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RESEARCH ARTICLE

EFFECT OF GROWTH REGULATOR AND FOLIAR ORGANICS ON GROWTH AND YIELD OF TUBEROSE (*Polianthestuberosa* L.,) Cv. PRAJWAL

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ABSTRACT

An experiment was carried out to study the "Effect of growth regulator and foliar organics on growth and yield of Tuberose (*Polianthes tuberosa* l.,) cv. Prajwal " in the department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai nagar during 2016 – 2018. The effect of twelve treatments including growth regulators GA_3 at various concentrations, foliar organics viz., fish amino acid and panchakavya at the level of 3% were studied under randomized block design (RBD) with three replications. The effect of treatment combination were studied based on their influence on plant height, number of leaves, number of side shoots, days taken for first spike emergence and flower yield. Evaluation of twelve treatments revealed that the performance of plants treated with (T_{10}) GA_3 @ 150 ppm with fish amino acid @ 3% resulted in favorable plant height (62.84), number of leaves(49.72), number of side shoots per plant(10.73) , days taken for flower spike emergence(82.44) and flower yield (15.16 t).

Key words: Tube rose, GA_3, Prajwal, Spike emergence, Flower yield

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INTRODUCTION

Tuberose (*Polianthes tuberosa* L.) is one of the most important tropical bulbous flowering plants cultivated for production of long lasting flower spikes. It is popularly known as Rajanigandha. It belongs to family Amaryllidaceae and its native of Mexico. Tuberose is a night blooming tropical and subtropical bulbous flower crop. It consist of about 12 species and an important, popular flower crop being cultivated on a large scale for its scented flower in many parts of the world and in plains of India. The tuberose blooms throughout the year, florets are star shaped, waxy and loosely arrange on spike that can reach up to 30 to 45 cm in length. There is high demand for tuberose concrete and absolute in international market which fetch very good price. Since the demand for cut and loose flowers of tuberose is rapidly increasing throughout the year, among the various factors which affect the productivity of tuberose, growth regulator application and foliar spray of organic nutrient management assumes greater significance. The use of growth regulator has brought about a sort of revolution in the floriculture industry overwhelming importance of growth regulating chemicals in the field of floriculture is well recognized. Synthetic growth regulating chemicals especially GA_3 were reported to be very effective in manipulating growth, flowering and bulb production in tuberose (Rani and Singh, 2013). Plant growth substances play a vital role in overall performance including growth, flowering and bulb production. The foliar organics are often timed to coincide with specific vegetative and flowering stages of crop growth. Foliar organic fertilization such as the use of panchakavya and fish amino acid as liquid plant food is the most effective way to supplement the major and minor elements. Panchakavya has got reference in the scripts of Vedas and Vrkshayurveda (Vrksha means plant and ayurveda means health system). Fish amino acid is a organic product obtained from fish, it contains twenty types of amino acids, so its triggering the protein synthesis of the plants. They improve crop yield and quality which has a positive impact on farm profitability. It also improves the uptake and efficient use of other essential inputs, notably fertilizers. This helps farmers optimize their investments with the added benefit of reducing environmental impacts. In this context, the spraying of growth regulator GA_3 with foliar organics gains prominence. This involves the combined use of growth regulator GA_3 together with foliar organics to promote N-fixation and P-mobilization.

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MATERIALS AND METHODS

The present investigation entitled "Effect of growth regulator and foliar organics on growth and yield of tuberose (*Polianthes tuberosa* L.) *cv.* Prajwal" was carried out in the floriculture yard, Department of Horticulture, Annamalai University, Annamalai nagar, Tamil Nadu from 2016 to 2018. The experiment was laid out in Randomized block design with the plant spacing of 45 × 30 cm.. The treatments used in this study is (T_1) GA_3 @ 50 ppm, (T_2) GA_3 @ 100 ppm, (T_3) GA_3 @ 150 ppm, (T_4) Fish

