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To study the effect of potting containers on growth and disease incidence of vanilla cuttings

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Abstract

The experiment entitled the effect of potting containers on growth and disease incidence of vanilla cuttings conducted in a controlled laboratory setting condition. We put small parts of plants with 2, 3, and 4 nodes into the ground to see how they would grow and the cuttings of 2, 3, and 4 nodes were to compare their growth and disease appearance. All of the pot sizes were better than the plastic bag. Moreover, in two node cutting plants, it was observed that the tallest average height (25.54 and 125.49 cm) and the highest number of leaves (3 and 15) were recorded in pots measuring 26 x 24 cm at 45 days after planting and 90 days after planting, respectively. In three nodes', the highest mean height of the plant (31.81 and 133.53 cm) and the number of leaves (4 and 15.20) were recorded in 26 x 24 cm pot size at 45 DAP and 90 DAP, respectively and in four nodes', highest mean height of plant (40.19 and 142.72 cm) and number of leaves (5 and 16.30) were recorded in 26 x 24 cm pot size at 45 DAP and 90 DAP, respectively. Moreover, minimum percent mortality was observed in a pot of 26 x 24 cm (26.67%), followed by 18 x 16 cm, (33.33%). Maximum percent mortality was recorded in a 15 x 10 cm polythene bag, primarily due to poor drainage. Effect of sterilized soil against vanilla cuttings in a pot experiment, minimum percent mortality was recorded in 15 PSI 121°C for 30min. double sterilization (3.33%), followed by 15 PSI 121 °C for 15min. double sterilization (13.33%) while maximum percent mortality was recorded in Black Sheet (83.33%) mortality. In summary, the best results were obtained with four-node cuttings potted in containers measuring 26 x 24 cm. These plants had the tallest average height, and the number of leaves was measured at 45 days after planting and 90 days after planting, with no signs of disease.

Keywords: Pot, container, growth, disease, vanilla etc.

Introduction

India is known as the land of spices because it produces, uses, and sells the most spices in the world. In simple terms, most of the spices made in the country are used by the people who live there, while only a small amount is sent to other countries. India is responsible for almost half of the world spice market, both in terms of how much is produced and how much it is worth (Patil PP 2003) ^[1].

Vanilla is a type of plant that climbs and grows every year. It belongs to the orchid family. Vanilla originally comes from Mexico in South America. People started growing vanilla as a cash crop in places like Madagascar, Java, Mauritius, Tahiti, the Seychelles, Zanzibar, Brazil, Indonesia, the Comoro Islands, India, and other areas. In recent years, Vanilla has become more important. It is known as the "Prince of Spices". Most of the plants in this group have 110 different types. They look like vines and have big and pretty flowers that are green or cream in color. The flowers usually smell sweet scent.

Suryawanshi (2005) ^[3] found that growing a lot of vanilla in five main areas of Maharashtra, specifically in Konkan regions, like Thane, Raigad, Ratnagiri, and Sindhudurg, has caused many fungal diseases. Some of these diseases are shoot tip rot, leaf spot or rot, and stem rot. The Fusarium rot disease was worse in areas where vanilla plants were grown close together and in areas with shade nets, compared to vanilla plants grown in arecanut orchards. On the other hand, the Colletotrichum leaf rot disease was more severe. So, at first, we decided to study how planting pots and sterilizing the soil affects the growth and disease of vanilla plants in pots. Please rewrite this text using simple language.

Materials and Methods

Effect of potting containers on growth of vanilla cuttings was studied in laboratory conditions. The materials and the methods used are described below.

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Pot experiment: We studied how using different types of pots affected the growth of vanilla cuttings in a controlled environment. The cuttings had varying lengths of 2, 3, and 4 nodes. The pots used in the study were different sizes: 12 x 10 cm, 13 x 12 cm, 18 x 16 cm, 26 x 24 cm, and there was also a plastic bag sized 15 x 10 cm. In these studies, researchers looked at ten plants in each group to see how tall they grew and how many leaves they had when they were planted, 45 days later, and 90 days later. Researchers conducted an experiment in the laboratory to see how different pots affect the fortuitous of disease in vanilla cuttings. We tested how vanilla cuttings grow and survive in four different pot sizes and one plastic bag. The information was recorded 90 days after the plants were put in the ground.

