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Effect of different growing condition on vegetative, flowering and yield parameter of rose cv. Gladiator

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Abstract
An investigation on effect of different growing conditions in rose cv. Gladiator was carried out at College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during the year 2018-19 and 2019-20 in randomized block design with three treatment of growing condition *viz.*, Open field, Polyhouse condition and Shadenet condition, it was undertaken by considering the commercial importance of rose to maximize the production of farmer throughout the year. The result revealed that, the significantly maximum plant height (102.45 cm), maximum number of branches (18.52), number of leaves (524.60), initiation of first flower bud (33.00), appearance of tight bud stage (39.16), Opening of first flower bud (44.29), stalk length (42.99 cm), number of flower per plant (25.25), number of flower per m^2 (93.42), number of flower per hectare (9.35) was recorded in treatment T_2 i.e. polyhouse.

Keywords: Rose, polyhouse, growth, yield, condition

Introduction
Rose (*Rosa indica*) is a tropical and subtropical plant which belongs to genus Rosa, sub family is Rosoideae and family Rosaceae. Rose is one of nature's most beautiful creations and is universally known as 'Queen of flowers' for its shape, different sizes, attractive colours and most delightful fragrance with varied uses. Roses are most popular flowers among many floriculture crops of the world. The rose word derived from the Latin word "Erose" meaning the "God of love". The rose has 200 species and more than 20,000 varieties (Gauchan *et al*., 2009) [1]. Among these the important categories of rosesare Hybrid Tea, Floribunda, Hybrid perpetual, Grandifloras, Tea scented china roses, Polyanthas, Miniatures, Cabbage rose, Bourbon rose, French rose alba, Musk rose, Mamblers moss roses, Noisette roses**.** Rose is a symbol of love, adoration and innocence and it occupies a prominent position in the tradition, religious and social culture of every country in the world. Rose as cut flower has great demand in the internal as well as export markets.
Rose can be successfully cultivated in mild climate with good sunshine. The flower production in rose can be increased by using different growing structure like polyhouse, shadenet. As it is difficult to obtain good quality cut flowers under open conditions throughout the year in Konkan region due to high average annual rainfall (3635 mm) and low light intensity (150-200 lux) in rainy season. Therefore the crops should be cultivated under the cover to get good quality produce (Polyhouse, Shadenet), it is large enough to grow crops under partial or fully controlled environmental conditions to obtain optimum growth and quality production. The main advantages of polyhouse and Shadenet cultivation are the crops can be cultivated successfully throughout the year, getting high productivity with excellent quality, it is easy to protect the crops against extreme climatic conditions and incidence of pests and disease. Climatic factors play a vital role in the production of quality roses.

Material and Method
A field experiment was carried out at College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during the year 2018-19 and 2019-20 in randomized block design to study effect of different growing condition on vegetative, flowering and yield parameter of rose cv. Gladiator with three treatment *viz.*, T_1- Open field, T_2- Polyhouse condition and T_3- Shadenet condition and replicated seven times. The treatments were imposed on new budded plants of rose cv. Gladiator.
The variety gladiator was planted under three growing conditions with 25 plants per plot in seven replications i.e. 175 plants were planted under three growing condition (open, polyhouse, shadenet) with total plant population of 525 plants.

Healthy plants were used for the planting in the three sets of experimental plots. Before planting the field was prepared by mixing with different fertilizers like suphala (25 g/plant), FYM (100 g/plant), etc. Planting was done on 19th and 20th June, 2018 for three sets of experiments. The rose plants were planted on bed of size 6.3 m x 1.2 m with spacing 60cm x 45 cm in each experiment.

Nutrient management was done with application @ 600 kg nitrogen, 200 kg phosphorous and 200 kg potash per hectare in the form of straight fertilizers i.e., urea, single super phosphate and muriate of potash for three sets of experiments i.e. 17 gm urea, 32.4 gm SSP, 8.64 gm MOP/plant was provided, whole dose of phosphorous, potassium and 1/3rd dose of nitrogen was applied at the time of planting. While 2/3rd dose of nitrogen was applied as top dressing in three equal splits. Application of 19:19:19 drenching (10gm/lit), soil application of Suphala (15:15:15) @25gm/plant, drenching of 0:52:34 @5gm/lit and Humic acid @10 gm/15 lit of water were singly provided once in a week. FYM was added @100 gm/plant at the time of planting.

