



# **Effect of Different Levels of Vermicompost on Growth and Establishment of Different Varieties of Bush Pepper (*Piper nigrum* L) under Prayagraj Agro-climatic Zone**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

An Experiment was conducted on the effect of different levels of vermicompost on growth of different varieties of bush pepper under Prayagraj agro-climatic zone. The experiment was laid out with 10 treatments replicated thrice in randomized block design. Ten treatments including three different varieties of bush pepper in three different concentrations of soil and vermicompost are taken. The present investigation revealed that Soil and vermicompost 50% each for the variety Panniyur-2 followed by soil and vermicompost 50% each for the variety Sreekara are the best in terms of growth parameters. Hence it is concluded that the Panniyur-2 planted in 50% of soil and vermicompost is the most suitable for Prayagraj agro-climatic zone.

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## 1. INTRODUCTION

Black pepper (*Piper nigrum L*) is a tropical perennial climbing vine belongs to the family Piperaceae. Black pepper is also known as the king of spice which contributes to a major share in the Indian spice scenario. Black pepper is cultivated for its fruits which dried and then used. The medicinal properties of black pepper can be attributed due to the chemical component Piperine. Black pepper provides physiological benefits and prevent chronic illness [1-4]. It has Anti-Oxidant, Anti-microbial, Anti-Inflammatory and gastro protective effects. Black pepper grows extensively in the evergreen forest of Western Ghats and nearby areas and it can grow well in both plains and high altitudes (~ up to 1500 m mean sea level (MSL) (Butt et al., 2013).

Bush pepper is a miniature version of black pepper attains a bushy appearance with decorative and economic value [5-7]. Bush pepper raised from fruiting branches and produces spikes from all its branches yielding berries throughout the year. Bush pepper is also useful where area for cultivation is a limiting factor [8,9].

The planting material used for producing normal way of black pepper is to use the rooted cuttings (single or 3noded) of runner shoots or climbing shoots. Here the plant turns into a vine after climbing on a support and produces fruiting branches all over the support. But in case of bush pepper the laterals are used as planting material, so that the plants grow like a bush. Unlike vines they produce numerous laterals throughout the year. The rooting percentage of laterals as planting material was found to be far less ie, less than 30% compared to runners. (Sujatha et al., 2004).

## 2. MATERIALS AND METHODS

The experiment was carried out from June 2022 to November 2022 at the experimental research field, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, (UP). Varieties Sreekara, Karimunda, collected from IISR, Calicut and Panniyur-2 collected from Pepper research station, Panniyur, Kerala.

Collected cuttings were carefully placed and watered under the shade net until the potting

mixture is ready. Once the potting mixture is prepared, healthy cuttings were selected and planted in polybags of size 20 x 15 cm with different concentrations of soil and vermicompost as per the treatments. To prevent bacterial wilt 19:19:19 2g/L applied at the time of transplanting. T<sub>0</sub>- (Soil+ NPK, T<sub>1</sub>-Soil(75%)+ vermicompost (25%) in the variety Sreekara), T<sub>2</sub>- (Soil(50%)+ vermicompost (50%) in the variety Sreekara), T<sub>3</sub>- (Soil(25%)+ vermicompost (75%) in the variety Sreekara), T<sub>4</sub>- (Soil(75%)+ vermicompost (25%) in the variety Panniyur-2), T<sub>5</sub>- (Soil(50%)+ vermicompost (50%) in the variety Panniyur-2), T<sub>6</sub>- (Soil(25%)+ vermicompost (75%) in the variety Panniyur-2), T<sub>7</sub>- (Soil(75%)+ vermicompost (25%) in the variety Karimunda), T<sub>8</sub>- (Soil(50%)+ vermicompost (50%) in the variety Karimunda), T<sub>9</sub>- (Soil(25%)+ vermicompost (75%) in the variety Karimunda). The observations were taken in 60 DAT, 120 DAT (Days after transplanting) and DBR (Day before Replanting).

For growth parameters Survival percentage (%), Plant height (cm), Number of leaves, Leaf area (cm<sup>2</sup>), Number of branches, Length of internode (cm) were considered. The mean data of each character would be replicated three times and each character would be worked out statistically by the method of analysis of variance using RBD (Randomized Block Design).

## 3. RESULTS AND DISCUSSION

### 3.1 Growth Parameters

Survival percentage (%)

T5 Soil (50%) + vermicompost (50%) for the variety Panniyur-2 and T4 Soil (75%)+ Vermicompost(25%) for the variety Panniyur-2 showed the maximum Survival percentage and the minimum recorded in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda and in T3 Soil(25%) + Vermicompost(75%) for the variety Sreekara. The maximum survival percentage might be due to the humidity tolerance of the variety and the sufficient nutrient supply of potting mixtures. similar findings are recorded by Bendre et al. [10] in soil + rice husk + compost (1:1:1) media.

