

## Effect of Planting Dates and Growing Conditions on Rose Scented geranium (*Pelargonium graveolens* L.) during Late rabi Season under Southern Telangana Zone

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**ABSTRACT:** A field investigation entitled “Effect of planting dates and growing conditions on rose scented geranium (*Pelargonium graveolens* L.) was conducted during late rabi season under Southern Telangana zone” was conducted at Medicinal and Aromatic plant research station, Sri Konda Laxman Telangana State Horticultural University, Rajendranagar, Hyderabad during the year 2022-2023. The experiment was laid out in Factorial Randomized Block Design (FRBD) with nine treatments and three replications. Results revealed that maximum plant height (118.14 cm), number of leaves per plant (111.00) and essential oil yield per hectare (201.60 kg) were recorded in the treatment combination of T<sub>1</sub> - P<sub>1</sub>G<sub>1</sub> (December 1<sup>st</sup> + 50 % shade net). While the lowest plant height (72.57 cm) in T<sub>5</sub> - P<sub>2</sub>G<sub>2</sub> (December 15<sup>th</sup> + partial shade), number of leaves per plant (55.53) in T<sub>6</sub> -P<sub>2</sub>G<sub>3</sub> (December 15<sup>th</sup> + open condition) respectively, Whereas maximum essential oil yield per hectare (91.67 kg) was recorded in the treatment combination of T<sub>8</sub> - P<sub>3</sub>G<sub>2</sub> (January 1<sup>st</sup> + partial shade) as compared with other treatments.

**Keywords:** Geranium, Essential oil, Shade net, Partial shade.

### INTRODUCTION

Rose scented geranium (*Pelargonium graveolens* L. Herit) is an important high value perennial aromatic shrub, belong to the family Geraniaceae (Shawl *et al.*, 2006). The name of the genus *Pelargonium* comes from the Greek “Pelargos” meaning a stock, due to the “stock bill shaped” characteristics of its flower and stem. The plant is a native of dry rocky slopes of Cape Province in South Africa. It is highly adaptable to different climatic conditions like drought tolerant, perennial and aromatic herb (Angadi and Kumar 1995). It is mostly cultivated for the geranium oil, an essential oil with an intense rose-like aroma and is traditionally grown in hilly regions in the South and West parts of India, where the climate is temperate and the soils are gravelly acidic (Ram *et al.*, 1995).

The main reason for utilization of geranium is to make essential oil, by hydro steam distillation of fresh herbage, it produces a pale yellow to light greenish geranium oil, if we store properly, the oil has a rich, almost rose-like aroma that is said to get better with age

(Gulati *et al.*, 1982). Its essential oil is utilised in industry to fragrance soaps and cosmetics as well as to extract Rhodinol, an expensive aroma chemical used in high-end perfumes (Prasad and Chattopadhyay 1999). Geranium oil is also used in aroma therapy to treat menopausal symptoms, skin illnesses, mental weariness and anxiety (Singh *et al.*, 2000). It also exhibits pharmacological, antifungal, pesticidal and antiseptic effects (Aggarwal *et al.*, 2000).

Growth, development and oil quality of any aromatic plant depends on climatic factors, but these factors are beyond the control of human beings. It can also be improved by cultural operations. While planting any crop, it is important to consider the time of planting and space appropriately depending on the plant growth habit and nature of root system. Geranium can grow in temperate, sub-tropical and tropical climates. Temperature range of 5-23°C and rainfall ranging from 750mm of the plains up to 2750 mm ideal for its cultivation. Hence, for good yields, optimal growing conditions are crucial. Therefore, it is important to research how

growing conditions and planting dates can alter environmental factors and have an impact on the growth, yield and oil quality of geranium. Hence, present investigation was aimed to study the effect of planting dates and growing conditions on rose scented geranium (*Pelargonium graveolens* L.) during late rabi season under Southern Telangana Zone.

## MATERIALS AND METHODS

The present investigation was conducted at Medicinal and Aromatic Plant Research Station, Sri Konda Laxman Telangana State Horticultural University, Rajendranagar, Hyderabad, during Rabi season for the year 2022-23. The experiment was laid out in Factorial Randomized Block Design (FRBD) with nine treatments and three replications with two factors viz., factor one consists of three levels of planting dates viz., P<sub>1</sub>: December 1<sup>st</sup>, P<sub>2</sub>: December 15<sup>th</sup> and P<sub>3</sub>: January 1<sup>st</sup> with three growing conditions viz., G<sub>1</sub>: 50 percent shade net, G<sub>2</sub>: partial shade or intercropping and G<sub>3</sub>: open condition. Periodical observation was recorded for Plant height, number of leaves per plant and essential oil yield per hectare. Data based on the mean of the individual plants chosen for observation were statistically analyzed as defined by Panse and Sukhatme (1967).

