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## Evaluation of pepper genotypes for growth and yield parameters

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### Abstract

The present investigation was carried out at Horticultural Research Station, Tamil Nadu Agricultural University, Yercaud. Pepper genotypes viz., Acc.No.33, Acc.No.57, Acc.No.53, Acc.No.106, PRS 64, HB 20052, IISR Sakthi, IISR Thevam, Panniyur -1. Morphological and yield parameters were observed. Among the IISR Sakthi recorded the maximum plant height (3.80 m) followed by IISR Thevam (3.50 m), Acc. No 33 (3.50 m) and PRS 64 (3.00 m). The data indicates that IISR Sakthi had the longest spike length at 11.10 cm, followed closely by IISR Thevam at 11.00 cm. In terms of the number of berries per spike, IISR Sakthi had the highest count at 67.50 and the lowest count of berries per spike, recorded at 36.00. The maximum number of 100 green berry weight was noticed in IISR Thevam of 12.30 g followed by Panniyur -1 11.70 g, IISR Sakthi 11.10 g. Similar trend also observed in 100 dry berry weight IISR Sakthi 11.10 g, IISR Thevam 3.56 g. The mean number of spikes berries per spike was highest in the variety (85.00), IISR Sakthi, The green berry ranged from 2.50 to 3.90 and the highest green berry was recorded in IISR Sakthi with 3.90 kg followed by IISR Thevam 3.80 kg, Acc. No 57 (3.70 kg), Acc.No.33 (3.60 kg). Similarly, the maximum dry yield per plant was recorded in the IISR Sakthi with 1.10 kg followed by IISR Thevam 0.98 kg, Acc. No 57 (0.92 kg) and Acc. No.33 (0.91 kg).

**Keywords:** Pepper, genotypes, vegetative, yield parameters

### Introduction

Black pepper, scientifically known as *Piper nigrum*, is a remarkable spice deeply entrenched in culinary traditions worldwide. Originating from the Malabar Coast of India, its cultivation has spread to tropical regions globally. For millennia, black pepper has been prized not only for its flavour but also for its medicinal properties. It finds its place not just in kitchens but also in traditional medicine practices, where it has been utilized to address various health concerns. Its significance in global trade is profound; black pepper holds the distinction of being the most traded spice globally. Its ubiquity is evident in Western dining culture, where it often sits alongside salt on dining tables, readily accessible in shakers or mills. In India, black pepper is mainly grown in Kerala and Karnataka states. It is also cultivated to some extent in Tamil Nadu. In addition to above states, black pepper is also cultivated in Assam, Meghalaya, Tripura, Goa and Andaman and Nicobar Islands. In the internationally market Indian pepper has earned a reputation for its superior quality.

The performance of black pepper varieties can indeed vary significantly depending on the altitudes. This variation can be attributed to both genetic differences among varieties and the influence of different environmental factors. But the continuous use of low yielding cultivars, non-availability planting materials, losses due to severe incidence of biotic and abiotic stress and also non adoption of appropriate agronomic practices are some of the prominent factors contributing to low productivity of black pepper in India.

The initiative to evaluate black pepper genotypes for suitability in the Shevaroy's conditions of the Eastern Ghats is a crucial step towards enhancing productivity and quality for local growers. By systematically assessing different genotypes, valuable insights can be gained into which varieties perform best in this specific agro climatic environment. Through rigorous evaluation, factors such as yield potential, adaptability to local conditions can be assessed, providing growers with valuable information to make informed decisions about which varieties to cultivate.

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This research not only benefits local growers by potentially increasing their yields and improving the quality of their pepper but also contributes to the broader scientific understanding of black pepper cultivation in diverse environments. It may lead to the development of new high-yielding varieties tailored to the unique conditions of the Shevaroy's region, further enhancing the sustainability and profitability of black pepper farming in the Eastern Ghats. Keeping this in view, Nine genotypes were collected and evaluated to identify suitable black pepper cultivars for eastern ghats.

