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RESEARCH ARTICLE

INFLUENCE OF SEASON ON THE YEAR ROUND PRODUCTION OF AFRICAN MARIGOLD (*TAGETES ERECTA* L.) VARIETIES GROWN UNDER PROTECTED STRUCTURES

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ABSTRACT

Marigold is one of the important crop used as loose flower throughout the country. The area and importance of the marigold is getting increased due to the xanthophyll content which increases the colour of the egg yolk in poultry industry. To enhance the productivity of marigold round the year, a study was initiated. The experiment was conducted to study the role of environmental conditions in flowering of African marigold (*Tagetes erecta L.*) under polyhouse condition during three seasons (June- July, September- October and January- February) in three marigold varieties (L3 hybrid V1, Pusa Narangi Gainda V2 and Nilakkottai Local V3). There was a significant increase in plant spread (27.67, 24.36 and 26.84 cm) during September – October in all the three varieties of marigold *viz.,* V1, V2 and V3 respectively. This is due to the favourable microclimate persisting in the polyhouse, especially during winter months. Increased single flower weight (8.24g) and increased yield of flowers (346.08 g) were recorded during September – October under polyhouse in L3 hybrid marigold. Polyhouse showed the highest number of harvests (9.00, 8.66 and 9.00) in all the three varieties of marigold *viz.,* V1, V2 and V3 respectively. This is due to the favourable condition prevailing under polyhouse that accelerates the flower production which is not possible in open conditions during winter. This increase may be due to an increase in the soil temperature, light intensity and humidity under polyhouse that results to increase in leaf area and plant spread which ultimately leads to increased flower production during September- October. Hence off season marigold production is enhanced under polyhouse condition.

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INTRODUCTION

African marigold (*Tagetes erecta* L.) belongs to the family Asteraceae, is an important traditional flower crop grown as an ornamental crop for loose flowers and also as a landscape plant, as well as a source of pigment for poultry feed. They perform well in dry, hot, sunny locations and produce dark-green, fine-textured foliage and bright coloured flowers throughout the summer and also in winter. Marigold is cultivated throughout India. Growth, development and productivity depends on different environmental factors and its interaction. Environment plays a major role in production and productivity of the crop. In most of the loose flower crops depending on the light availability and its intensities, the vegetative and reproductive characters exhibit some changes. The crops grown in open field are exposed to vivid environmental conditions, attack of insects and pests, whereas the polyhouse provides a more stable environment. Under protected structures *viz.,* 50% shade net house and polyhouse, the environmental conditions can be controlled by us by controlling the light and temperature to make the plants flower even in off season which could not be possible under open field environment.

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MATERIALS AND METHODS

This investigation was carried out under polyhouse condition to study the flowering of African marigold (*Tagetes erecta* L.) during three seasons (June- July, September- October and January- February) in three varieties of marigold (L3 hybrid, Pusa Narangi Gainda and Nilakkottai Local) at Botanic Gardens, Department of Floriculture and Landscaping, TNAU, Coimbatore by adopting Factorial Randomized Block Design (FRBD) with nine treatments and three replications to evaluate its performance on flower production.

RESULTS AND DISCUSSION

Significant variation among the varieties at different growing seasons was observed (Table 1 and 2). The plant height and stem diameter was maximum (101.8cm and 3.30 cm) during (S2) September- October in the variety (V3) Nilakkottai Local and least was in Pusa Narangi Gainda during June- July.

Table 1. Performance of African marigold (*Tagetes erecta L.)* with respect to growth attributes

Conditions (Varieties with Seasons)	Plant height (cm)	Plant spread (cm)	Stem diameter (cm)	Number of laterals	Total chlorophyll content (mg/g)
V1S1	65.49	26.01	2.45	9.00	1.25
V1S2	55.00	27.67	2.60	10.00	1.64
V1S3	54.03	21.86	2.10	9.00	1.31
V2S1	44.44	23.62	1.80	8.00	1.41
V2S2	57.88	24.36	2.10	9.00	1.72
V2S3	83.4	20.05	1.90	5.00	1.25
V3S1	68.66	25.51	2.30	8.00	1.64
V3S2	101.8	26.84	3.30	10.00	2.89
V3S3	64.05	20.94	2.31	9.00	1.56
C.D @ 5%	2.494	0.881	0.084	0.279	0.060

Table 2. Performance of African marigold with respect to yield and quality attributes

Conditions (Varieties with Seasons)	Number of flowers / plant	Flower diameter (cm)	Single flower weight (g)	Yield of flowers / plant (g)	Number of harvests made
V1S1	48.00	5.46	5.18	248.83	10.00
V1S2	42.00	4.50	8.24	346.08	9.00
V1S3	39.00	5.10	4.65	181.54	8.00
V2S1	32.00	4.50	4.82	154.24	9.00
V2S2	40.00	4.13	4.47	78.80	8.00
V2S3	27.00	4.20	3.37	90.90	9.00
V3S1	54.00	5.14	5.14	277.56	9.00
V3S2	44.00	4.70	6.14	270.16	9.00
V3S3	42.00	5.10	4.72	198.03	9.00
C.D @ 5%	1.296	0.163	0.178	9.959	2.494

