



Studies on rapid multiplication of black pepper (*Piper nigrum* L.) on soil mound

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Abstract

An experiment was conducted to study rapid multiplication of black pepper (*Piper nigrum*) on soil mound at Dapoli (Maharashtra). The black pepper plants were planted at the base of soil mound (2.5 m width, 0.60 m height at centre, 18 m length, 45° angle slope) at various spacings (15.0, 22.5, 30.0 and 37.5 cm) and compared with cuttings raised by bamboo and traditional methods. The vines in soil mound method exhibited superior performance with respect to length and root production node⁻¹. The availability of cuttings from soil mound method was also the highest. The rooting percentage of cuttings obtained from soil mound and bamboo methods were significantly superior over traditional method of propagation. The B : C ratio for marketable black pepper cuttings by soil mound method was the best (2.1:1.0). Planting base material at 15 cm spacing on soil mound was the best and produced more runners per unit area as compared to other spacing treatments and traditional method.

Keywords: black pepper, *Piper nigrum*, propagation, soil mound.

Cultivation of black pepper (*Piper nigrum* L.) is restricted in the Konkan region of Maharashtra in India, because of constraints such as non-availability of planting material and post planting mortality. Vegetative propagation method such as stem cuttings is the easiest and cheapest method for rapid multiplication of black pepper. The Indian Institute of Spices Research (IISR), Calicut, has standardized a rapid multiplication method of black pepper which involves use of bamboo halves (splits) (Sivaraman 1987). In the Konkan region, this method has limitations because of severe attack of termites on bamboos and the difficulty in maintenance, replacement and availability of suit-

able bamboos. An experiment was therefore conducted to develop an indigenous technique for rapid multiplication of black pepper by raising on soil mound.

The experiment was conducted at Department of Horticulture, College of Agriculture, Dapoli (Maharashtra), during 1999-2002. Semi-hardwood cuttings of black pepper (var. Panniyur-1) were prepared in 1999 and kept for rooting and served as base material. The rooted cuttings were used for planting on soil mound and bamboo splits. The experiment was conducted in a randomized block design and each treatment was replicated five times with a unit of four. A soil mound of 2.5 m x

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Table 1. Growth performance of black pepper cuttings on soil mound and bamboo splits

| Particulars | Treatment | | | | | | Mean | SEm ± | CD (P=0.05) |
|---|----------------|----------------|----------------|----------------|----------------|----------------|---------|-------|----------------|
| | T ₁ | T ₂ | T ₃ | T ₄ | T ₅ | T ₆ | | | |
| Length of vine (m) | 1.92 | 1.63 | 1.66 | 1.72 | 1.17 | - | 1.62 | 0.09 | 0.24 |
| No. of roots node ⁻¹ of vine | 3.93 | 3.68 | 3.87 | 3.67 | 2.81 | - | 3.59 | 0.16 | 0.43 |
| No. of branches vine ⁻¹ | 1.20 | 1.06 | 1.06 | 1.00 | 1.07 | - | 1.08 | 0.07 | NS |
| No. of cuttings harvest ⁻¹ | 18.41 | 15.41 | 13.54 | 15.10 | 9.70 | - | 14.43 | 0.16 | 0.44 |
| No. of cuttings year ⁻¹ | 73.50 | 61.67 | 54.16 | 60.24 | 38.80 | - | 57.67 | 0.06 | 0.16 |
| Per cent success | 90.71 | 90.09 | 89.32 | 90.95 | 89.77 | 62.86 | 85.61 | 1.28 | 3.77 |
| | (71.94) | (72.11) | (71.02) | (72.65) | (71.40) | (51.29) | (68.40) | | |

T₁=soil mound (15.0 cm spacing); T₂=soil mound (22.5 cm spacing); T₃=soil mound (30.0 cm spacing); T₄=soil mound (37.5 cm spacing); T₅=bamboo splits (15.0 cm spacing); T₆=conventional method.