### Materials and Methods

The present investigation was carried out at Horticultural Research Station, Tamil Nadu Agricultural University, Yercaud. The experimental site is geographically situated between 11° 04" to 11° 05" North latitude and 78° 05" to 78° 23" East longitude and at an altitude of 1500 m above mean sea level. The average maximum and minimum temperature is 31.0 °C and 12.4 °C. The soil of the experimental plot was laterite in texture with 0.5 to 1.5 m depth. The experiment was laid out in a randomized block design with three replication. Pepper genotypes viz., Acc.No.33, Acc.No.57, Acc.No.53, Acc.No.106, PRS 64, HB 20052, IISR Sakthi, IISR Thevam, Panniyur -1 were used under study. Uniform sized seedling were planted and trained in silver oak plant as a standard with a spacing of 10 x 10 m. Observations were recorded on each cultivar in each replication were used as tester for Vine length (m), Mean No. of branches per vine, Mean number of spikes/m<sup>2</sup>, Mean Number of berries per spike, Green berry yield/vine (kg), Dry berry yield/vine (kg). The data generated during the course of study was subjected to

statistical analysis as prescribed by Panse and Sukhatme (2000) [7].

### Results and Discussion

Data presented in (Table 1.) showed that there was significant variation in vegetative characters. The Mean Vine length ranged from 2.20 to 3.80 m. IISR Sakthi recorded the maximum plant height (3.80 m) followed by IISR Thevam (3.50 m), Acc. No 33 (3.50 m) and PRS 64 (3.00 m). While, the least plant height was noticed in Acc.No.106 (2.20 m). This was attributed by the plant's vigour and its genetic character Hegde *et al.*, (2017) [2] Ravindran 1991 [9]. With respect to mean number of branches per vine IISR Thevam (15.50), IISR Sakthi (12.80), Acc.No.106 (12.60), Acc.No.53 (12.0). This type of variation in the mean number of branches was also explained by few other previous workers Maheswarappa *et al.*, 2012 [4].

The data indicates that IISR Sakthi had the longest spike length at 11.10 cm, followed closely by IISR Thevam at 11.00 cm. HB 20052 and PRS 64 also had substantial spike lengths, at 10.87 cm and 10.40 cm, respectively. On the other hand, Acc.No.53 had the shortest spike length at 7.70 cm. The present was inline of Paul resmi *et al.*, 2023 [8]. The number of berries per spike has the important part in deciding the ultimate yield of the crop. In terms of the number of berries per spike, IISR Sakthi had the highest count at 67.50, followed by IISR Thevam at 64.60, and Panniyur -1 at 59.65. Conversely, Acc No. 53 had the lowest count of berries per spike, recorded at 36.00. This result was in accordance with the findings of Sasikumar *et al.*, (2004) [10] in black pepper.

**Table 1:** Growth and spike characters of different black pepper cultivars under Yercaud condition

Treatments	Vine Length (m)	Mean No. of branches per vine	Spike length (cm)	Number of berries/spike
Acc.No.33	3.50	12.10	9.80	54.00
Acc.No.57	2.60	9.20	9.50	39.40
Acc.No.53	2.50	12.50	7.70	36.00
Acc.No.106	2.20	12.60	9.50	36.65
PRS 64	3.00	10.50	10.40	53.00
HB 20052	2.70	12.30	10.87	39.50
IISR Sakthi	3.80	12.80	11.10	67.50
IISR Thevam	3.50	15.50	11.00	64.60
Panniyur -1	2.89	10.20	10.59	59.65
S.Ed	0.15	0.82	0.027	0.304
CD(0.05)	0.37	1.74	0.058	0.650