amino acid (FAA) @ 3 %, (T_5) Panchakavya @ 3%, (T_6) GA_3 @ 50 ppm + fish amino acid @ 3 %, (T_7) GA_3 @ 50 ppm + Panchakavya @ 3 %, (T_8) GA_3 @100 ppm + fish amino acid @ 3 %, (T_9) GA_3 @100 ppm + Panchakavya @ 3 %, (T_{10}) GA_3 @150 ppm + fish amino acid @ 3 %, (T_{11}) GA_3 @150 ppm + Panchakavya @ 3 %, (T_{12}) control. Three replications were maintained for each treatment. Healthy and matured uniform sized bulbs were procured from Nattarasankottai village in Sivagangai district. A normal recommended fertilizer dose of FYM 25 tonnes and 200 kg of N, 200 kg of P and 200 kg of K per hectare was applied. Two third of nitrogen along with full doses of P and K were applied as basal at the time of planting. The spray solution of 300 ppm of GA_3 was prepared and used as a stock solution for each spray. The growth regulator (GA_3) and foliar organics *viz.,* fish amino acid and panchakavya were given as per the treatments in individual plots and foliar spray was done at 30 days interval from 30 DAP onwards 480 DAP. Spraying was done with hollow cone pore size nozzle. At the time of spray, required quantity of GA_3 50, 100, 150 @ ppm and foliar organics *viz.,* fish amino acid and panchakavya @ 3% were prepared as per the treatment schedule. Fish waste was collected from nearby fish markets and chopped well. Jaggery was made into the powder form. A layer of powdered jaggery and chopped fish waste were alternatively placed in the container and closed properly. After 60 days the fish waste mixture was decayed and turned into brown colour liquid. It had the odour of palm fruit and this solution was filtered in a wire mesh and stored ready to use.

Table 1. Composition of fish amino acid

Parameters	Values
Total nitrogen (%)	1.96
Total phosphorus (%)	1.04
Total potassium (%)	0.19
Organic carbon (%)	34

Table 2. Effect of growth regulator and foliar organics on growth and yield of tuberose (*Polianthes tuberosa* l.,) cv. Prajwal

Treatments	Plant height (cm)	Number of leaves	Number of side shoots	Days taken for spike emergence	Yield /ha
T_1 GA_3 @ 50 ppm	56.94	44.21	8.29	89.81	13.89
T_2 GA_3 @100 ppm	59.48	46.58	9.34	86.65	14.43
T_3 GA_3 @150 ppm	60.31	47.35	9.68	85.61	14.61
T_4 Fish amino acid (FAA) @ 3 %	57.78	45.00	8.63	88.76	14.07
T_5 Panchakavya @ 3%	56.13	43.46	7.95	90.82	13.72
T_6 GA_3 @ 50 ppm + fish amino acid @ 3 %	59.37	46.48	9.29	86.78	14.41
T_7 GA_3 @ 50 ppm + panchakavya @ 3 %	58.58	45.74	8.96	87.77	14.24
$T_8$$GA_3$ @100 ppm + fish amino acid @ 3 %	61.92	48.86	10.35	83.59	14.96
T_9 GA_3 @100 ppm + panchakavya @ 3 %	61.10	48.09	10.01	84.62	14.78
T_{10} GA_3 @150 ppm + fish amino acid @ 3 %	62.84	49.72	10.73	82.44	15.16
T_{11} GA_3 @150 ppm + panchakavya @ 3 %	62.03	48.97	10.40	83.45	14.99
T_{12} Control	53.79	41.27	6.98	93.75	13.21
S. Ed	0.24	0.22	0.10	0.29	0.05
CD (P=0.05)	0.62	0.58	0.26	0.77	0.13

The observations on vegetative characters such as plant height, number of leaves, number of side shoots, days taken for first spike emergence, were recorded at 60th, 90th and 120th days after planting and flower yield was calculated at weekly intervals. The data on various parameters were analysed statistically as per the procedure suggested by Panse and Sukhatme (1978).

