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Studies on performance of rose (*Rosa* spp.) under different growing condition.

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Abstract
An studies on 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 spread (44.17), leaf area (8393.67 cm^2), days taken for tight bud stage (39.16), was recorded in treatment T_2 i.e. polyhouse. Bud length (4.23 cm), bud diameter (3.44 cm), flower diameter (9.84 cm), stem diameter (1.78 cm), number of petal per flower (50.07), fresh weight of fully open flower (20.43 g), was recorded in treatment T_1 i.e. open.

Keywords: Rose, diameter, growth, weight, condition

Introduction
Rose is flowering plants that have been cultivated for thousands of years and are known for their beauty, fragrance and cultural significance. 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. Rose (*Rosa indica*) is a tropical and subtropical plant which belongs to genus Rosa, sub family is Rosoideae and family Rosaceae. The queen of flower, rose is beautiful and attractive. It grows in different colours like red, white, yellow, pink and other varieties. Small thorns on the stem protect the plant. In the world of art, poetry and literature, rose has been glorified as a symbol of love, compassion and eternal beauty. Among these the important categories of roses are 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.

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.

Materials and Methods
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).

Results and Discussion

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

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

Treatment	Stem diameter (cm)	Plant spread (cm)	Leaf Area(cm^2)	Days taken for tight bud stage	Bud length (cm)	Bud diameter (cm)	Flower diameter (cm)	Number of peteal/ flower	Fresh weight of fully open flower
T_1-Open	1.78	39.28	8215.80	41.90	4.23	3.44	9.84	50.07	20.43
T_2-Polyhouse	1.69	44.17	8393.67	39.16	3.87	2.86	8.15	43.79	17.44
T_3-Shadenet	1.71	36.40	7129.88	48.64	4.12	3.35	9.73	46.64	18.16
SE	0.01	0.12	53.65	0.16	0.05	0.05	0.16	0.44	0.22
CD	0.02	0.38	165.31	0.49	0.14	0.14	0.50	1.37	0.67

Growth

The vegetative growth parameter like stem diameter, maximum plant spread, leaf area in rose shows significant effect on plant growth. The treatment T_2 i.e. polyhouse were recorded significantly highest plant spread (44.17 cm) which was followed by open condition this might be due to Various growing environments had significant influence on spread of the plants at all stages of plant growth. It was observed that plants under polyhouse had maximum spread (46.89 and 41.46 cm), which was followed by open condition (38.29 cm and 34.51 cm) and the minimum plant spread was observed in shadenet condition due to low light intensity as compared to polyhouse and shadenet.

Reduction of light intensity to optimum condition, increased temperature and relative humidity under polyhouse might have favored increase in spread as compared to open condition. However, the spread under open were at par with each other during some of the observations. The present findings are in the same line as reported by Moe (1972) [4]. The results of present study are similar to the findings of Mohanty *et al.,* (2011) [5] in rose.

Maximum leaf area (8393.67cm^2) were recorded in treatment T_2 i.e. polyhouse. Significant differences were also observed among growing conditions for leaf area. In general the polyhouse condition recorded maximum leaf area which was at par with open condition. Higher leaf area in the polyhouse as well as open field was due to more leaf length. The size of leaf was increased in polyhouse and open condition as compared to shadenet due to the more photosynthesis rate and more absorption of photosynthetic active radiation in bright sunshine.

Leaf area was minimum in shadenet, shorter leaves resulted in minimum leaf area. Since the varied in their length of leaves, leaf area also varied. Variation in leaf area among cultivars was also observed in gerbera by Mahanta *et al*. (2003) [1].

Significantly maximum stem diameter (1.78 cm) were also recorded in treatment T_1 i.e. open this might be due to higher carbohydrates in plants in open condition. It is very essential for cut flowers to possess a strong stem of sufficient strength to hold bloom firmly erect (Malik, 1968) [3]. Stem diameter indicates the sturdiness of the cut flowers. In the present investigation stem diameter was maximum in gladiator. (Malik,1968) [3].

This might be due to higher carbohydrates in plants maintained in open condition as compared to polyhouse and shadenet condition (Malhotra and Kumar, 2000) [2].

Flowering

The treatment T_2 i.e. polyhouse recorded minimum days taken for tight bud stage (39.16), days taken for tight bud stage this might be due to 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 bud length (4.23 cm) was recorded in treatment T_1 i.e. open condition this might be due to, the fact that light received in open and polyhouse condition is more than shadenet. And also due to higher temperature during the vegetative growth phase, thereby influencing both vegetative and reproductive characters by Subhendu *et al*. (2011) [6].

The significantly maximum bud diameter (3.44 cm) and flower diameter (9.84 cm) was recorded in treatment T_1 i.e. open condition this might be due to, open cultivation flower get maximum sunshine and receive more light for the flower development. And also due to higher temperature during the vegetative growth phase, thereby influencing both vegetative and reproductive characters by Subhendu *et al*. (2011). The significantly maximum number of petal / flower (50.07) and fresh weight of fully open flower (g) (20.43) was recorded in treatment T_1 i.e. open condition It is clear from results that the open condition recorded maximum number of petals and fresh weight of fully open flower which might be due favorable environment (temperature and humidity) in open environment. The above results are in accordance with Subhendu *et al*. (2011).

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