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Effect of Plant Growth Regulators on Flowering and Quality of Tuberose (*Polianthes tuberosa* L.)

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A B S T R A C T

An experimental study was carried out during *kharif* season of the year 2008-2009 at the farm of Horticulture Section, College of Agriculture, Nagpur. The experiment was laid out in Randomized Block Design (RBD) with three replications and ten treatments viz. GA_3 at 100, 150 and 200 ppm, NAA at 50, 100 and 150 ppm, CCC at 1000, 1500 and 2000 ppm and control (Water spray). The higher concentration of GA_3 at 200 ppm attributed superior results regarding earliness in initiation of flower stalk, length of spike and length of rachis. The diameter of spike, length and diameter of fully opened florets, vase life of spike, found to be significantly maximum with CCC at 1500 ppm.

Introduction

Tuberose (*Polianthes tuberosa* L.) is one the dearest flower to the mankind among the ornamental bulbous plants. Tuberose is much adore for its colour, elegance and fragrance, it occupies a prime position because of its popularity as cut flowers, loose flowers as well as for its potential in perfume industry. Loose flowers are used for making artistic garlands, floral ornaments, bouquets and button holes etc. Tuberose is commercially propagated vegetatively by means of bulbs. It is a day neutral plant; it requires high humidity and 20-30^{0}C temperature for its luxuriant growth. Tuberose (*Polianthes tuberosa* L.) belongs to family Amaryllidaceae, is native of Mexico. In India, it is popularly known as Rajanigandha, Nishigandha, Sugandharaja, Gulcheri, and Gul-eshahu. Tuberose is muchadorned for its colour, elegance and fragrance. Among the commercially grown flowers, Tuberose occupies prime position in India since it is used as cut flower, loose flower as well as for its potential in perfume industry. Tuberose is cultivated in many tropical and subtropical parts of world including India.

Plant growth regulators have significant role in modifying the growth and flowering of plant. Today, the practical use of growth

regulating substances in horticulture has assumed invariable dimensions due to revealed capacity of many significant mechanisms in plant which have led to a situation nearly approaching to horticultural revolution (Devadanam *et al.,* 2007[b]). Keeping in view the above points, the experiment was undertaken to study the effect of foliar application of plant growth regulators on growth, flowering and yield of tuberose.

Materials and Methods

The investigation was undertaken at the farm of Horticulture Section, College of Agriculture, Nagpur during *kharif* season of the year 2008-2009 in Randomized Block Design (RBD) with ten treatments replicated three time. Three growth regulators with three concentrations of each, i.e. GA_3 (100, 150 and 200 ppm), NAA (50, 100 and 150 ppm) and CCC (1000, 1500 and 2000 ppm) along with a control (Water spray) were used to study the effect on growth, flowering and yield of tuberose.

The foliar sprays of growth regulators in the concentration as per treatments were undertaken once on dated 15th June 2008. The experiment was super imposed on already established tuberose plot of cv. Single raised on flat beds at spacing of 20 cm x 20 cm during the year 2007. Before conducting the experiment, water stress was given from 30th April 2008 till the monsoon start. The recommended dose of chemical fertilizers at the rate of 200:300:200 kg NPK ha^{-1} along with FYM @ 15 t ha^{-1} was applied before start of experiment. The full dose of P_2O_5 and K_2O along with 1/4th dose of N as a basal was applied on dated 1st June 2008 and remaining doses of N were given in three equal splits after 30, 60 and 90 days. . The various observations on flowering *viz.,* days required for initiation of first flower were recorded after planting, length of spike, diameter of spike, length of rachis, length of florets, diameter of florets, vase life of spike were recorded after harvesting. Collected data were analyzed as per the method suggested by Gomez and Gomez (1984).