Plant height (cm)

Plant height (cm) found to be highest in T5 Soil (50%) + Vermicompost (50%) for the variety

**Table 1. Effect of different treatments on growth parameters of various varieties of bush pepper**

Treatments	Details of treatments	Survival percentage (%)	Plant height(cm)	Number of leaves	Leaf area(cm <sup>2</sup> )	Number of branches	Length of internode(cm)
T <sub>0</sub>	Soil+ NPK(RDF)	66.66	21.19	5.33	94.02	2	6.51
T <sub>1</sub>	75%+ 25% in the variety Sreekara	66.66	23.02	4.55	87.24	3.22	6.63
T <sub>2</sub>	50%+ 50% in the variety Sreekara	66.66	26.75	5.88	100.93	3.55	7.31
T <sub>3</sub>	25%+ 75% in the variety Sreekara	33.33	19.49	4.55	23.26	2.11	4.92
T <sub>4</sub>	75%+ 25% in the variety Panniyur-2	100	24.11	5.77	118.52	3	7.04
T <sub>5</sub>	50%+ 50% in the variety Panniyur-2	100	28.69	12.11	127.52	4.11	8.05
T <sub>6</sub>	25%+ 75% in the variety Panniyur-2	66.66	19.73	6.99	97.36	1.44	5.53
T <sub>7</sub>	75%+ 25% in the variety Karimunda	66.66	19.90	6	108.84	2.44	6.12
T <sub>8</sub>	50%+ 50% in the variety Karimunda	66.66	26.23	5.88	124.59	3.55	7.12
T <sub>9</sub>	25%+ 75% in the variety Karimunda	33.33	18.98	4.66	47.6	1.22	4.12
F- test			S	S	S	S	S
S.Ed			0.03	0.14	70.42	0.05	.004
CD at 5%			0.29	0.64	14.39	0.39	0.02
CV			0.75	6.11	9.02	0.24	8.66

Panniyur-2 60 DAT (18.193) 120 DAT (22.187) DBR (28.69) and the minimum in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda 60 DAT (16.47) 120 DAT (18.057) DBR (18.987). The proper nutrient availability might be helped the plants to grow faster.

#### Number of leaves

Number of leaves of different varieties of bush pepper as affected on various treatments shown highest in T5 Soil(50%) + Vermicompost (50%) for the variety Panniyur-2 60 DAT(5.663) 120 DAT(8.663) DBR (12.11) and the minimum in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda 60 DAT (2.663) 120 DAT (3.55) DBR (4.663). physical and chemical activity in the potting media might be resulted increase in the rate of photosynthesis which triggered the number of leaves.

#### Leaf area (cm<sup>2</sup>).

Leaf area (cm<sup>2</sup>) found to be highest in T5 Soil (50%) + Vermicompost (50%) for the variety Panniyur-2 60 DAT (17.847) 120 DAT (56.943) DBR (127.52) and the minimum in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda 60 DAT (9.683) 120 DAT (25.503) DBR (47.6). The maximum leaf area (cm<sup>2</sup>) might be due to the moisture holding capacity and good nutrient availability of potting media. Similar findings were revealed by Thankamani et al. [11] in media containing granite powder and farm yard manure in 2:1:1 proportion.

#### Number of branches

Number of branch of different varieties of bush pepper on various treatments found to be highest in T5 Soil(50%) + Vermicompost (50%) for the variety Panniyur-2 60 DAT(1.00) 120 DAT(2.663) DBR (4.11) and the minimum in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda 60 DAT (0.00) 120 DAT (0.33) DBR (1.22). The composition of potting media and the favorable environmental conditions might be the reason of maximum number of branches.

#### Length of internode (cm)

Length of internode(cm) on various treatments found to be highest in T5 Soil (50%) + Vermicompost (50%) for the variety Panniyur-2 60 DAT (3.553) 120 DAT (6.607) DBR (8.057) and the minimum in T9 Soil (25%) + Vermicompost (75%) for the variety Karimunda 60 DAT (2.813) 120 DAT (3.82) DBR (4.123).

Better physiological and morphological status of the plant which also a reason for maximum internode length (cm).

Similar results were reported by Malligenahalli et al., (2006) in coffee pulp compost and vermicompost media in bush pepper.

## 4. CONCLUSION

From the present investigation, it is concluded that treatment T5 (Soil+ Vermicompost, 50% each in the variety Panniyur-2) performed best in terms of growth Plant height (28.69), and Survival percentage (100%).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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