RESULT AND DISCUSSION

The various concentration of growth regulator along with foliar organics panchakavya and fish amino acid @ 3% significantly increased the plant growth and yield. The data on the growth parameter and yield as per (Table 2) revealed that the maximum height(62.84 cm) was recorded in (T_{10}) GA_3 @ 150 ppm with fish amino acid @ 3% followed by (T_{11}) GA_3 @150 ppm + Panchakavya @ 3 % with the value of (62.03cm). The plant height was least in T_{12} (53.79 cm). All the treatments differed significantly over the control, while the treatments T_{11}, T_8, T_6 and T_2 were found to be on par with each other. Similar increase in plant height was obtained by Kumar *et al.,* in tulip by foliar application of GA_3. Sharma *et al.,* (2011) also reported in their studies that increased growth characters in carnation was noticed due to foliar spray of biostimulants (panchakavya and fish amino acid). The data on the number of leaves revealed that the maximum number of leaves per plant (49.72) at 120 DAP was recorded in T_{10} followed by T_{11} which registered the values of (48.97). The number of leaves per plant was minimum in T_{12} (41.27). All the treatments differed significantly over the control, while the treatments T_{11}, T_8, T_6 and T_2 were found to be on par with each other. (Singh *et al.,* 2013) also observered increased number of leaves in tuberose due to the application of growth regulator. Carol lyngdoh *et al.,* (2017) also reported an increased number of leaves due to foliar application of panchakavya and fish amino acid . the results ere in line ith the above findings. The results revealed that the maximum number of side shoots (10.73) was observed in (T_{10}) GA_3 @ 150 ppm + fish amino acid @ 3%. It was followed by T_{11} (GA_3 @ 150 panchakavya @ 3%) which was on par with T_8 (GA_3 @ 100 ppm + fish amino acid) which recorded (10.35).

The minimum number of side shoots (6.98) was recorded in treatment T_{12} (control). Naik *et al.,* (2013) observed the increased vegetative growth in orchids as due to application of foliar organics. The data presented in table 2 reported that days taken for flower spike emergence was significantly decreased due to the application of GA_3 and foliar organics. Among the 12 treatments T_{10} (GA_3 @ 150 ppm + fish amino acid @ 3%) was recorded the minimum number of days taken for flower spike emergence in (82.44 days). The maximum number of days taken for spike emergence (93.75 days) was recorded in treatment T_{12}(control) Similar results were reported by Bhosale *et al.,* (2014) in tuberose. The estimated flower yield per hectare varied among the treatments. Among the various

concentration of GA_3 and foliar organics on tuberose, the estimated flower yield per hectare was significantly increased in T_{10} GA_3 @ 150 ppm + fish amino acid @ 3% was recorded (15.16 t). It was followed by T_{11} GA_3 @ 150 ppm + panchakavya @ 3% which recorded (14.99 t) was on par with T_8 GA_3 @ 100 ppm + fish amino acid @ 3% (14.96 t). The minimum yield of (13.21 t) was recorded the treatment T_{12} (control). Sendhilnathan *et al.,* (2017) also reported the effect of bio-regulators along with organics significantly increased the growth and yield of jasmine. In the present study, the growth parameters and yield were significantly influenced by GA_3 and foliar organic treatments. Overall comparison of the treatment imposed significant enhancement in plant height (cm), number of leaves and number of side shoots, days taken for spike emergence and yield when compared to control. The treatments received foliar organic supplements along with GA_3 were performed significantly better than the treatments received GA_3 alone. These observations and findings in the present investigation are in conformity with those reported earlier by Padaganur *et al.,* (2005) Sarkar *et al.,* (2009), (Rani and Singh, (2013) and Singh *et al.,* (2013) in tuberose. Enhancement in plant height, number of leaves and number of shoots due to GA_3 treatment observed in the present study might be due to increase in cell elongation, cell division or both induced by gibberellins. Increase in growth parameters and due to the application of GA_3 may be due to the fact that gibberellic acid increases cell division and cell elongation in plants resulting in more number of cells and increased cell length which ultimately increases the plant growth (Taiz and Zeiger, 1998). Further, application of fish amino acid might have supplemented the additional nutritional need occurred due to the augmented growth by GA_3.