Effect of soil sterilization on survival of vanilla cuttings in pots

Effect of sterilized soil against vanilla cuttings in pot experiment was studied in laboratory. The various types of sterilizations were used for study *viz.*, treatments were,

Tr. No. Treatments of sterilization

T ₁	: Black Sheet (7 days)
T ₂	: 15 PSI 121 °C for 15min. Once
T ₃	: 15 PSI 121 °C for 15min. Twice
T ₄	: 15 PSI 121 °C for 30min. Once
T ₅	: 15 PSI 121 °C for 30min. Twice
T ₆	: 5% formalin (48 hrs.)
T ₇	: 10% formalin (48 hrs.)
T ₈	: Control (unsterilized soil)

In these studies ten plants were observed with three replications in each treatment for percent mortality of vanilla cuttings.

Results and Discussion

We conducted an experiment in a lab to see how different types of pots affect the growth of vanilla cuttings with 2, 3, and 4 nodes. Different sizes of pots were used for the study. The sizes were 12 x 10 cm, 13 x 12 cm, 18 x 16 cm, 26 x 24 cm, and one polythene bag of size 15 x 10 cm. In these studies, ten plants were looked at in each treatment (pot size) to see how tall they were and how many leaves they had when they were planted, 45 days after they were planted, and 90 days after they were planted.

Two nodes

From the data Table 1, it was observed that the all the pot

sizes were found superior to the polythene bag. Moreover, it was noted that the highest mean height of the plant (25.54 and 125.49 cm) and number of leaves (3 and 15) in a 26 x 24 cm pot size at 45 DAP and 90 DAP, respectively. Subsequent these, the pot sizes of 18 x 16 cm showed 23.85 cm plant height and 3 leaves at 45 DAP and 108.95 cm plant height and 11.90 leaves at 90 DAP for vanilla cuttings. The least values for height of plant (17.39 and 55.94 cm) and number of leaves (3 and 5.4) at 45 DAP and 90 DAP were observed in the treatment of a polythene bag of size 15 x 10 cm.

Three nodes

All the pot sizes were found superior to the polythene bag (Table 1). It was revealed that the highest mean height of the plant (31.81 and 133.53 cm) and number of leaves (4 and 15.20) were recorded in a 26 x 24 cm pot size at 45 DAP and 90 DAP, respectively. Followed by the pot sizes of 18 x 16 cm showed 30.65 cm plant height and 4 leaves at 45 DAP and 117.54 cm plant height and 12.90 leaves at 90 DAP of vanilla cuttings.

The least values for height of plant (23.82 and 62.40 cm) and number of leaves (4 and 5.60) at 45 DAP and 90 DAP, respectively, were observed in the treatment of a polythene bag of size 15 x 10 cm.

Four nodes

The data are given in Table 1. It was noticed that the highest mean height of the plant (40.19 and 142.72 cm) and number of leaves (5 and 16.30) were recorded in a 26 x 24 cm pot size at 45 DAP and 90 DAP, respectively. Also, the pot sizes of 18 x 16 cm showed 39.37 cm plant height and 5 leaves at 45 DAP and 128.36 cm plant height and 13.80 leaves at 90 DAP of vanilla cuttings. The lowest values for height of plant (32.76 and 72.09 cm) and number of leaves (5 and 7.20) at 45 DAP and 90 DAP, respectively, were observed in the treatment of a polythene bag of size 15 x 10 cm. Moreover, all the pot sizes were found superior as compare to polythene bag.

In support of these findings, Sankaran *et al.* (1994) [2] found that the length of a vine in vanilla is connected to the number of characters, nodes, leaves, and the distance between nodes. It looks like this is the first time they are trying to study how different pots affect the growth of cuttings and survival of vanilla plants in a controlled environment. So, we couldn't find the usual evidence that links the plant pots and diseases together.