Results and Discussion

Effect of plant growth regulators on flowering of tuberose

The data regarding to the number of days required for initiation of first flower stalk (spike) was recorded and presented in Table-1 and it is revealed that the minimum days required for spike initiation (42.80 days) were recorded under the treatment GA_3 at 200 ppm, which was significantly superior over all other treatments. It might be due to the early production of florigine in GA_3 treated plant, as GA_3 is a component of florigine that required for formation of flowers in the plant system. Similar results were obtained by Sanap *et al.,* (2004) and Devadanam *et al.,* (2007[b]) in tuberose.

Effect of plant growth regulators on quality of tuberose

It is revealed from the data presented in Table-1 that foliar spray of different plant growth regulators had significant effect on flower quality parameters of tuberose plants. Significantly, maximum length of spike (106.06 cm) and length of rachis (31.23 cm) was observed under the treatment GA_3 200 ppm. The GA_3 treatments produced maximum length of spike and length of rachis; it might be due to acceleration in cells elongation and cell division of flowering spike. The above results are in close agreement with the findings of Leena *et al.,* (1992), Singh and Barad (2002) in gladiolus, Sagar *et al.,* (2005) and Devadanam *et al.,* (2007[b]) in tuberose.

Table.1 Effect of foliar application of plant growth regulators on flowering and quality of tuberose cv. Single

Treatments (ppm)	Days required for initiation of first flower stalk (Spike)	Length of spike (cm)	Diameter of spike (mm)	Length of rachis (cm)	Length of fully opened florets (cm)	Diameter of fully opened florets (cm)	Vase life of spike (days)
GA_3 - 100 ppm	47.26	101.03	8.18	28.40	6.17	3.22	11.60
GA_3 - 150 ppm	45.73	102.96	8.40	29.53	6.38	3.40	12.26
GA_3 - 200 ppm	42.80	106.06	8.58	31.23	6.51	3.62	12.96
NAA - 50 ppm	49.96	95.43	7.64	24.63	5.20	2.86	9.66
NAA - 100 ppm	51.30	96.96	7.84	25.90	5.43	3.12	10.06
NAA - 150 ppm	52.83	98.70	8.02	27.06	5.71	3.38	10.40
CCC - 1000 ppm	55.66	91.56	8.72	21.56	6.73	3.89	14.06
CCC - 1500 ppm	57.40	89.96	9.02	23.03	6.86	4.12	15.10
CCC - 2000 ppm	58.70	87.90	8.45	24.23	6.57	3.68	13.13
Control (W.S.)	60.63	93.66	7.17	19.90	4.97	2.48	7.93
SE (m) ±	0.69	0.69	0.04	0.49	0.10	0.11	0.20
CD at 5%	2.05	2.07	0.13	1.47	0.31	0.32	0.60

In respect of diameter of spike, the data presented in Table-1 revealed that, maximum diameter of spike (9.02 mm) was recorded under the treatment CCC-1500 ppm, which was significantly superior over all other treatments under study. Cycocel (CCC) helps in formation of more food material i.e. carbohydrates and thereby resulted maximum diameter of spike. Similarly, Baskaran and Misra (2007) reported maximum diameter of spike in gladiolus.

It is evident from the data presented in Table-1 that significantly, maximum length of fully opened florets (6.86 cm) and diameter of fully opened florets (4.12 cm) were recorded in the treatment CCC-1500 ppm. The increase in size of florets by the foliar application of CCC might be due to suppression of apical dominance, which attributed to increase mobilization of biomass to flowers from the source. Similar results were reported by Leena *et al.,* (1992) in gladiolus, Sagar *et al.,* (2005) in tuberose.

Similarly, maximum vase life of spike (15.10 days) was recorded in the treatment CCC-1500 ppm, which was significantly superior over rest of the treatments under study and the data presented in Table-1. Cycocel (CCC) in higher concentration was found more effective in prolonging vase life of flowering spike than GA_3 and NAA application. Similar results were reported by Katkar *et al.,* (2005) in china aster, Baskaran and Misra (2007) in gladiolus.

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