and flowering of tuberose cv. Prajwal

Vipul H Patel, Gaurang D Patel, Naren K Patel and Desai Supal

Abstract
The present investigation entitled "Integrated weed management in tuberose (*Polianthes tuberosa* L.)" was conducted at Floriculture Research Farm, ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari (Gujarat) during the year 2017-2018. The experiment was conducted in Randomized Block Design (RBD) with three replications and eight treatments consisting of hand weeding, mulching and application of pre as well as post emergence herbicide. Among all treatments application of pendimethalin 1.0 kg/ha as PE + Organic mulch (sugarcane tress) after bulb sprouting and remulch at every 4 month interval (T_5) was found most effective in average plant height 120, 240 DAP and at end of experiment (64.33 cm, 70.88 cm, and 73.05 cm, respectively), number of leaves per plant (128.80) and tillers per plant (13.33) at end of experiment (360 DAP), minimum days to spike emergence (98.80), maximum spike length (108.27 cm), number of florets per spike (46.80) as well as vase life (6.87 days). Dry biomass of plant (3.76 kg/plot) was also found maximum in the same treatment at end of experiment.

Keywords: Tuberose, hand weeding, mulching, herbicide, DAP

Introduction
Tuberose (*Polianthes tuberosa* L.) is one of the most important tropical ornamental bulbous flower plants cultivated for production of long lasting flower spikes. It is popularly known as Rajanigandha. It belongs to the family Amaryllidaceae and native is Mexico. The flowers are attractive and elegant in appearance with sweet fragrance. 'Single' varieties are more fragrant than 'Double' type and contain 0.08 to 0.14 percent concrete which is used in high grade perfumes (Singh and Uma, 1995) [11]. The flower spike of tuberose remains fresh for long time and finds a distinct place in the flower markets. Due to its immense potential, cultivation of tuberose is gaining momentum day by day in our country. The growth and yield of plant are mainly depend on the adequate plant population, nutrition, moisture, weed management, plant population, plant protection, etc. However, efforts are still being continued in these directions to boost up the yield. Weed is an unwanted plant, it not only competes with crop plants for nutrients, soil moisture, space and sunlight but also serves as an alternative hosts for several insect pest and diseases (Bond and Oliver, 2006) [1]. Flower growers of south Gujarat are facing serious weed problems because of varied agro-climatic conditions and great diversity in the ecology of weed flora. Keeping in view the need and importance, present investigation was undertaken to study the integrated weed management in tuberose.

Materials and Methods
The present experiment was carried out at Floriculture Research Farm, ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari (Gujarat) during the year 2017-2018. The experiment was conducted in Randomized Block Design (RBD) with three replications and eight treatments *viz*., Weedy check (T_1), Weed free check (T_2), Organic mulch after bulb sprouting and remulch at every 4 month interval(T_3), Pendimethalin 1.0 kg/ha as PE + Hand weeding at 25, 50, 75 DAP (T4), Pendimethalin 1.0 kg/ha as PE + T_3(T_5), Pendimethalin 1.0 kg/ha as PE + Oxyfluorfen 0.25 kg/ha as POE at 25, 50, 75 DAP(T_6), Pendimethalin 1.0 kg/ha as PE + Propaquizafop0.1 kg/ha as POE at 25, 50, 75 DAP(T_7), Pendimethalin 1.0 kg/ha as PE + (Oxyfluorfen 0.25 Kg/ha + Propaquizafop 0.1 kg/ha) as POE at 25, 50, 75 DAP (T_8).
The healthy and disease free bulb are planted at Floriculture research farm, ACHF, NAU, navsari at 22nd February 2017. Individual plot of 1.2 m x 4.2 m size were demarcated in

experimental field and planting bulb with 30 cm x 30 cm Spacing. After planting drip irrigation was installed in experimental plot and gives the recommended dose of fertilizer with fertigation. Pre-emergence application of Pendimethalin was done after first irrigation and then subsequent treatments are applied. Post-emergence herbicides are applied at 25, 50, and 75 days after planting.

