

**Research Article**

Evaluation of potting mixtures and humidity conditions for rooting and establishment of plagiotropic branches of black pepper (*Piper nigrum* L.)

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Abstract: Bush pepper grown from the lateral branches (plagiotrops) of black pepper (*Piper nigrum* L.) has the advantage of growing as a garden plant without standards for trailing and there is surge in demand for planting materials. An experiment was conducted to standardize suitable rooting conditions for the production of bush pepper in which, potting mixture (soil and vermicompost in 3:1 proportion) and coir pith compost, alone and in combination were evaluated for the rooting and establishment of bush pepper with and without humid chambers. The laterals of black pepper variety Panniyur 1 were used. There were nine treatments with three replications each. After 50 days of planting it was observed that, the largest number of laterals established where coir pith compost in 8 x 5 cm black nursery bags and kept under humid chamber (T₂ / 63.3 %) followed by coir pith compost in 19" x 8" transparent LDPE bags, planted the cuttings and tied the mouth for retaining humidity (T₈ / 60.8%). In both the cases the planting medium used was coir pith compost. Hence it is inferred that coir pith compost could be used as medium for rooting and establishment of laterals for large scale production of bush pepper.

Keywords: Bush pepper; establishment; laterals; plagiotrops; planting material; rooting

Introduction

Bush pepper is a miniature black pepper (*Piper nigrum* L.) plant in the shape of a bush grown as potted plant with decorative and economic value, raised from lateral branches (plagiotrops) of yielding vines. Bush pepper needs no standards for trailing or climbers for harvesting, anybody can care the plant and pluck the spikes as one wishes. Growing bush pepper in 3-4 pots in the sit out or veranda of the house especially in urban areas help them to taste garden fresh pepper (Lakshmana *et al.*, 2016; Nybe *et al.*, 2016).

Growing bush pepper is one of the important suggestions to bridge the gap between demand and supply of black pepper (Madhura and Chandini, 2000). Considerable interest among urban people has been noted to grow bush pepper in the garden and terrace which in turn increased the demand for planting materials. As compared to runner shoots, the rooting of laterals was found to be far less. Hence there is a need to standardize suitable rooting conditions for the production of bush pepper. The present study investigates the rooting and establishment of laterals in potting mixture incorporated with coir pith compost under different humidity conditions.



Fig. A: Lateral branch



Fig. B: Lateral branches prepared for planting

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Materials and Methods

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The experiment was carried out at Indian Cardamom Research Institute, Regional Station, Sakleshpur, Karnataka, India during May-July 2016. Potting mixture (soil and vermicompost in 3:1 proportion) and coir pith compost (CPC) were evaluated for the rooting and establishment of lateral branches of black pepper with and without humid chambers. The healthy lateral shoots (Fig. A) from pepper vines (Panniyur 1) were collected from ICRI farm, and given a slant cut at the bottom and dipped in rooting hormone (commercial grade powder) to enhance the root initiation (Fig. B). Then the laterals were planted in the various medium.

The following were the treatments.

- T₁ Potting mixture in 8 x 5 cm black nursery bags under humid chamber
- T₂ Coir pith compost (CPC) in 8 x 5 cm black nursery bags under humid chamber
- T₃ Potting mixture + CPC (1:1) in 8 x 5 cm black nursery bags under humid chamber
- T₄ Potting mixture in 8 x 5 cm black nursery bags without humid chamber
- T₅ CPC in 8 x 5 cm black nursery bags without humid chamber
- T₆ Potting mixture + CPC (1:1) in 8 x 5 cm black nursery bags without humid chamber
- T₇ Potting mixture in 19 x 8 inch transparent LDPE bags mouth tied with thread for retaining humidity
- T₈ CPC in 19 x 8 inch transparent LDPE bags mouth tied with thread for retaining humidity
- T₉ Potting mixture + CPC (1:1) in 19 x 8 inch transparent LDPE bags mouth tied with thread for retaining humidity

Replication: 3

No. of plants (bags) per replication: 12



Fig. C: Bush pepper established in pots



Figure D: Yielding bush pepper plant

Each bag carried ~500g potting mixture or coir pith compost or both. After planting, the bags were watered thoroughly. The poly bags of the treatments T₁ - T₃ were arranged under a humid chamber created by covering with thin white plastic sheet (200 µm thick). The treatments T₄ - T₆ were arranged without humid chamber. In both the cases, agro shade nets were used to cover the area so as to provide required shade and prevent direct sunshine. In T₆ - T₉ the mouths of the LDPE bags were tied with thread for retaining proper humidity and the bags were allowed to hang down under agro shade net cover. The experiment was set up in third week of May and the establishment of the bush pepper was recorded in first week of July. The rainfall and temperature data during the study period was noted from the meteorological observatory of the institute in order to assess the seasonal conditions favorable for rooting and establishment especially in T₄ - T₆.

