



EFFECT OF ORGANIC NUTRIENTS AND BIO REGULATORS ON FLOWERING AND YIELD ATTRIBUTES OF CELOSIA (*Celosia cristata* L.)

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Abstract

A field experiment on the effect of organic nutrients and bio-regulators on growth and yield of Celosia (*Celosia cristata* L.) was conducted in randomized block design at floriculture unit, Department of Horticulture, faculty of Agriculture, Annamalai university, Tamil Nadu. The experiment comprised of 10 treatment combination comprised of organic manures viz., Farmyard manure, Vermicompost and Poultry manure along with bio regulators like Panchagavya, Humic acid and Seaweed extract was given as foliar application. Among the various treatments, application of Vermicompost @ 5 t ha⁻¹ along with Panchagavya @ 100 ppm was significantly increasing the Flowering parameters viz., Days taken for first flowering (28 days), duration of flowering (65 DAT), Number of flower per plant (19.00), Single flower weight (9.00 g) and Flower head width (7.00 cm) and flower yield characteristics viz., Flower yield per plant (127.33 g), flower yield per plot (1145.97 g) and flower yield per hectare (5.09 t ha⁻¹) was achieved in Celosia. From the experiment, application of Vermicompost @ 5 t ha⁻¹ with combination of Panchagavya @ 100 ppm, could adjudged as the best treatment in performance of Celosia under the open field condition.

Key words: Vermicompost, Humic acid, *Celosia cristata*

Introduction

Celosia (*Celosia cristata* L.) a C₃ plant, belongs to the Amaranthaceae family and is of tropical origin. The family Amaranthaceae is one of the largest families which comprises of well known species such as plume type (*Celosia plumose* L.), crested type (*Celosia cristata* L.) and wheat type, (*Celosia spicata* L.), which resembles of a wheat head. The name Celosia is derived from the Greek word 'Kelos' means 'burn' which describes the flame like colour and inflorescence. Flower heads may be harvested for fresh sales or dried for sale as everlasting flowers or used in making pot-pourri. It is one of the most versatile annual herbaceous plants with different colours, ranging from shades of red, purple, gold, orange and yellow including multicolored flower heads and it is a decorative flowering annual grown in warm countries mainly in the tropical and subtropical region (Okusanya, 1980). Integrated systems of flower producer are less dependent on intensive management. The use of bio 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 (Dhanumjaya Rao *et al.*, 2015). Bio 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. Hitherto, bio 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 bio regulators are essential to regulate the crop growth continuously. In light of these facts an attempt was made towards finding of the effect of organic nutrients and bio-regulators on growth and yield of Celosia (*Celosia cristata* L.) 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 organic nutrients and bio-regulators on growth and yield of Celosia (*Celosia cristata* L.) in the Department of Horticulture, Faculty of Agriculture, Annamalai Nagar in 2015 to 2017. The experiment was laid out in on Randomized Block Design (RBD) with 10 treatments and replicated three times (Panse and Sukhatme 1985). The experiment was conducted by using different organic manures viz., Farmyard manure, vermicompost and poultry manure and the application of bioregulators viz., Panchagavya, humic acid and seaweed extract given as foliar application as shown in the Table 1. The observations are recorded on the selected five plants for a treatment in each replication and the mean data is statistically analyzed.

Table 1: Treatment details of the experiment

No.	Treatment details
T ₁	Farmyard manure @ 20 t ha ⁻¹ + Panchagavya @ 100 ppm
T ₂	Farmyard manure @ 20 t ha ⁻¹ + Humic acid @ 100 ppm
T ₃	Farmyard manure @ 20 t ha ⁻¹ + Sea weed extract @ 100 ppm
T ₄	Vermicompost @ 5 t ha ⁻¹ + Panchagavya @ 100 ppm
T ₅	Vermicompost @ 5 t ha ⁻¹ + Humic acid @ 100 ppm
T ₆	Vermicompost @ 5 t ha ⁻¹ + Sea weed extract @ 100 ppm
T ₇	Poultry manure @ 10 t ha ⁻¹ + Panchagavya @ 100 ppm
T ₈	Poultry manure @ 10 t ha ⁻¹ + Humic acid @ 100 ppm
T ₉	Poultry manure @ 10 t ha ⁻¹ + Sea weed extract @ 100 ppm
T ₁₀	Control