REFERENCES

Anburani, A. and H. Vidhyabharathi. 2008. Response of growth attributes of mullai (*Jasminum auriculatum*) organic and inorganic nutrients. *J. Ornamental Horticulture,* 11(3): 212-215.

Baskaran, V. and R.L. Misra. 2007. Effect of plant growth regulators in growth and flowering of Gladiolus. *Indian Journal of Horticulture,* 64(4): 479-482.

Bellubi, S.B., B.S. Kulkarni and C.P. Patil. 2015. Effect of integrated nutrient management on growth and flowering of gerbera (*gerbera jamasonii* L.) var. Rosalin under poly house condition. *Intl. J. Agric. Sci. and veterinary medicine,* 1(1) : 121 – 123.

Bhalla Rajesh, Kanwar Priyanka, S. R. Dhiman and Jain Ritu. 2006. Effect of biofertilizers and bio stimulants on growth and flowering in gladiolus. *J. Orn. Hort.,* 9(4): 248-252.

Bhosale, N., A.V. Barad and N. Bhosale. 2014. Effect of storage period and GA3 soaking of bulbs on growth and flowering of tuberose (Polianthes tuberosa L.) cv. Double. Hort. Flora Research Spectrum, 3(2):154-157.

Carol Lyngdoh, Vijay Bahadar, David, A.A. Prasad, V.M. and Tajungsola Jamir 2017. Effect of organic manures, organic supplements and biofertilizers on the growth and yield of Cowpea. *Int. J. of current Microbiology and Applied Sci.,* 6(8): 1029-1036.

Dharma Sandeep, (2006). Effect of bio fertilizers and bio stimulants on growth and flowering of carnation. Ph.D., thesis,Dr. YS Parmar Universities of Horticulture and Forestry, Nauni, Solan(HP), p. 124.

Jawaharlal, M., J. Prem Joshua, S. Arumugham S. Subramanian and M. Vijayakumar. 2001. Standization of nutrients and growth regulators to reduce pre- blooming period and to promote growth and flowering in anthurium (*Anthurium andreanum*) under protected shade net house. South Indian Hort., 49: 342 – 344.

Kumar, A. and D.K. Gautam. 2011. Effect of plant growth regulators on spike yield and bulb production of tuberose (*Polianthes tuberosa* Linn.) cv. "Hyderabad Double". Progressive Horticulture, 43(2): 234-236.

Kumar, R., N. Ahmed, D.B. Singh, O.C. Sharma, S. Lal and M.M. Salmani, M.M. 2013. Enhancing blooming period and propagation coefficient of tulip (*Tulipa gesneriana* L.) using growth regulators. *Afr. J. Biotechnol.,* 12(2): 168-174.

Mukhopadhyay, A. and G.L. Banker. 1983. Regulation of growth and flowering in tuberose. J. Orn. Hort., 6: 80-81.

Nagalakshmi, S., A. Sankari, M. Anand and R. Arulmozhiyan. 2010. Organic stimulants on the growth and yield of Anthurium (*Anthurium andreaum*) Cv. Verdun Red. *Asian J. Hort.,* 5 (2): 450-452.

Naik, S.K., D. Barman, R. Devadas, T. Ushabharathi. 2013. Evaluation of panchakavya as source of nutrients for cymbidium orchids. African J. of Agrl. Res., 8(46): 5728-5732.

Natarajan, K. 2002. Panchagavya - A Manual. Other Indian Press, Mapusa, Goa, India, pp: 333.

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