**Table 1: Treatment details.**

Number of Treatments	Treatment Combinations
T <sub>1</sub> = P <sub>1</sub> × G <sub>1</sub>	December 1 <sup>st</sup> + 50 per cent shade net
T <sub>2</sub> = P <sub>1</sub> × G <sub>2</sub>	December 1 <sup>st</sup> + partial shade/Inter cropping
T <sub>3</sub> = P <sub>1</sub> × G <sub>3</sub>	December 1 <sup>st</sup> + open condition
T <sub>4</sub> = P <sub>2</sub> × G <sub>1</sub>	December 15 <sup>th</sup> + 50 per cent shade net
T <sub>5</sub> = P <sub>2</sub> × G <sub>2</sub>	December 15 <sup>th</sup> + partial shade/Inter cropping
T <sub>6</sub> = P <sub>2</sub> × G <sub>3</sub>	December 15 <sup>th</sup> + open condition
T <sub>7</sub> = P <sub>3</sub> × G <sub>1</sub>	January 1 <sup>st</sup> + 50 per cent shade net
T <sub>8</sub> = P <sub>3</sub> × G <sub>2</sub>	January 1 <sup>st</sup> + partial shade/Inter cropping
T <sub>9</sub> = P <sub>3</sub> × G <sub>3</sub>	January 1 <sup>st</sup> + open condition

**Table 2: Effect of planting dates and growing conditions on plant height (cm) and number of leaves of rose scented geranium (*Pelargonium graveolens* L.)**

Planting dates (P)	Plant height (cm)				Number of leaves			
	Growing conditions (G)				Growing conditions (G)			
	G <sub>1</sub>	G <sub>2</sub>	G <sub>3</sub>	MEAN	G <sub>1</sub>	G <sub>2</sub>	G <sub>3</sub>	MEAN
P <sub>1</sub>	118.14	73.26	79.81	<b>90.40</b>	111.00	64.93	70.47	<b>82.13</b>
P <sub>2</sub>	107.06	72.57	74.31	<b>84.65</b>	87.53	62.40	55.53	<b>68.49</b>
P <sub>3</sub>	100.09	77.04	90.69	<b>89.27</b>	90.67	57.73	63.53	<b>70.64</b>
<b>MEAN</b>	<b>108.43</b>	<b>74.29</b>	<b>81.60</b>		<b>96.40</b>	<b>61.69</b>	<b>63.18</b>	
	<b>SEm±</b>		<b>CD @ 5%</b>		<b>SEm±</b>		<b>CD @ 5%</b>	
<b>P</b>	0.95		2.84		0.87		2.62	
<b>G</b>	0.95		2.84		0.87		2.62	
<b>P × G</b>	1.64		4.93		1.51		4.53	

## RESULTS AND DISCUSSION

### A. Plant height (cm)

The data on plant height at 30, 60 and 90 days after planting as influenced by the planting dates, growing conditions and their interactions are presented in the Table 2 and depicted in the Fig. 1.

Regarding plant height, it was discovered that the variations in planting dates and growing conditions were found to be significant. P<sub>1</sub>G<sub>1</sub> (December 1<sup>st</sup> + 50 % shade net) registered highest value (118.14 cm) for plant height, while P<sub>2</sub>G<sub>2</sub> (December 15<sup>th</sup> + partial shade) recorded the lowest value for plant height (72.57 cm).

Among growing conditions, higher plant height was recorded in G<sub>1</sub> (50 % shade net) which was due to the fact that plants grow in the shade tend to have elongated growth due to long segment of stem composed of thin-walled cells, larger intercellular spaces and fewer transport tissue and binding tissue. This can be caused by the activity of auxin (Boardman, 1977).

### B. Number of leaves per plant

Data recorded on number of leaves per plant as influenced by different planting dates, growing conditions and their interactions are presented in the Table 2 and Fig. 1

The number of leaves varied considerably depending on the planting dates and growing conditions. Among the treatment combinations, P<sub>1</sub>G<sub>1</sub> (December 1<sup>st</sup> + 50 % shade net) recorded a greater number of leaves per plant (111.00). Whereas P<sub>2</sub>G<sub>3</sub> (December 15<sup>th</sup> + Open condition) registered lesser number of leaves per plant (55.53).

