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Effect of bio regulators along with organics on growth and yield of gundumalli (*Jasminum sambac* Ait)

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Abstract

A study of the effect of bio-regulators along with organics on growth and yield of Gundumalli (*Jasminum sambac* Ait) was conducted. The organic manures viz., Farmyard manure, Vermicompost along with bio regulators like Naphthalene acidic acid, Gibberellic acid and panchagavya was given as foliar application. Among the various treatments application of vermicompost @ 2.5 t ha⁻¹ along with foliar spray of panchagavya @ 3 percent was significantly increasing the plant growth characters of plant height (124.52 cm), Number of primary shoots (10.71), Number of secondary shoots (10.41), Number of leaves (260), leaf area (27.56 cm²), Number of productive shoots (55.47) and chlorophyll content (2.64 CCI). Flowering parameters viz, commencement of flowering (50.97 days), length of flower bud (3.66 cm), flower bud diameter (3.58 cm), bud length without corolla (1.89 cm), Corolla tube length (1.63 cm), and flower yield characteristics viz, hundred bud weight (26.39 g), flower yield per plant (677.74 g), flower yield per plot (4066.44 g), flower yield per hectare (3.78 t/ha), and the quality characters like shelf life (34.39 hrs) was achieved in Gundumalli (*Jasminum sambac* Ait). From the experiment application of treatment combination of vermicompost @ 2.5 t ha⁻¹ along with foliar spray panchagavya 3 percent, could adjudged as the best treatment in performance of Gundumalli under the open field condition.

Keywords: Bio-regulators, Organic manures, Foliar spray, Growth and flowering parameters, *Jasminum sambac*.

Introduction

Gundumalli (*Jasminum sambac* Ait.) the oldest commercial flower belongs to the Oleaceae family which is grown mainly for its fresh flowers are used for making garlands, decorating hair of women, religious offering etc. jasmine concrete which is used in cosmetic and perfumery industries. Jasmine is native of India having its origin in southern foothills of Himalayas, from where it spread and adorned the gardens of the Mediterranean countries. The genus *jasminum* comprises of about 300 species which are dispersed in the warmer parts of Asia, Africa, Europe and pacific region [4]. Integrated systems of flower producer are less dependent on intensive management. The use of plant growth regulators with recommended horticultural practices in specific cultivars seems to be novel theme of modifying plant for sustained production. Organic manure has received considerable attention by the farmers as a source of nutrients for enhanced plant growth and productivity. They help in supplying a balanced nutrition of the growing plants and improve the production and quality of crop [7]. Plant growth regulators are the organic chemical compounds which modify or regulate physiological process in an appreciable measure in plants when used in small concentrations. They are readily absorbed and move rapidly through tissues when applied to different parts of the plant. Either to, plant growth regulators have gained wide acceptance in many flower crops for optimizing the yield of plants by modifying growth, development and stress behavior. Hence, strategies such as application of organic manures along with foliar application of bioregulators are essential to regulate the crop growth continuously [15].

In light of these facts an attempt was made towards finding of the effect of bio-regulators along with organics on growth and yield of Gundumalli are carried out to evolve an ideal nutrient management by the way to increase the production through improved management techniques.

Materials and methods

The present investigation was under taken to study the effect of bio-regulators along with organics on growth and yield of gundumalli in the Department of Horticulture, Faculty of Agriculture, Annamalai Nagar in 2013 to 2015. The experiment was laid out in on Randomized Block Design (RBD) with 10 treatments and replicated three times [10]. The experiment was conducted by using different organic manures viz.,

Farmyard manure, vermicompost along with application of bioregulators viz., Naphthalene acidic acid, Gibberellic acid and panchagavya given as foliar application. The observations are recorded on the selected five plants for a treatment in each replication and the mean data is statistically analyzed.

Treatment	Treatment details
T ₁	NAA @ 100 ppm foliar spray
T ₂	GA ₃ @ 300 ppm foliar spray
T ₃	Panchagavya @ 3 per cent foliar spray
T ₄	Farmyard manure @ 12.5 t/ha + NAA @ 100 ppm foliar spray
T ₅	Farmyard manure @ 12.5 t/ha + GA ₃ @ 300 ppm foliar spray
T ₆	Farmyard manure @ 12.5 t/ha + Panchagavya @ 3 per cent foliar spray
T ₇	Vermicompost @ 2.5 t/ha + NAA @ 100 ppm foliar spray
T ₈	Vermicompost @ 2.5 t/ha + GA ₃ @ 300 ppm foliar spray
T ₉	Vermicompost @ 2.5 t/ha + Panchagavya @ 3 per cent foliar spray
T ₁₀	Control