Result and Discussion

Vegetative growth

The data presented in Table 1, clearly indicated that plant height, number of leaves, number of tillers and dry biomass of plant were greatly influenced by different weed management treatments. T_5 (application of pendimethalin 1.0 kg/ha as PE + Organic mulch (sugarcane tress) after bulb sprouting and remulch at every 4 month interval) recorded maximum plant height (64.33 cm, 70.88 cm and 73.05 cm at 120, 240 and at end of experiment, respectively), number of leaves (128.80), number of tillers (13.33) and dry biomass of plant (3.76 kg/plot), than all the other treatments. Due to Effective weed control may have increased the capacity of the crop in utilizing soil moisture, light and nutrient in building new tissue that accounted for improving the vegetative growth (Sharma *et al*., 2014) [10]. Pre-emergence application of pendimethalin (Tripathi *et al*., 2015) [13]. Moreover, mulching provides a favourable micro climate for growth which resulted in more vigorous and healthier plants. Favourable soil temperature and appropriate moisture content through mulching stimulate root growth which leads to greater plant growth. Furthermore, good layer of organic mulches help to prevent soil from compactness and helps to retain oxygen and aeration which is beneficial for stimulate the root growth which leads to greater plant growth. Therefore, mulched plants usually grow and mature more uniformly than unmulched plants (Bhardwaj, 2011 and Han *et al*., 2000) [3, 6]. The results obtained in the present study conformity with Barman *et al*., (2005) [2] in gladiolus, Tetteh *et al*., (2011) [12] in tomato as well as Challa and Ravindra (1999) [4] in rose.

Table 1: Influence of integrated weed management on growth parameters in tuberose (*Polianthes tuberosa* L.)

Treatments	Plant height (cm)			Number of leaves	Number of tillers	Dry biomass (kg/plot)
	120 DAP	240 DAP	end of experiment			
T_1	36.70	42.04	50.03	67.13	5.53	1.91
T_2	59.62	64.50	67.46	112.13	11.27	3.43
T_3	58.50	66.98	69.39	120.20	11.47	3.36
T_4	55.06	58.04	61.17	107.33	9.20	2.88
T_5	64.33	70.88	73.05	128.80	13.33	3.76
T_6	50.45	56.55	59.76	88.20	7.93	2.50
T_7	47.26	54.20	57.70	86.60	7.80	2.31
T_8	52.93	57.33	61.57	94.27	7.87	2.62
S.Em±	3.31	4.07	3.62	6.46	0.68	0.13
C.D. at 5%	10.05	12.36	10.97	19.59	2.08	0.39
CV%	10.80	12.00	10.02	11.12	12.75	7.73

Floral parameters

The data presented in Table 2, clearly indicated that plant height, number of leaves, number of tillers and dry biomass of plant were greatly influenced by different weed management treatments. T_5 (application of pendimethalin 1.0 kg/ha as PE + Organic mulch (sugarcane tress) after bulb sprouting and remulch at every 4 month interval) recorded minimum days to spike emergence (98.80), maximum spike length (108.27 cm), number of florets per spike (46.80) as well as vase life (6.87 days). Due to after bulb sprouting, spreading of mulch may retard the losses of soil moisture by intercepting upward movement of capillary water by shading the soil; It regulate soil temperature fluctuations, salinity and weed control and on decay, the mulch material add to the fertility of soil. It exerts deleterious effects on earliness, mature more uniform by improve yield and quality of the mulched plants then unmulched plants as reported by Challa and Ravindra (1999) [4] in rose. An integrated approach towards weed management is perhaps the best way out. Moreover, INM with organic mulching can improve the chemical, physical and biological conditions of the soil resulting in greater availability and uptake of nutrients as reflected through higher yield owing to increased photosynthesis towards reproductive structure, resulting in enhancement of flowering, flower quality and yield parameters of flowers (Rami, 2012) [7]. These results are in accordance as reported by Han *et al*., (2000) [6] in rose, Shalini and Patil (2006) [9] in gerbera, Gudugi *et al*., (2012) [5] in tomato and Samant and Prusty (2009) [8] in tomato.

Table 2: Influence of integrated weed management on floral parameters in tuberose (*Polianthes tuberosa* L.)

Treatments	Days to spike emergence	Spike length (cm)	Number of florets per spike	Vase life (days)
T_1	154.20	73.86	26.87	4.53
T_2	117.60	98.47	39.40	6.27
T_3	107.27	97.90	41.20	6.13
T_4	118.73	89.31	37.47	5.67
T_5	98.80	108.27	46.80	6.87
T_6	135.47	87.49	35.33	5.53
T_7	146.33	84.78	34.07	5.47
T_8	122.00	90.36	36.47	5.60
S.Em±	8.08	5.55	2.97	0.37
C.D. at 5%	24.51	16.85	9.01	1.11
CV%	11.19	10.54	13.84	11.04

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