All cultural operations *viz*., manual pruning, pinching, disbudding, weeding, irrigation, pest control, etc. were carried out as and when required was done after 45 days of planting. Observations on various vegetative characters *viz*., plant height, maximum number of branches, number of leaves, flowering parameter like initiation of first flower bud, appearance of tight bud stage, Opening of first flower bud, stalk length, yield parameter like number of flower per plant, number of flower per m^2, number of flower per hectare were recorded at proper stage and analysed statistically by the method suggested by Panse and Sukhatme (1978) [5].

Result and Discussion

The data presented in table 1 revealed that, different treatments of growing condition had significant effect on all growth, flowering and yield parameter of rose studied in this.

Table 1: Growth, flowering and yield of rose cv. Gladiator as influenced by different growing condition

Treatment	Plant height (cm)	Number of branches	Number of leaves	Initiation of first flower bud	Appearance of first flower bud	Opening of first flower	Stalk length (cm)	Yield of flower/plant	Yield of flower/m^2	Yield of flower/ha
T_1-Open	101.19	17.54	492.50	37.03	41.90	47.43	38.80	23.58	87.23	8.73
T_2-Polyhouse	102.45	18.52	524.60	33.00	39.16	44.29	42.99	25.25	93.42	9.35
T_3-Shadenet	97.20	17.22	463.06	41.72	48.64	54.50	32.45	21.89	81.01	8.10
SE	0.22	0.08	2.62	0.62	0.16	0.24	0.31	0.32	1.17	1.17
CD	0.69	0.24	8.06	1.90	0.49	0.75	0.95	0.98	3.61	3.61

Growth

The vegetative growth parameter like plant height, maximum number of branches, number of leaves in rose shows significant effect on plant growth. The treatment T_2 i.e. polyhouse were recorded significantly highest plant height (102.45 cm) which was followed by open condition this might be due to optimum light intensity in combination with warmer environment and higher relative humidity inside the polyhouse which helped in increase in height as compared to open condition and shade environments. These results are in agreement to those reported by the Mohanty *et al*. (2011) [4], Maximum number of branches (18.52) were recorded in treatment T_2 i.e. polyhouse this might be due to Reduction of light intensity to optimum condition, increased temperature and relative humidity under polyhouse might have favoured early sprouting of buds and increase in branches as compared to open condition. The present findings are in the same line as reported by Moe (1972) [3]. Significantly maximum number of leaves (524.60) were also recorded in treatment T_2 i.e. polyhouse this might be due to the long waves of light which entre into the polyhouse might have converted into short wave, the short waves were trapped into the polyhouse which helps to increase the inner temperature and $C0_2$ inside the polyhouse which increase the photosynthesis rate of plant and simultaneously increase the number of leaves. (Patil *et al*. 2012) [6].

Flowering

The treatment T_2 i.e. polyhouse recorded minimum days for initiation of first flower bud (33.00), days taken for tight bud stage Opening of first flower (44.29) this might be due suitable growing condition with optimum light intensity, favorable temperature and moist air inside the polyhouse might have helped in the faster growth and early appearance of flower buds as observed in the present study. This might have favored accumulation of more carbohydrate than other growing environments. It is the tendency of plant to come to reproductive phase early if it has enough carbohydrate in it (Malhotra and Kumar, 2000) [2]. The significantly maximum stalk length (42.99 cm) was recorded in treatment T_2 i.e. polyhouse condition this might be due to, in polyhouse plant get maximum sunshine which helps to increase the stalk length of rose plant. Malhotra and Kumar (2000) [2] also observed increment in stalk length of roses under polyhouse as compared to open condition.

Yield

The treatment T_2 i.e. polyhouse recorded significantly maximum yield of flower per plant (25.25), Yield of flower per m^2 (93.42), Yield of flower per ha (9.35) this might be due to the microclimatic conditions in polyhouse which helps to increase the flower yield and more light intensity, warmer environment. The same result was noticed by Talukdar *et al*. (1987) [7]. However, performance of cultivar Gladiator under shadenet and open condition were statistically comparable with each other. The similar findings were also observed by Mohantay *et al.* 2011 [4].

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