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**Nivedita T Garande**

M.Sc. (Horti.) Scholar, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**RC Gajbhiye**

Associate Professor, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**RG Khandekar**

Professor and Head, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**AV Mane**

Agronomist, Regional Coconut Research Station, Bhatye, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**KV Malshe**

Deputy Director of Research (Seed), College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**SB Thorat**

Assistant Professor, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**ST Garande**

M.Sc. (Horti.) Scholar, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

**Corresponding Author:**

**Nivedita T Garande**

M.Sc. (Horti.) Scholar, Department of Plantation, Spices, Medicinal, and Aromatic Crops, College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

## Effect of different rapid multiplication methods on rooted cuttings in black pepper (*Piper nigrum* L.)

Nivedita T Garande, RC Gajbhiye, RG Khandekar, AV Mane, KV Malshe, SB Thorat and ST Garande

### Abstract

The present investigation entitled “Effect of different rapid multiplication methods on rooted cuttings in black pepper (*Piper nigrum* L.)” was undertaken at College of Horticulture, Dr. B. S. K. K. V., Dapoli (M.S.) during the year 2021-2022. The experiment was conducted in Randomized Block Design (RBD) with seven treatments and four replications. The treatments comprises; T<sub>1</sub>: Raised bed method, T<sub>2</sub>: Split halves of PVC method, T<sub>3</sub>: Serpentine method, T<sub>4</sub>: Soil mound method, T<sub>5</sub>: Wooden log method, T<sub>6</sub>: Modified serpentine method, T<sub>7</sub>: Wire mesh column method. Among the different treatments studied, the treatment T<sub>6</sub> (modified serpentine method) recorded the maximum number of cuttings per harvest, total number of cuttings obtained per year, sprouting percentage % at 30 DAP and survival percentage % at 45 DAP. The highest B:C ratio (1.98) was observed in serpentine method.

**Keywords:** Black pepper, rapid propagation, multiplication, spices, techniques

### Introduction

Black pepper (*Piper nigrum* L. Piperaceae) is called the “King of Spice” (Srinivasan, 2007; Mathew *et al.*, 2001) [11, 6] it is one of the most economically important spice crops of the world. Black pepper is the world's most traded spice, and is one of the most common spices added to cuisines around the world. Out of 1000 Species of pepper, *Piper nigrum* is the most important cultivated species due to its economic value (Bhat *et al.*, 1995) [3]. Black pepper is originated in the tropical evergreen forests of the Western Ghats of India and is presently largely cultivated in India; Brazil, Indonesia, Malaysia, Sri Lanka, Vietnam and People's Republic of China (Sivaraman *et al.*, 1999) [10].

In the world, India is a major producer, consumer and exporter of black pepper, even though it is predominantly grown for export. In 2020, Vietnam was the world's largest producer and exporter of black pepper, producing 270,192 tonnes or 36% of the world total. During 2019-20, India produced 10,40,710 tonnes of black pepper in a total area of 16,07,740 ha. During 2019-20, India exported 17,000 tonnes of black pepper with a net revenue of Rs. 57,371 lakhs<sup>6</sup> (Ashoka *et al.*, 2021) [2].

Black pepper can be propagated sexually by seeds and asexually by cuttings, layering and grafting. Seed propagation often resulted in genetic variation and propagation are slow and time consuming (Atal & Banga, 1962) [1] so, there is a necessity to introduce efficient methods for rapid propagation of black pepper. In order to get more seedling and quality planting material in short period of time black pepper is multiplied rapidly in different countries of world *viz.*, India, Sri Lanka (Sivaraman, 1987) [9].

### Material and Methods

The field experiment was carried out at the Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri during the year 2021-2022. The experiment was conducted in Randomized Block Design (RBD) with seven treatments and four replications. Five black pepper rooted cuttings were selected randomly from replication of each treatment to record observations. Average of five cuttings was computed for further statistical analysis. In each treatment, 20 cuttings were planted in every replication. The maximum number of cuttings per harvest, total number of cuttings obtained per year, sprouting percentage (%) at 30 DAP and survival percentage (%) at 45 DAS were recorded at appropriate stages during investigation period. The data was statistically analysed as method suggested by Panse and Sukhatme (1995) [7].

## Results and Discussion

The data pertaining to number of cuttings in different rapid multiplication methods of black pepper are presented in Table 1. From the data, it is observed that there was significant difference among the treatments with respect to number of cuttings per harvest.

**Table 1:** Effect of different rapid multiplication of black pepper on production of number of rooted cuttings

Treatments	Number of cuttings per harvest		Total number cuttings obtained per year
	1 <sup>st</sup> harvest	2 <sup>nd</sup> harvest	
T <sub>1</sub> - Raised bed	30.25	32.75	63.00
T <sub>2</sub> - Split halves of PVC	45.25	44.50	89.75
T <sub>3</sub> - Serpentine	51.50	50.25	101.75
T <sub>4</sub> - Soil mound	47.75	48.75	96.50
T <sub>5</sub> - Wooden log	34.00	35.25	69.25
T <sub>6</sub> - Modified serpentine	55.25	55.75	111.00
T <sub>7</sub> - Wire mesh column	38.25	40.75	79.00
S.Em±	1.12	0.80	0.93
CD at 5%	3.38	2.42	2.80