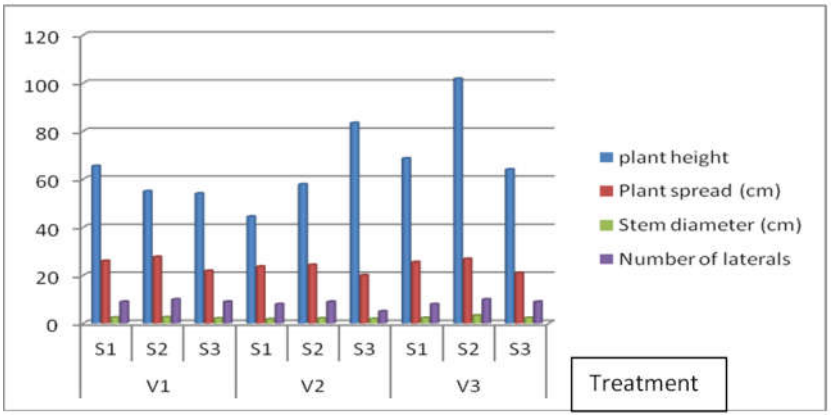

Figure 1. Performance of African marigold (*Tagetes erecta* L.) with respect to growth attributes

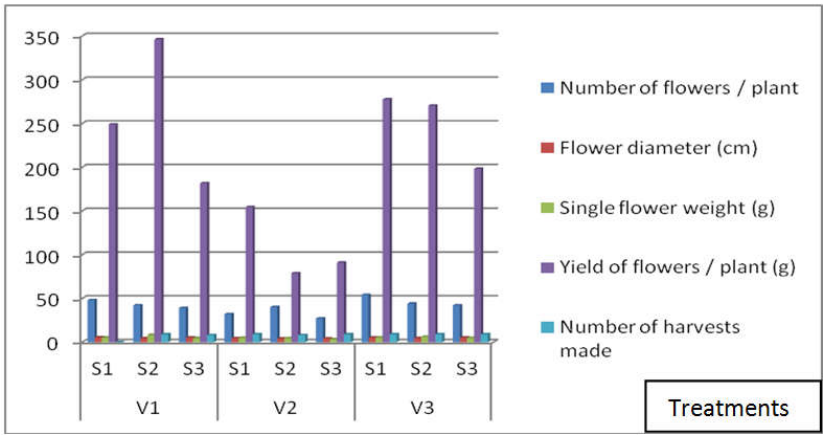

Figure 2. Performance of African marigold (*Tagetes erecta L.)* with respect to yield attributes

This was in accordance with Gaikwad and Patil (2001) who observed increased plant height in poly house than open environment in chrysanthemum. The plant spread was maximum (27.67 cm) in the variety L3 hybrid during September- October and least in (20.05 cm) Pusa Narangi Gainda during January- February. This is due to the favourable microclimate persisting in the polyhouse, especially during winter months. Similar variation in growing conditions for plant spread was also observed in gerbera by Kumar and Sooch (2003). Number of laterals and single flower weight was maximum (10.00 and 10.00), (8.24 and 6.14 g) in L3 hybrid and Nilakkottai Local during September- October. Such variations in lateral production were also reported by Bhuyar and Sable (2003) and Kumar and Sooch (2003) in several cultivars of gerbera (*Gerbera jamesonii* L.). Number of flowers per plant was maximum (54.00) in Nilakkottai Local followed

by L3 hybrid (48.00) during June- July. Flower diameter was observed maximum (5.46 cm) in L3 hybrid during June- July and least (4.13 cm) in Pusa Narangi Gainda during September- October. This was in accordance with Gotz (1983) in gerbera cultivars grown under greenhouse conditions. Single flower weight was maximum (8.24 g) in L3 hybrid during September- October. Similarly Gaikwad and Patil (2001) reported medium height and spread with more number of branches, more number of flowers per spray and more number of sprays per plant and per plot in chrysanthemum. Number of harvests made was maximum (10.00) in L3 hybrid during June- July. This is due to the favourable micro climate prevailing under polyhouse. Yield of flowers/ plant was maximum (346.08 g) during September- October. Similar finding in carnation (*Dianthus caryophyllus* L.) with respect to flower yield was also observed by Sathisha (1997), Naveenkumar *et al.* (1999), Patil (2001), Gurav *et al.* (2004), Shiragur (2002), Ryagi *et al.* (2007) and Shahakar *et al.* (2004). This is due to an increase in the soil temperature, light intensity and humidity prevailing under polyhouse condition. During September- October, increased yield of flowers was observed in polyhouse grown plants. This result may be due to the variation of differential light intensities received by the plants during different growing season. This increase may be due to an increase in the soil temperature, light intensity and humidity that results to increase in leaf area and plant spread which ultimately leads to increased plant growth and flower production during September- October. This might be due to the lower incidence of PAR under polyhouse condition. As a result, the air temperature inside the polyhouse gradually increased due to green house effect. Thus, the inner polyhouse becomes warm to warmer and the temperature remained at the optimum level (above 20ºC) for the growth and development of marigold plants during September- October season.

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