EFFECT OF CHLORMEQUAT (CCC) AND GIBBERELLIN (GA_3)ON GROWTH AND FLOWERING OF TUBEROSE (*Polianthes tuberosa*L.) Var. MEXICAN SINGLE

Abstract

The experiment was conducted at Experimental Farm, Department of Agriculture, Mata Gujri College, Fatehgarh Sahib, Punjab during summer season 2022-2023 to study the effect of growth regulators on growth and flowering of Tuberose (*Polianthes tuberosa*) var. Mexican Single. The experiment was laid out in randomized block design with seven treatments such as no - growth regulators(Control),GA_3@50ppm, GA_3@100ppm, GA_3@150ppm, CCC@1250ppm, CCC @ 1500ppm and CCC @1750ppm and the treatments were replicated thrice. Observation were recorded for vegetative and flowering parameters.Maximum plant canopy was recorded with CCC @ 1750ppm. Maximum leaf size was found in GA_3 @ 150ppm.Flowering parameters such as early opening of first florets and Maximum spike length was found with GA_3@150ppm. Diameter of spike and diameter of first floret recorded maximum with CCC@ 1500ppm. Total water uptake (ml) by flowers during post harvest found to be maximum in CCC@ 1750ppm.Therefore, GA_3 @ 150ppm and CCC@ 1500ppm can be recommended for growth and flowering of Tuberose.

Keywords: Growth regulators, Flowering, Tuberose, GA_3 @ 150ppm and CCC@ 1500ppm.

Introduction:

Tuberose is an important bulbous plant or (*Polianthes tuberosa* L.), and belong to Amaryllidaceae family and is indigenous to Mexico. The 70–80 cm long, narrow, and densely packed leaves of the tuberose are a light green color. The flowering stalk that also emerges from center of the leaf cluster is between 80 and 120 cm long, bears leaves, and has tubular flower buds. The 5–6 cm long flowers have a slight bend near the base. Normally, 90 to 95 days after planting, tuberose starts to bloom. The tuberose oil is made from the flowers, which also give off a lovely fragrance. Tuberose natural flower oil, which is used in soap making and the cosmetics industry as well as is among the most expensive raw materials for perfumery. In the plains and during the rainy season (April to September), tuberose blooms profusely. On hills, it blooms from May to July. In mild climates, tuberose blooms all year long.(Sanap *et al.*, 2000).

Gibberellic acid signaling is important for maintaining source-sink relationships, loading phloem with sucrose, sucrose long-distance transport by phloem cells of plant vascular systems, and metabolic activity in sink organs by sucrose unloading to sink organs or tissues that influence plant performance or growth. Gibberellic acid treatments have been known to play a significant role in promoting various plant developmental processes, including early flowering, increased plant height, and improved leaf yield and quality in various flowering crops. (Kumar *et al.*, 2003). The growth inhibitor Cycocel significantly improves the tuberose flower quality and flower stalk output. (Ponnuswami and Sowmeya, 2015). Therefore, present research was carried out to study the effect of growth regulators on growth and flowering of tuberose var. Mexican Single.

Material and Methods

The current study, titled "Effect of growth regulators on growth and flowering of Tuberose var. Mexican single," was conducted from March 2022 to May 2023 at Mata Gujri College's Research Farm in Fatehgarh Sahib, Punjab. The experimental site's field is located at 30.6435° North latitude and 76.3970° East longitude. The position is 246 meters above mean sea level. The uniformly sized (1-3 cm) bulbs were utilized for planting on the beds (2×2m) with a spacing of 30 cm between rows and 30 cm between bulbs. Foliar application of plant growth regulators on tuberose was done during 2022. In this study, plants of a single Mexican variety were exposed to various concentrations of plant growth regulators, including no - growth regulators (Control), GA_3@ 50ppm, GA_3@ 100ppm, G_{A3}@ 150ppm, CCC@ 1250ppm, CCC@ 1500ppm, and CCC @ 1750ppm.Three replications of the experiment were used in its Randomized Block Design (RBD) design.