Table 2: Effect of organic nutrients and bio-regulators on flowering and yield parameters of Celosia (*Celosia cirstata* L.)

Treatments	Days taken for first flowering	Duration of flowering (days)	No. of flowers plant ⁻¹	Single flower weight (g)	Flower head width (cm)	Flower yield plant ⁻¹ (g)	Flower yield plot ⁻¹ (g)	Flower yield (t ha ⁻¹)
T ₁	36.49	57.60	13.29	6.75	6.34	81.55	733.95	3.26
T ₂	29.88	63.37	17.74	8.51	6.86	117.16	1054.44	4.68
T ₃	31.77	61.73	16.47	8.01	6.73	106.98	962.82	4.27
T ₄	28.00	65.00	19.00	9.00	7.00	127.33	1145.97	5.09
T ₅	35.55	58.42	13.93	7.01	6.42	86.65	779.85	3.46
T ₆	33.67	60.08	15.19	7.50	6.58	96.82	871.38	3.87
T ₇	38.7	55.97	12.02	6.26	6.19	71.37	642.33	2.85
T ₈	41.21	53.49	10.09	5.51	5.95	56.12	505.08	2.24
T ₉	40.26	54.33	10.74	5.97	6.03	61.21	550.89	2.44
T ₁₀	43.11	51.84	8.81	5.01	5.80	45.94	413.46	1.83
S.ED	0.93	0.81	0.62	0.24	0.06	5.07	–	–
CD	1.87	1.62	1.25	0.48	0.13	10.5	–	–

Result and Discussion

Application of organic nutrients and bio-regulators significantly influenced the growth, flowering and yield parameters. The data and the result on the effect of organic nutrients and bio-regulators on flowering and yield parameters of Celosia (*Celosia cirstata* L.) and their observation is present in (Table 2) *viz.*, days taken first flowering (days), duration of flowering (days), number of flower per plant, single flower weight (g), flower head width (cm) and flower yield per plant (g) flower yield per plot (g), flower yield (t ha⁻¹).

Flower Parameters

Flower parameters *viz.*, Days taken for first flowers T₄ (28 days), duration of flowering (65 days), number of flowers per plant (19), single flower weight (9.00 g), flower head width (7.00 cm). In the present study application of organic nutrients and bio regulators increases the flower parameters. Moreover, higher content of nitrogen might have accelerated protein synthesis, thus promoting earlier floral primordia

development. 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 (Yathindra *et al.* 2016). 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. Thus, results are in conformity with the findings of Weena Nilawonk and Arnat Tancho. (2015) and Acharya and Dashora (2004) in African marigold.

Flower Yield Parameters

Flower yield characteristics *viz.*, flower yield per plant (127.33 g), flower yield per plot (1145.97 g) and flower yield per hectare (5.09 t ha⁻¹) was achieved 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. The best treatment was 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, actinomycetes and earth worm activity etc. Improvement in soil properties might have improved the root growth, nutrient uptake and quality of flowers. In the present study is in closed agreement with the findings of Ali salehi sardoei *et al.* (2014) in African marigold, Harshavardhan *et al.* (2016) in Carnation

Conclusion

Based on the present investigation it can be concluded that the treatment combination of Vermicompost @ 5 t ha⁻¹ along with foliar application of Panchagavya @ 100 ppm is best suited to grow Celosia (*Celosia cristata* L.) in open field condition to achieve good growth, profuse flowering and flower yield.

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