Table 1: Effect of potting containers on growth of Vanilla cuttings (2, 3 and 4 nodes)

Tr. No.	Pot Size (cm)	At time of Planting		After Planting			
				45 Days		90 Days	
		Plant Height (cm)*	No. leaves*	Plant Height (cm)*	No. leaves*	Plant Height (cm)*	No. leaves*
2 nodes							
T1	12 x 10	15.25	2.00	19.40	3.00	64.39	7.80
T2	13 x 12	15.00	2.00	21.07	3.00	81.22	9.30
T3	18 x 16	15.30	2.00	23.85	3.00	108.95	11.90
T4	26 x 24	15.30	2.00	25.54	3.00	125.49	15.00
T5	Poly bags 15 x 10	13.28	2.00	17.39	3.00	55.94	5.40
3 nodes							
T1	12 x 10	21.75	3.00	25.82	4.00	71.96	8.10
T2	13 x 12	21.50	3.00	27.50	4.00	88.88	9.60
T3	18 x 16	21.80	3.00	30.65	4.00	117.54	12.90
T4	26 x 24	21.80	3.00	31.81	4.00	133.53	15.20

T5	Poly bags 15 x 10	19.78	3.00	23.82	4.00	62.40	5.60
4 nodes							
T1	12 x 10	30.25	4.00	34.44	5.00	81.25	8.80
T2	13 x 12	30.00	4.00	36.58	5.00	98.66	10.60
T3	18 x 16	30.30	4.00	39.37	5.00	128.36	13.80
T4	26 x 24	30.30	4.00	40.19	5.00	142.72	16.30
T5	Poly bags 15 x 10	28.28	4.00	32.76	5.00	72.09	7.20

* Mean of Plant Height and No. of leaves

Effect of potting containers on disease incidence of Vanilla cuttings

In the lab, we studied how using different types of planting containers affected the amount of disease in vanilla cuttings.

We tested the growth and survival of vanilla cuttings by using four different sizes of pots and one polythene bag. The observations were recorded 90 days after planting. The data obtained were displayed in Table 2.

Table 2: Effect of potting containers on disease incidence of Vanilla cuttings.

Tr. No.	Treatments (Pot Size cm)	Mean	% Mortality
T ₁	12 x 10	6.00	60.00
T ₂	13 x 12	5.33	53.33
T ₃	18 x 16	3.33	33.33
T ₄	26 x 24	2.67	26.67
T ₅	Poly bags 15 x 10	7.83	78.33

Minimum percent mortality was recorded in 26 x 24 cm i.e. 26.67 percent, followed by 18 x 16 cm, i.e. 33.33 percent. Also, in 13 x 12 cm pot size found 53.33 percent mortality. Maximum percent mortality was shown in 15 x 10 cm size polythene bag, which might be due to ill drainage.

Effect of soil sterilization on survival of Vanilla cuttings in pots

The Effect of sterilized soil against Vanilla cuttings in pot experiment was studied *in vitro*. The various types of sterilization were used for study are as Black Sheet, 15 PSI 121 °C for 15min. Single, 15 PSI 121 °C for 15min. Double, 15 PSI 121 °C for 30min. Single, 15 PSI 121 °C for 30min.

Double, 5% formalin and 10% formalin. In these studies, ten plants were observed with three replications in each treatment for percent mortality of vanilla cuttings.

From the data obtained table 3, it was observed that the minimum percent mortality was observed in 15 PSI 121 °C for 30min. Double sterilization (T₅) i.e. 3.33 percent, followed by 15 PSI 121 °C for 15min. Double sterilization (T₃), i.e. 13.33 percent and 15 PSI 121 °C for 30min. Single sterilization (T₄) i.e. 16.67 percent as compared to control (T₈) i.e. 89.33 percent. Also, in treatments T₂, T₇ recorded 36.67 and 46.67 percent mortality. Maximum percent mortality was recorded in Black Sheet (T₁) i.e. 83.33 percent mortality. (Goh KM, 1977, Colombo RC 2016) [4, 5].

Table 3: Effect of soil sterilization on survival of vanilla cuttings in pots.

Tr. No.	Treatments of sterilization	Mean	Mortality (%)
T ₁	Black Sheet (7 days)	8.33	83.33
T ₂	15 PSI 121 °C for 15min. (once)	3.67	36.67
T ₃	15 PSI 121 °C for 15min. (Twice)	1.33	13.33
T ₄	15 PSI 121 °C for 30min. (once)	1.67	16.67
T ₅	15 PSI 121 °C for 30min. (Twice)	0.33	3.33
T ₆	5% formalin (48 hrs.)	6.00	60.00
T ₇	10% formalin (48 hrs.)	4.67	46.67
T ₈	Control (unsterilized soil)	8.93	89.33

Conclusion

In conclusion, the best results were obtained with four-node cuttings potted in containers measuring 26 x 24 cm. These plants had the tallest average height, and the number of leaves was measured at 45 days after planting and 90 days after planting, with no signs of disease.

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