Results and Discussion

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The largest number of laterals was rooted and sprouted in T₂ (63.3 %) where coir pith compost (CPC) was taken in 8 x 5 cm black nursery bags and kept under humid chamber. It was followed by T₈ (60.8%) where CPC as taken in 19 x 8 inch transparent LDPE bags, planted the cuttings and tied the mouth for retaining humidity. In both the cases the planting medium was CPC. The treatments T₉ and T₇ recorded 55 % and 52.6 % establishment respectively which were on par with each other (Table 1). Lakshmana *et al.*, (2016) reported a success rate of 35% with plagiotropic branches of pepper variety, Panniyur 1 when planted in 4" x 6" PE bags and kept in 50% shade for rooting and sprouting. Similarly, Prakash *et al.*, (2016) reported that success rate of rooting of lateral branches fluctuated from 10-40% in one of the farmer's nursery. It is evident that the establishment rate of rooting obtained during the present study is significantly higher than the

previous observations and hence the method could be easily adopted for making more number of bush pepper plants (Fig. C & D).

Table 1: Establishment of lateral branches of black pepper in different planting media and humid conditions

Treatment	Establishment (%)
T ₁ Potting mixture in 8 x 5 cm black nursery bags under humid chamber	41.60 (39.85) ^{de}
T ₂ Coir pith compost (CPC) in 8 x 5 cm black nursery bags under humid chamber	63.30 (54.38) ^a
T ₃ Potting mixture + CPC (1:1) in 8 x 5 cm black nursery bags under humid chamber	44.16 (41.77) ^d
T ₄ Potting mixture in 8 x 5 cm black nursery bags without humid chamber	35.83 (36.88) ^{ef}
T ₅ CPC in 8 x 5 cm black nursery bags without humid chamber	38.80 (38.38) ^{ef}
T ₆ Potting mixture + CPC (1:1) in 8 x 5 cm black nursery bags without humid chamber	38.80 (38.38) ^{ef}
T ₇ Potting mixture in 19" x 8" LDPE bags mouth tied with thread for retaining humidity	52.60 (46.59) ^c
T ₈ CPC in 19" x 8" LDPE bags mouth tied with thread for retaining humidity	60.08 (51.29) ^b
T ₉ Potting mixture + CPC (1:1) in 19" x 8" LDPE bags mouth tied with thread for retaining humidity	55.00 (48.09) ^c
CD (p=0.05)	8.718

Values followed by same letters in a column do not differ significantly and accordingly Duncan's Multiple Range Test (DMRT). Values in parenthesis indicate angular transformation.

The weather parameters during the study period showed that minimum temperature ranged from 16-19°C and maximum temperature ranged from 26-34°C. In addition, the number of rainy days (53) and rainfall (1741 mm) received were also might have contributed for the development of sufficient humidity for the establishment of the cuttings (Table 2). Wahid and Sitepu (1987) stated that a relative humidity of 60-95 % was optimum for various stages of growth of pepper vines and optimum soil temperature for root growth was 26-28°C. The environmental conditions prevailed during the present study period would have highly favoured the rooting and sprouting of the laterals. Even then there is a need to establish more precise micro-climatic conditions required for bush pepper nursery so that the success rate of rooting of laterals could be further enhanced which in turn reduces the cost involved. In general, the study indicated that maximum rooting of lateral was obtained when CPC was used as potting medium under humid conditions and hence could be used for large scale production of bush pepper planting materials.

Table 2: Weather conditions recorded during the period of study

Month & Year	Temperature (°C)		No. of rainy days	Rainfall (mm)
	Min	Max		
April 2016	19	33	2	28
May 2016	19	34	6	70
June 2016	16	30	22	951
July 2016	16	26	23	692
Total	-	-	53	1741

There was 50 effective rainy days (*i.e.* 5 mm and above) out of total

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