Figures in paranthesis indicate transformed values

0.60 m (45° angle) of 18 m length was prepared using locally available laterite soil. Overhead shade was provided with silpolyne sheets on MS iron angles. In the upper layer of 5 cm of soil mound, ground farm yard manure (FYM) was mixed @ 1 kg sq m⁻¹ and black pepper cuttings were planted at the base of soil mound at four spacings namely, 15.0 cm (T₁), 22.5 cm (T₂), 30.0 cm (T₃) and 37.5 cm (T₄) during April 1999. For planting the cuttings, a trench of 0.3 m x 0.3 m x 1.0 m was opened and filled with FYM, soil and sand mixture. The treatment T₅, planting in bamboo splits at 15 cm spacing, was installed as per the recommendation of IISR. The planted cuttings were irrigated by overhead sprinklers. No major disease was observed during the tenure of experimentation. The cuttings obtained by conventional method (T₆) was used as control. In this method mature runners were selected from vines and two-node cuttings were prepared and planted in polythene bags of 4" x 6" filled with potting

mixture. Data on growth parameters namely, length of vine, number of roots node⁻¹, number of branches vine⁻¹ and number of cuttings obtained harvest⁻¹ and year⁻¹ were recorded (Table 1). These cuttings were planted in polythene bags of 4" x 6" size filled with soil, FYM and sand in equal proportion and survival percentage was recorded. The economics for various treatments was worked out (Table 2).

The mean length of vines after 3 months of planting varied from 1.17 m in bamboo method to 1.92 m in soil mound method at 15 cm spacing which was statistically significant. Similarly, the roots produced node⁻¹ also varied significantly from 2.81 to 3.93 in these treatments. Root production in all the soil mound treatments were superior over bamboo split method. The number of branches were non significant in various treatments.

The number of cuttings available harvest⁻¹ as well as year⁻¹ were significantly higher in all

Table 2. Economics of production of black pepper cuttings

| Particulars | Treatment | | |
|---|----------------|----------------|----------------|
| | T ₁ | T ₅ | T ₆ |
| Material cost (Rs) | 1220 (50.7) | 1258 (49.5) | 2100 (54.3) |
| Labour cost (Rs) | 611 (25.3) | 681 (26.8) | 890 (23.1) |
| Other cost (Rs) | 576 (23.9) | 603 (23.7) | 877 (22.7) |
| Total (Rs) | 2407 (100.0) | 2542 (100.0) | 3870 (100.0) |
| Net returns from 1000 rooted cuttings (Rs) | 5000 | 5000 | 5000 |
| B:C ratio | 2.07:1.00 | 1.96:1.00 | 1.29:1.00 |
| Net profit 1000 cuttings ⁻¹ (Rs) | 2593 | 2458 | 1130 |

T₁=soil mound (15 cm spacing); T₅=bamboo splits (15 cm spacing); T₆=conventional method

Figures in paranthesis indicate per cent cost

the soil mound treatments irrespective of spacing. Maximum number of cuttings harvest⁻¹ (18.41) as well as year⁻¹ (73.50) were obtained from treatment T₁ (soil mound-15 cm spacing) which were statistically superior over the rest of the treatments. The least number of cuttings harvest⁻¹ and year⁻¹ were available from bamboo splits (9.7 and 38.8, respectively).

The cuttings with single node prepared from the vines harvested from mounds/bamboos were used for planting in polybags and compared with cuttings from conventional method for their success. All the soil mound treatments were significantly superior (89.3% to 91.0%) over bamboo splits treatment (62.9%).

The cost involved in preparation of 1000 black pepper cuttings by the traditional method was the highest (Rs. 3870/-), followed by bamboo splits (Rs. 2542/-) and soil mound technique (Rs. 2407/-). Net return was the highest in soil mound technique (Rs. 2593/-) followed by bamboo splits (Rs. 2458/-) and traditional method (Rs. 1130/-). Though the bamboo

split technique is a unique and novel method for rapid multiplication of black pepper (IISR 2002), in the present study at Dapoli, better growth on soil mound was observed. This might be due to more volume of soil available for foraging by roots and the addition of FYM on the upper layer of mound might help better water retention and aeration. Unlike in bamboo method, it is not necessary to tie the nodes on the soil mound. Thus, the present study indicated the advantage of soil mound technique for rapid multiplication of black pepper over other methods in vogue at Dapoli. This method can be used to produce more cuttings to meet the planting material requirement of black pepper at Konkan region.

References

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