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## Effect of cattle urine and Vermiwash on periodical success and growth of rooted black pepper saplings

**Vijaya Rajendra Yadav, Dr. RG Khandekar, Dr. SB Thorat, Dr. RV Dhopavkar and Dr. VG More**

### Abstract

The experiment entitled “Effect of cattle urine and vermiwash on periodical success and growth of rooted black pepper saplings” was carried out in 2022-23 with ten treatments viz., T<sub>1</sub> Cattle urine 2.5%, T<sub>2</sub> Cattle urine 5%, T<sub>3</sub> Cattle urine 7.5%, T<sub>4</sub> Cattle urine 10%, T<sub>5</sub> Vermiwash 10%, T<sub>6</sub> Vermiwash 15%, T<sub>7</sub> Vermiwash 20%, T<sub>8</sub> Vermiwash 25%, T<sub>9</sub> Keradix powder and T<sub>10</sub> Control and each treatment was replicated thrice in Randomized Block Design. The highest success percentage (91.29%) was recorded in treatment T<sub>4</sub>. Minimum days required for first sprouting (12.13 days) was observed in treatment T<sub>7</sub> where minimum days required for last sprouting (45.67 days) was observed in treatment T<sub>4</sub>. Highest girth of sprout (6.37 mm), leaf area (69.75 cm<sup>2</sup>) and length of root (16.70 cm) was recorded in treatment T<sub>4</sub> which was significantly superior over all treatments.

**Keywords:** Cattle urine, Vermiwash, black pepper, drenching

### Introduction

Among the all spices, Black pepper (*Piper nigrum* L.) belonging family Piperaceae, is one of the most economically significant spice crops in the world, and also referred as “Black Gold” and “King of Spices”. This crop is grown in tropical and sub-tropical region having wide range of soil from red loam, clay loam, or sandy loam with a pH of about 4.5 to 6.0. It is mainly use in pharmaceutical industries as well as in food preservation, cosmetics, and fragrance industries.

Black pepper is mainly propagated through seeds, cuttings, layering and grafting but cuttings from runner shoots is mostly preferred. Currently, the major obstacle facing the pepper industry are shortage of quality planting material and post planting mortality. To overcome this problem, there is necessity to understand and standardized ideal dose of organic nutrients in black pepper cuttings to increase survival and to produce vigorous and healthy growth of black pepper rooted cuttings.

### Materials and Methods

The experiment was performed at Nursery no. 4, College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli-415712, Dist. Ratnagiri, (M. S.). The experiment consisted ten treatments viz., T<sub>1</sub> Cattle urine 2.5%, T<sub>2</sub> Cattle urine 5%, T<sub>3</sub> Cattle urine 7.5%, T<sub>4</sub> Cattle urine 10%, T<sub>5</sub> Vermiwash 10%, T<sub>6</sub> Vermiwash 15%, T<sub>7</sub> Vermiwash 20%, T<sub>8</sub> Vermiwash 25%, T<sub>9</sub> Keradix powder and T<sub>10</sub> Control and was laid in RBD design. The cuttings are planted in polybags which filled with potting mixture soil and FYM in 3:1 proportion and drenching of cattle urine and vermiwash at various concentrations was done at monthly interval up to six months. Ten Black pepper cuttings in each treatment per replication were selected randomly to record observations.

### Results and Discussions

The data presented in Table 1 expressed that the days required for first sprouting and last sprouting in black pepper cuttings varied significantly due to effect of drenching of cattle urine and vermiwash.

It is seen from the data that the minimum days required for first sprouting was observed in treatment T<sub>7</sub> (Vermiwash 20%) which was at par with treatment T<sub>4</sub> (12.93 days), T<sub>6</sub> (13.53 days) and T<sub>3</sub> (13.59 days), where minimum days required for last sprouting was obtained by drenching of cattle urine 10% (T<sub>4</sub>) which was at par with treatment T<sub>6</sub> (Vermiwash 15%), T<sub>7</sub>

(Vermiwash 20%), T<sub>3</sub> (Cattle urine 7.5%), T<sub>8</sub> (Vermiwash 25%).

The earliest sprouting may result from the use of stored carbohydrates in cuttings, as well as from nitrogen and other elements working with growth regulators like cattle urine and vermiwash which helps in improving soil texture and structure. Auxins, which are found in cow urine and vermiwash, helps chelation of iron in plants, promoting healthy growth and nutrient uptake, particularly in the root system development which further results in early sprouting.

Gawas (2019) [4] found minimum days for first sprouting (18.90 days) in black pepper by drenching of 30% vermiwash and Garande (2021) [3] found minimum days for last sprouting (47.07 days) by drenching cow urine 7.5% in black pepper.

The data regarding to success percentage at 150 days after planting is presented in Table 1 and it is varied significantly. The highest success (91.29%) was recorded in treatment T<sub>4</sub> i.e., Cattle urine 10% while minimum success (71%) was recorded in treatment T<sub>10</sub> (Control). Cattle urine is easily soluble, higher concentrations can be applied to plants and will be absorbed directly, helping the plant quickly overcome its nutrient deficit. Also, it works as a biopesticide and biofertilizer, reducing plant mortality in the early stages of planting (Jadhav *et al.*, 2020) [6].

The findings are analogues to Adsure (2021) [1] with drenching 20% vermiwash and 7.5% cattle urine in black pepper.