Results and Discussion

Findings from the table 1 shows that maximum plant canopy was found in T_7 (46.76 cm) i.e. CCC @ 1750ppm.It is due to that, CCC helps in reduce the plant growth and reduce apical dominance due to which the plants become bushy. Shah *et al.*, (1994) observed more plant canopy with CCC in chrysanthemum. The maximum leaf size was found in T_4 (27.13 cm) i.e. GA_3 @ 150ppm because GA helps in cell division and also helps in cell expansion. Similar results were found by Padaganur *et al.*, (2005) in Tuberose.

Flowering parameters such as early opening of first floret was registered with T_4 (170.67 days) i.e. GA_3 @ 150ppm. It is due to that high concentrations of GA_3 shorten the juvenile phase, and near the end of the juvenile phase, the apical meristem begins to produce flowers rather than vegetative development, leading to early flowering in tuberose. Similar result was found by Thakre *et al.*,(2019) found that GA_3 helps in early opening of first floret in Tuberose. Maximum length of spike was found in T_4 (81.87 cm) i.e. GA_3 @150ppm.It might be due to acceleration of the blooming spike's cells' elongation and cell division. The above result was in lined with the findings of Manisha *et al.*, (2002) in Tuberose. Maximum spike diameter was recorded in T_6

(9.26 mm) i.e. CCC @ 1500ppm.It is due to that Cycocel(CCC), helps in formation ofmore food material, specifically carbohydrate, leading to the maximum spike diameter. According to, Baskaran and Misra (2007) maximum diameter of spike was observed in CCC @ 1500ppm in Gladiolus. Maximum diameter of first floret was observed in T_6 (5.56 cm) i.e. CCC @1500ppm and.The foliar application of CCC may have increased biomass mobilization to flowers from the source, which in turn increased floret size by suppressing spike length. Similar results were observed by Sagar *et al.*,(2005) in Tuberose.Total water uptake (ml) by flowers during post harvest life was found maximum in T_7 (79.16 ml) i.e. CCC@ 1750ppm. It is due to that CCC increases the number of vascular bundles and their diameter and density as compared to control which increase the water uptake in tuberose during vase life. Similar outcomes was observed by Srinivasan *et al.*,(2017) in tuberose.

Table 1 :Seven treatments and different parameters

Treatments	**Plant canopy (cm)**	**Leaf size (cm)**	**Days to opening 1st floret**	**Spike length (cm)**	**Spike diameter (mm)**	**Diameter of 1st floret(cm**	**Total water uptake (ml)**
T_1 no - growth regulators	31.35	17.83	181.17	63.95	6.79	2.44	71.11
T_2 GA_3 @50ppm	34.22	17.99	228.83	78.81	7.25	3.25	77.77
T_3 GA_3 @ 100pmm	35.64	18.06	184.07	79.84	7.98	3.40	75.55
T_4 GA_3 @150ppm	34.37	27.13	170.67	81.87	7.14	3.42	75.61
T_5 CCC @ 1250ppm	40.11	26.61	268.87	71.91	8.66	4.05	78.33
T_6 CCC @ 1500pmm	39.48	18.35	279.73	73.27	9.26	5.56	78.11
T_7 CCC@ 1750ppm	46.76	25.98	260.87	66.49	7.33	3.91	79.16
Sem±	2.25	0.86	0.28	2.07	0.37	0.09	2.46
CD (0.05)	6.95	2.64	0.86	6.38	1.14	0.29	7.57

Conclusion: From the above study it is concluded that GA_3 @ 150ppm and CCC @ 1500ppm is best for growing Tuberose var. Mexican Single in field conditions. GA_3@ 150ppm and CCC @1500ppm improve the vegetative and flowering parameters of tuberose.

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