Result and Discussion

Application of bio-regulators as a foliar application along

with organics significantly influenced the growth, flowering, yield and quality parameters. The data and the result on the effect of bio-regulators along with foliar application of organics in gundumalli (*Jasminum sambac* Ait) and their observation is present in (Table 1) on growth parameters viz., plant height (cm), number of primary shoots, number of secondary shoots, number of leaves, leaf area (cm²), number of productive shoots and chlorophyll content (CCI). The observation of flower parameters present in (Table 2) viz., commencement of flowering (days), length of flower bud (cm), corolla tube length (cm), flower bud diameter (cm), bud length without corolla (cm), corolla tube length (1.63 cm), hundred bud weight (g), flower yield per plant (g), flower yield per plot (g), flower yield (t ha⁻¹) and shelf life (hours)

The results revealed that application of vermicompost @ 2.5 t ha⁻¹ along with foliar spray panchagavya 3 percent (T₉) was found to be beneficial in improving the growth, flowering, yield and quality of Gundumalli.

Table 1: Effect of Bio Regulators along with Organics on growth parameters in Gundumalli (*Jasminum sambac* Ait).

Treatment	Plant height (cm)	Number of primary shoots	Number of secondary shoots	Number of leaves/ plant	Leaf area (cm ²)	Productive shoots	Chlorophyll content (CCI)
T ₁	77.72	5.26	6.43	46.70	15.62	33.75	1.55
T ₂	84.13	6.09	6.69	74.10	17.42	37.35	1.33
T ₃	87.36	6.43	7.21	87.20	18.75	38.78	1.42
T ₄	94.24	7.23	7.76	125.80	19.94	41.91	1.63
T ₅	107.49	8.82	9.01	192.40	23.39	48.16	2.00
T ₆	110.72	9.16	9.26	205.50	24.16	49.56	2.09
T ₇	100.94	8.01	8.36	161.80	21.54	45.21	1.81
T ₈	117.97	9.96	9.36	233.10	25.91	52.52	2.44
T ₉	124.52	10.71	10.41	260.00	27.56	55.47	2.64
T ₁₀	72.72	4.98	6.31	45.00	14.34	31.56	1.19
S.Ed	1.68	0.27	0.20	12.14	0.59	0.78	0.04
CD (p = 0.05)	3.53	0.58	0.42	24.26	1.25	1.63	0.10

In plant height which is maximum occurred (124.52 cm) in T₉ (vermicompost @ 2.5 t ha⁻¹ along with foliar spray panchagavya 3 percent) followed by treatment (T₈) (117.97 cm). It was much minimum in T₁₀ control (72.72 cm). The highest primary shoots (10.71 cm), number of secondary shoots (10.41 cm), leaves per plant (260.00), leaf area (27.56 cm), productive shoots (55.47 cm) and chlorophyll content (CCI – 2.64). The reason for the highest value in the best treatment (T₉) could be due to combined application of organic and bio regulators. Vermicompost owing to its surplus nutritive content enhanced beneficial soil micro flora and increase the plant growth. Hence it can be used as best source of organic nutrients for flower productivity as reported by [13]. This may be due to increased supply of major plant nutrients, which are required in larger quantities for the growth and development of plants, the application of nitrogen at optimum level attributed to acceleration in development of

growth and reproductive phases. Moreover, higher content of nitrogen might have accelerated protein synthesis, thus promoting earlier floral primordial development. Thus, results are in conformity with the findings [1] in African marigold. Application of bioregulators along with organic manures also is a reason for increased growth parameters. This was supported [11] in African marigold [3] in Tuberose. Application of vermicompost increased microbial biomass, humic materials and other plant growth influencing substances such as plant growth hormone, produced by microorganism during vermicomposting and dehydronagnose activity in soil [2]. This might be due to nitrogen is an essential part of nucleic acid this plays vital role in promoting the plant growth. This confirms the finding of [9] and [14]. This obvious that phosphorus is a constituent of chlorophyll and is involved in many physiological process including cell division, development of carbohydrates, fats and proteins etc.

Table 2: Effect of Bio Regulators along with Organics on floral parameters in Gundumalli (*Jasminum sambac* Ait).

Treatment	Days taken for commencement of flowering	Length of flower bud (cm)	Flower bud diameter (cm)	Bud length without corolla (cm)	Corolla tube length (cm)	100 bud weight (g)	Flower yield/plant (g)	Flower yield/plot (g)	Flower yield/ (ha ⁻¹)	Self life (hours)
T ₁	61.62	2.03	1.96	0.90	0.75	14.44	254.80	1526.40	1.98	25.45
T ₂	60.31	2.24	2.15	1.04	0.88	16.09	316.02	1896.12	2.57	26.57
T ₃	59.09	2.33	2.24	1.15	0.92	16.88	345.33	2071.98	2.68	27.14
T ₄	57.65	2.56	2.44	1.30	1.01	18.76	413.95	2483.70	3.94	28.24
T ₅	59.94	3.14	2.92	1.50	1.37	22.28	531.19	3187.14	3.20	31.04
T ₆	57.63	3.23	3.01	1.61	1.41	23.07	560.50	3363.00	3.31	31.61
T ₇	56.32	2.81	2.67	1.36	1.24	20.55	472.57	2835.42	2.95	29.41