The number of cuttings obtained at first and second harvest differed significantly among the various treatments. The maximum number of cuttings at first harvest (55.25) and second (55.75) were observed in treatment T<sub>6</sub> i.e. modified serpentine method which was significantly superior over rest of the treatments at first and second harvest. The minimum number of cuttings of 30.25 and 32.75 were harvested in treatment T<sub>1</sub> i.e. raised bed method during the first and second harvest, respectively. The present investigation the maximum numbers of cuttings per harvest were observed in modified serpentine method. It might be due to allowing runners to strike roots on the bed composed of rich potting media. When the rooted cuttings grows and produces nodes, each of these nodes are gently pressed into the bed which further come in contact with potting media like vermicompost, soil and cocopeat with the help of a clip which enable for rooting at that junction. Present result are accordance with the findings reported by Prasath *et al.* (2014) [8] stated that partially decomposed coir pith and vermicompost (75: 25) enriched with *Trichoderma* is found to be an ideal potting medium for black pepper nursery for healthy planting material. Khandekar *et al.* (2004) [4] reported that maximum numbers of cuttings per harvest were obtained in soil mound method (18.41) and bamboo split method (9.70).

The perusal of data on total number of cuttings obtained in different rapid multiplication methods of black pepper are presented in Table 1. From the data it is observed that there was significant difference among different treatments in respect of total number of cuttings obtained per year. Significantly the highest numbers of cuttings (111.00) harvested in a year recorded in treatment T<sub>6</sub> i.e. modified serpentine method which was significantly superior over rest of the treatments. However, the lowest numbers of cuttings were recorded in treatment T<sub>1</sub> i.e. raised bed method (63.00). The highest total number of cuttings (111.00) was found in modified serpentine method. It might be due to fast growth of roots at each node when pressed on the bed of partially decomposed cocopeat, vermicompost and soil results in more number of cuttings per year. Similar findings were reported by Thapa *et al.* (2017) [12] they obtained highest 60 cuttings per mother plant in a year through serpentine method of multiplication. Khandekar *et al.* (2004) [4] they reported that

the maximum number of cuttings harvested in soil mound method (73.50) and bamboo split method (38.80) per year.

The data regarding sprouting percentage in various rapid multiplication methods of black pepper are presented in Table 2.

**Table 2:** Effect of different rapid multiplication of black pepper on sprouting percentage

Treatments	sprouting percentage	
	1 <sup>st</sup> harvest	2 <sup>nd</sup> harvest
T <sub>1</sub> - Raised bed	75.20	75.57
T <sub>2</sub> - Split halves of PVC	86.74	83.70
T <sub>3</sub> - Serpentine	90.77	88.05
T <sub>4</sub> - Soil mound	89.52	87.69
T <sub>5</sub> - Wooden log	78.68	76.59
T <sub>6</sub> - Modified serpentine	95.02	92.82
T <sub>7</sub> - Wire mesh column	83.00	80.36
S.Em±	1.33	1.17
CD at 5%	4.02	3.54

From the data presented in Table 2 it is revealed that at 30 DAP sprouting percentage at first and second harvest differed significantly among treatments. Significantly the maximum sprouting percentage was recorded in treatment T<sub>6</sub> (Modified serpentine method) at first (95.02%) and second (92.82%) harvest. However, the minimum sprouting percentage were observed in treatment T<sub>1</sub> (Raised bed method) 75.20% and 75.57% in first harvest second harvest, respectively. The maximum sprouting percentage was observed in modified serpentine method. It may be due to the more volume of potting media consists of vermicompost, soil and cocopeat available to each node for root initiation during growth of mother vine in modified serpentine method. Results analogous to this findings was reported by Kadake (2019) [5] who obtained the maximum per cent of sprouting in black pepper cuttings i.e. 96.59% at first harvest and 94.32% at second harvest in serpentine method.

The data pertaining to the survival percentage rooted cutting of black pepper in different rapid multiplication methods are presented in Table 3.

**Table 3:** Effect of different rapid multiplication of black pepper on survival percentage

Treatments	Survival (%)	
	1 <sup>st</sup> harvest	2 <sup>nd</sup> harvest
T <sub>1</sub> - Raised bed	66.94	67.93
T <sub>2</sub> - Split halves of PVC	77.90	75.28
T <sub>3</sub> - Serpentine	84.95	83.08
T <sub>4</sub> - Soil mound	78.01	75.89
T <sub>5</sub> - Wooden log	71.32	68.79
T <sub>6</sub> - Modified serpentine	92.76	91.03
T <sub>7</sub> - Wire mesh column	73.85	71.77
S.Em±	1.30	1.11
CD at 5%	3.91	3.37

The highest survival percentage of rooted cuttings at first harvest (92.76%) and second harvest (91.03%) were observed in treatment T<sub>6</sub> (Modified serpentine method) whereas the lowest survival percentage 66.94 and 67.93 was recorded in treatment T<sub>1</sub> (Raised bed method) at first and second harvest, respectively. In present investigation, the maximum survival percentage was observed in modified serpentine method (T<sub>6</sub>). It may be due to the more volume of vermicompost, soil and cocopeat available at each node which supplied all essential

nutrients that resulted more rooting of the cuttings and further growth of vine and their survival percentage. Similar results were reported by Kadake (2019) [5] that the maximum survival percentage of black pepper cuttings at first harvest (93.58) and second harvest (91.83) in serpentine method; these findings are in agreement with present results.

### Conclusion

From the present experiment result it can be concluded that, the maximum number of cuttings per harvest, total number of cuttings obtained per year, sprouting percentage and survival percentage was observed in treatment T<sub>6</sub> (Modified serpentine method). So far as growth performance, quality and production of total number of sampling per year is concerned, modified serpentine method followed by serpentine method was found best for rapid multiplication of black pepper.

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