More number of leaves per plant at 30, 60 and 90 DAP was recorded in P<sub>1</sub> (December 1st) which was due to the same treatment registered the best values with respect to plant height and number of branches per plant as compared to others. The other reason might be that early planting resulted in appropriate temperature prevailed during the growth period. These findings are in line with the report of Degu *et al.* (2017) in geranium.

### C. Essential oil yield per hectare:

Data depicted in the Table 3 revealed that significant differences were observed among the planting dates, growing conditions and their interactions in terms of essential oil content per hectare.

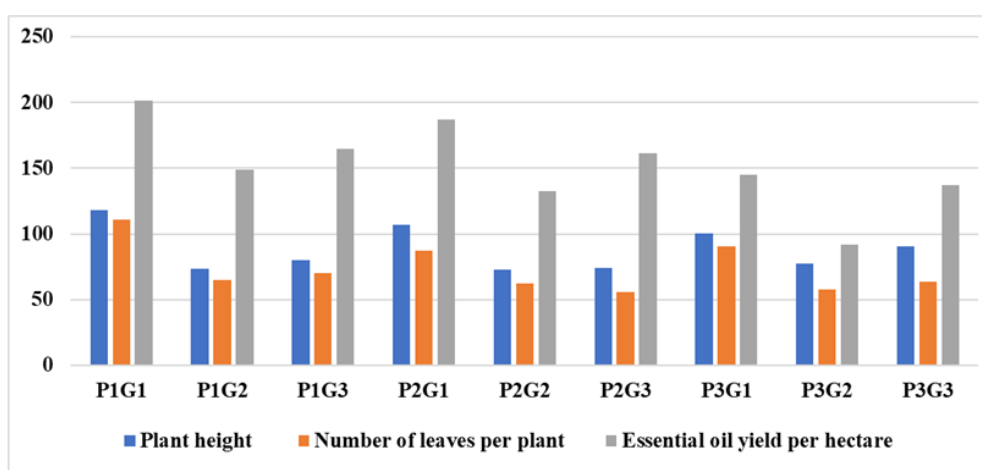
Significant interaction effect was observed between planting dates and growing conditions on this parameter. The treatment combination of P<sub>1</sub>G<sub>1</sub> (December 1<sup>st</sup> + 50 % shade net) recorded best value for essential oil yield per hectare (201.60 kg), while,

P<sub>3</sub>G<sub>2</sub> (January 1<sup>st</sup> + Partial shade) registered least value for essential oil yield per hectare (91.67 kg).

Maximum essential oil yield per plant, per plot and per hectare was recorded in G<sub>1</sub> (50 % shade net) which might be due to the same growing condition registered higher values for growth parameters as well as fresh herb yield than other growing conditions (Rao *et al.*, 1997). The other reason might be that increase of leaf yield per hectare attributed to the increment of essential oil yield per hectare (Degu *et al.*, 2017).

**Table 3: Effect of planting dates and growing conditions on essential oil yield per hectare (kg) in rose scented geranium (*Pelargonium graveolens* L.)**

Planting dates (P)	Essential oil yield per hector (kg)			
	Growing conditions (G)			
	G <sub>1</sub>	G <sub>2</sub>	G <sub>3</sub>	Mean
P <sub>1</sub>	201.60	148.67	164.93	<b>171.73</b>
P <sub>2</sub>	186.87	132.33	161.53	<b>160.24</b>
P <sub>3</sub>	145.07	91.67	136.80	<b>124.51</b>
<b>Mean</b>	<b>177.85</b>	<b>124.22</b>	<b>154.42</b>	
	S.Em±		C.D at 5%	
P	1.04		3.13	
G	1.04		3.13	
P × G	1.80		5.43	



**Fig. 1.** Effect of planting dates and growing conditions on plant height (cm), number of leaves and essential oil yield per hectare (kg) in rose scented geranium (*Pelargonium graveolens* L.)

### CONCLUSIONS

It could be concluded from the present investigation that; different treatment combinations significantly influence the growth and quality of rose scented geranium. Among the interactions, P<sub>1</sub>G<sub>1</sub> (December 1<sup>st</sup> + 50 % shade net) proved the best to improve growth and quality parameters under Southern Telangana conditions.

### FUTURE SCOPE

Essential oil content in geranium yield best under shade net condition. Therefore, the experiment can be conducted by comparing the performance of local varieties and export varieties under shade net conditions.

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**Conflict of interest.** None.

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