T ₈	52.32	3.43	3.36	1.75	1.53	24.76	616.12	3695.72	3.56	33.16
T ₉	50.97	3.66	3.58	1.89	1.63	26.39	677.74	4066.44	3.78	34.39
T ₁₀	63.23	2.00	1.86	0.88	0.73	13.41	208.74	1252.44	1.87	25.24
S.Ed	0.64	0.05	0.06	0.014	0.02	0.61	54.36	326.16	0.05	0.53
CD (p = 0.05)	1.28	0.10	0.13	0.09	0.06	1.28	27.11	162.66	0.10	1.13

Flower parameters viz., Days taken for commencement of flowers T₉ (50.97), Length of flower bud (3.66 cm), Flower bud diameter (3.58 cm), Bud length with corolla (1.89 cm), Corolla tube length (1.63 cm), Hundred bud weight (26.39 g), Flower yield per plant (677.74 g) is present in (Fig.1), Flower yield per plot (4066.44 g), Flower yield (3.78 t ha⁻¹) and shelf life (hours) (34.39) is present in (Fig.2). In the present study application of organics along with foliar application of bioregulators increases the flower parameters. This might be attributed to the enhanced vegetative growth simultaneously increase in flower and quality parameters due to the application of vermicompost along with foliar application of panchagavya. This may be due to the accelerated mobility of the photosynthetic from the source to the sink due to the readily available from the vermicompost and panchagavya. On the other hand panchagavya is a single organic input, which can act as growth promoter and immunity booster. It has significant role in providing resistance to pest and diseases and in increasing the yield and shelf life. In the present study is in closed agreement with the findings of [16] in *Chrysanthemum* [12] and [5] in African marigold.

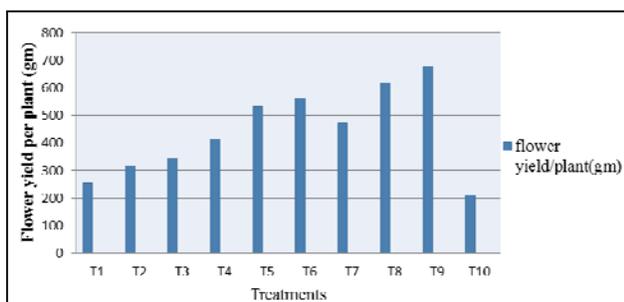


Fig 1: Effect of Bio Regulators along with Organics on flower yield per plant (gm) in Gundumalli (*Jasminum sambac* Ait).

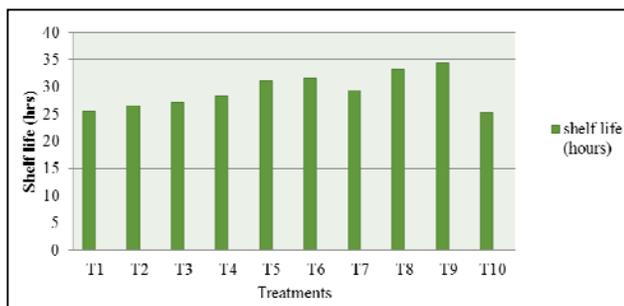


Fig 2: Effect of Bio Regulators along with Organics on shelf life (hrs) in Gundumalli (*Jasminum sambac* Ait).

The best treatment was with the application of vermicompost, which augmented the flowering and yield characters. The beneficial effect of earth worms on plant growth may be due to the presence of macro as well as micronutrients in vermicasts and in their secretions in considerable quantities. It is also the effect of metabolites produced by the earth worms which are responsible for stimulating the plant growth. It is also believed that the earth worm release certain vitamins and similar substances into the soil which may be vitamins B or

some pro-vitamins D or free amino acids reported [8] in marigold. Application of organic sources improved the quality parameters. This may be due to improvement in soil physical properties like bulk density, hardness, porosity, soil pH, Hormone etc., and biological properties like bacteria, fungi, actinomyces and earth worm activity etc. improvement in soil properties might have improved the root growth, nutrient uptake and quality of marigold flowers as reported [6].

Thus, from the study it was note worthy that application of vermicompost @ 2.5t ha⁻¹ along with foliar spray of panchagavya @ 3 percent was found to be beneficial in growth, flower yield and shelf life Gundumalli (*Jasminum sambac* Ait).

Conclusion

Based on the present investigation it can be concluded that the treatment combination of vermicompost @ 2.5 t ha⁻¹ along with foliar spray panchagavya 3 percent is best suited to grow Gundumalli (*Jasminum sambac* Ait) in open field condition to achieve good growth, profuse flowering, flower yield and shelf life.

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