The data regarding to girth of sprout (mm), leaf area (cm<sup>2</sup>) and length of root (cm) of black pepper cuttings presented in Table 2 influenced by drenching of cattle urine and vermiwash.

Significantly highest girth of sprout (6.37 mm) recorded in treatment T<sub>4</sub> (Cattle urine 10%) which was followed by treatment T<sub>3</sub> (6.25 mm). Meanwhile, the lowest girth of sprout (3.61 mm) was recorded in treatment T<sub>10</sub> (Control). Cattle

urine contains a wide variety of nutrients, such as K, N, and Cl, which cause an increase in cells, due to the osmotic effect and encourage plant growth (De Oliveira *et al.*, 2009) [2]. Mostly cell division and cell enlargement were promoted by nitrogen and potassium which might leads to increase in girth of sprout.

The findings are correspondence to Jalgaonkar (2022) [7] by drenching of Cattle urine 20% in black pepper and Juvekar (2006) [9] in chilli (1.56 mm) by drenching Cattle urine 10%.

The maximum leaf area (69.75 cm<sup>2</sup>) was recorded in drenching of cattle urine 10% (T<sub>4</sub>) which was significantly superior over remaining treatments. However, minimum leaf area (51.65 cm<sup>2</sup>) was recorded in treatment T<sub>10</sub> (Control). Cattle urine contains nitrogen constituents in different amounts and may be used as source of nitrogen for plant nutrition. If the available nitrogen elements are balanced with other elements, more proteins can be produced and leaves can grow wider due to photosynthesis going well. Hence, in this study maximum leaf area was observed by drenching cattle urine 10%.

Similar findings were reported by Adsure (2021) [1] in black pepper and Juvekar (2006) [9] in chilli when treated with cattle urine 10%.

The highest length of root (16.70 cm) was observed in treatment T<sub>4</sub> (Cattle urine 10%) which found significantly superior over other treatment. While, lowest length of root (7.26) was observed in treatment T<sub>10</sub> (Control). The type of auxin known as IAA, which is present in cattle urine, aids in cell division and growth (De Oliveira *et al.*, 2009) [2] results in increasing length of roots in black pepper after application of cattle urine.

Present result of experiment was analogous to findings were reported by Jandaik *et al.* (2015) [8] in Methi and Bhindi when treated with 5% cow urine.

**Table 1:** Effect of drenching of cattle urine and vermiwash on days required for first sprouting and last sprouting in black pepper cuttings

Treatments	Days required for first sprouting	Days required for last sprouting	Success percentage
T <sub>1</sub> - Cattle urine 2.5%	19.91	53.11	74.82 (59.88)
T <sub>2</sub> - Cattle urine 5%	17.90	50.26	77.69 (61.81)
T <sub>3</sub> - Cattle urine 7.5%	13.59	47.16	85.08 (67.28)
T <sub>4</sub> - Cattle urine 10%	12.93	45.67	91.29 (72.83)
T <sub>5</sub> - Vermiwash 10%	18.56	51.08	76.82 (61.22)
T <sub>6</sub> - Vermiwash 15%	13.53	46.68	85.36 (67.50)
T <sub>7</sub> - Vermiwash 20%	12.13	46.81	86.57 (68.50)
T <sub>8</sub> - Vermiwash 25%	14.77	47.73	79.78 (63.28)
T <sub>9</sub> - Keradix powder	21.26	54.87	72.64 (58.46)
T <sub>10</sub> - Control	23.44	55.74	71.00 (57.42)
Mean	16.80	49.91	80.11
S. Em±	0.67	0.76	0.54
CD at 5%	2.00	2.26	1.61
Result	SIG	SIG	SIG

(Figures in the parentheses are arcsine transformed values)

**Table 2:** Effect of drenching of cattle urine and vermiwash on girth of sprout (mm), leaf area (cm<sup>2</sup>) and length of root (cm) of black pepper cuttings 180 days after planting

Treatments	Girth of sprout (mm)	Leaf area (cm <sup>2</sup> )	Length of root (cm)
T <sub>1</sub> - Cattle urine 2.5%	4.38	55.36	10.26
T <sub>2</sub> - Cattle urine 5%	4.59	60.49	10.80
T <sub>3</sub> - Cattle urine 7.5%	6.25	65.51	14.08
T <sub>4</sub> - Cattle urine 10%	6.37	69.75	16.70
T <sub>5</sub> - Vermiwash 10%	4.68	57.90	10.35
T <sub>6</sub> - Vermiwash 15%	5.90	66.64	13.26
T <sub>7</sub> - Vermiwash 20%	5.71	66.95	15.28
T <sub>8</sub> - Vermiwash 25%	5.32	63.91	10.88

T <sub>9</sub> - Keradix powder	3.69	53.12	8.14
T <sub>10</sub> - Control	3.61	51.65	7.26
Mean	5.05	61.13	11.70
S. Em±	0.04	0.92	0.44
CD at 5%	0.12	2.73	1.33
Result	SIG	SIG	SIG

### Conclusion

Among the different treatments, minimum days required for initiation of sprouting and last sprouting, success percentage as well as growth parameters like girth of sprout, leaf area and length of root were significantly increased by drenching with cattle urine 10% over the control. In conformity with above results, it could be concluded that for getting of excellent growth of cuttings of black pepper at initial stage drenching of cattle urine (10%) at monthly interval was found best.

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