### Berry and yield characters

The Berry and Yield characters were presented in Table 2. The 100 green berry weight ranged from 8.50 to 12.30. The maximum number of 100 green berry weight was noticed in IISR Thevam of 12.30 g followed by Panniyur -1 11.70 g, IISR Sakthi 11.10 g. Similar trend also observed in 100 dry berry weight IISR Sakthi 11.10 g, IISR Thevam 3.56 g. The Mean number of spikes/m<sup>2</sup> ranged from 21.0 to 62.00. The number of spikes per meter square (62.00) was recorded in IISR Sakthi followed by IISR Thevam (59.00) and the lowest was recorded in the Acc.No.106 (21.0). The mean number of spikes berries per spike was highest in the variety (85.00), IISR Sakthi, followed by Acc No. 53 (75.00), IISR Thevam (72.00) and the lowest was recorded in Acc No. 106 (45.00). A similar kind of result was also reported from Naik *et al.*, (2013) [5] The green berry ranged from 2.50 to 3.90 and the highest green berry was recorded in IISR Sakthi with 3.90 kg followed by IISR Thevam 3.80 kg, Acc No 57 (3.70 kg), Acc.No.33 (3.60 kg). Genotypes with high endosperm content and low moisture content in berries tend to

have a higher dry weight. Endosperm is a storage tissue in seeds that provides nutrients to the developing embryo, and a higher endosperm content generally means more stored energy. Lower moisture content means there's less water weight, resulting in a higher proportion of dry matter. This combination leads to a higher overall dry weight in the berries. In breeding programs, selecting for these traits can be important for improving yield and nutritional value (Pannaga *et al.*, 2021) [6].

Similarly, the maximum dry yield per plant was recorded in the IISR Sakthi with 1.10 kg followed by IISR Thevam 0.98 kg, Acc. No 57 (0.92 kg) and Acc. No.33 (0.91 kg). However, minimum dry yield was recorded in Acc.no.106 (0.73 kg). This might be mainly due to maximum fresh berry yield per vine and comparatively higher recovery of black pepper apart from other spike and berry characters. Tripathi *et al.*, (2018) [11] and Arya *et al.*, (2003) [1] stated that there will be yield difference between any cultivars or varieties due to various spike and berry characters.

**Table 2:** Berry and Yield characters of different black pepper cultivars under Yaracuy condition

Treatments	100 green berry weight (g)	100 dry berry weight (g)	Mean number of spikes/m <sup>2</sup>	Mean Number of berries per spike	Green berry yield/vine (kg)	Dry berry yield/vine (kg)
Acc.No.33	10.00	3.07	40.00	65.00	3.60	0.91
Acc.No.57	8.50	3.10	55.00	69.00	3.70	0.92
Acc.No.53	9.00	2.80	33.00	75.00	3.30	0.89
Acc.No.106	9.20	3.00	21.00	45.00	2.50	0.73
PRS 64	10.20	2.60	25.00	61.00	3.00	0.79
HB 20052	10.50	2.30	31.00	60.00	2.90	0.75
IISR Sakthi	11.10	3.56	62.00	85.00	3.90	1.10
IISR Thevam	12.30	3.07	59.00	72.00	3.80	0.98
Panniyur -1	11.70	2.88	33.00	60.00	2.80	0.78
S.Ed	0.031	0.009	1.77	3.96	0.14	0.04
CD(0.05)	0.066	0.019	3.76	8.39	0.30	0.08

### Conclusion

The evaluation of black pepper genotypes in the Shevaroy region of the Eastern Ghats holds significant promise for enhancing productivity and quality for local growers. The research conducted at the Horticultural Research Station, Tamil Nadu Agricultural University, Yercaud, revealed substantial variation among different genotypes in terms of vegetative characters such as vine length, number of branches per vine, spike length, and number of berries per spike. Notably, certain genotypes, such as IISR Sakthi and IISR Thevam, exhibited favorable characteristics including longer spike lengths and higher numbers of berries per spike, which are essential factors for determining crop yield. These findings underscore the importance of systematic evaluation and selection of black pepper cultivars suited to specific agro-climatic conditions. The identification of promising genotypes through such research endeavors not only benefits local growers by potentially increasing yields and improving quality but also contributes to broader scientific knowledge and may lead to the development of new high-yielding varieties tailored to regional conditions. Therefore, continued efforts in this direction are crucial for enhancing the sustainability and profitability of black pepper farming in the Eastern Ghats region.

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