



Evaluation of ginger (*Zingiber officinale* Rosc.) cultivars for their suitability in hilly zone of Karnataka

Harsha K N^{1*}, Kavya S², Manuval Joseph³, Veeresh N⁴, Karuppa Samy K⁵

¹ Scientist C and Scientist-in-charge, Indian Cardamom Research Institute, Spices Board, Sakleshpur, Hassan, Karnataka, India

² Project Assistant, Indian Cardamom Research Institute, Spices Board, Sakleshpur, Hassan, Karnataka, India

³ Senior Agriculture Demonstrator, Indian Cardamom Research Institute, Spices Board, Sakleshpur, Hassan, Karnataka, India

⁴ Senior Microbiologist, Division of Plant Pathology, Indian Cardamom Research Institute, Spices Board, Sakleshpur, Hassan, Karnataka, India

⁵ Research Associate, Division of Crop Botany, Indian Cardamom Research Institute, Spices Board, Sakleshpur, Hassan, Karnataka, India

Corresponding Author: Harsha K N

Abstract

India is known as the land of spices from the time immemorial and has been the leading country in the world for production, consumption and export of spices. Ginger (*Zingiber officinale* Rosc.) is one of the oldest known spices valued for its aroma and pungency. Ginger is used both in fresh and dried form. Certain ginger genotypes have greater adaptability, higher yield, better quality and unique use value. Paddy fields of Sakleshpur regions are gaining change of crop. Due to increasing cost of production and labour cost paddy is being replaced with ginger. The most popular ginger cultivar Rio-de-Janeiro is the most preferred cultivar in this zone. On the contrary when industry requirement is assessed it also demand ginger with high oil content, fiber content and oleoresin content. Keeping these points in view an observatory trial was taken up at Indian Cardamom Research Institutes regional station Sakleshpur to evaluate promising released ginger cultivars and their suitability in Sakleshpur region during 2022-2023 and 2023-2024. Six ginger genotypes were laid out in Completely Randomized Block Design, replicated four times. Growth attributes like plant height varied from 58.6 cm to 72.8 cm. Among the six genotypes evaluated the genotype Rio-de- Janeiro recorded maximum plant height (72.8 cm) which was on par with genotype IISR-Vajra (68.8 cm) and the lowest plant height was observed in genotype IISR Rajatha (58.6 cm). The number of tillers were maximum in genotype Rio-de- Janeiro (13.40), which was statistically on par with IISR-Vajra (12.1) whereas the minimum number of tillers was observed in IISR Rajatha (7.80). The genotype Rio-de- Janeiro recorded the maximum yield per plant and yield per hectare (360.80 g and 28.86 t) respectively, next position for yield level was recorded with IISR-Vajra (308.6 g and 24.7 t) respectively and the lowest was recorded in the genotype IISR Mahima (248.2 g and 19.86 t) respectively. Among the different genotypes evaluated, the genotype Rio-de- Janeiro performed better with respect growth and yield parameters. Hence, it can be recommended for commercial cultivation of ginger in Sakleshpur area of Karnataka. Next level of yield was achieved by IISR Vajra. Yield level of IISR Vajra found to be consistent in both the seasons even in high rainfall condition also.

Keywords: Rio-de- Janeiro, IISR-Vajra, Ginger, Rhizome and yield

Introduction

India is known as the land of spices from the time immemorial and has been the leading country in the world for production, consumption and export of spices. Ginger (*Zingiber officinale* Rosc.) is one of the oldest known spices valued for its aroma and pungency. Ginger is used both in fresh and dried form. India occupies a unique position of being the largest producer and exporter of ginger in the world. There is tremendous scope to increase the yield per unit area and thereby the total production. A good amount of genetic variability has been reported among different varieties with regard to growth, yield and quality parameters under different agro-climatic conditions. Several cultivars of ginger are grown in different ginger growing areas in India. Certain ginger genotypes have greater adaptability, higher yield, better quality and unique use value. The available germplasm serves as most valuable natural reservoir for providing donor parent to improve the particular trait. Paddy fields of Sakleshpur regions are gaining change of crop. Due to increasing cost of production and labour cost paddy is

being replaced with ginger. The most popular ginger cultivar Rio-de-Janeiro is the most preferred cultivar in this zone. On the contrary when industry requirement is assessed it also demand ginger with high oil content, fiber content and oleoresin content. Keeping these points in view an observatory trial was taken up at Indian Cardamom Research Institutes regional station Sakleshpur to evaluate promising released ginger cultivars and their suitability in Sakleshpur region.

Material and Methods

The field experiment was taken up to evaluate ginger genotypes for growth and yield parameters at the Spices Boards ICRI, Regional research station Sakleshpur Karnataka during 2022-2023 and 2023-2024. Six ginger genotypes were laid out in Completely Randomized Block Design, replicated four times. The area falls under hilly zone, agroclimatic zone of Karnataka. The experiment was conducted under irrigated condition. The soil of experimental plot was sandy loam in texture, pH 5.9 organic

carbon content 1.3%, phosphorus 18 kg/ha, potassium 338 kg/ha. The land was brought to fine tilth and raised beds were prepared. Ginger varieties were planted in raised bed of 3.00 m length, 1.0 m width and 15 cm height during the second fortnight of March month. Seed rhizomes having 3 to 4 buds weighing about 20-25g were treated with mancozeb (3g/l), Quinalphos (2 ml/litre) and Streptomycin sulphate (0.5g/litre) solution for half an hour and dried in shade for twelve hours. Treated rhizomes were planted in the beds at 3.5 to 4.0 cm depth at a distance of 30 cm between rows and kept at 20 cm apart. The land was applied with FYM (25 t/ha) and recommended dose of P at the time of land preparation. Recommended N and K was applied in three split doses. Cultivation practices were followed as per recommended package of practices. The crop was harvested when leaves started withering by digging out the rhizomes after drying up of leaves which indicated complete maturity. Harvested rhizomes were cleaned to remove adhering soil and sticking roots. Observations were recorded for different growth and yield parameters on five randomly selected plants in each treatment of different replication. Dry leaf mulch was applied @ 12 t/ha after planting, to all the beds, irrespective of the treatments. The mulching is practiced to

prevent soil erosion and exposure of ginger rhizomes to heavy rainfall. The biometric observations were recorded at various stages of crop growth. Collected data was subjected for statistical interpretation as per the procedure (Gomez & Gomez 1984) [2].

Results and discussion

Table 1 shows highly significant variations among the genotypes for growth attributes. Growth attributes like plant height varied from 58.6 cm to 72.8 cm. Among the six genotypes evaluated the genotype Rio-de- Janeiro recorded maximum plant height (72.8 cm) which was on par with genotype IISR-Vajra (68.8 cm) and the lowest plant height was observed in genotype IISR Rajatha (58.6 cm). The number of tillers were maximum in genotype Rio-de- Janeiro (13.40), which was statistically on par with IISR-Vajra (12.1) whereas the minimum number of tillers was observed in IISR Rajatha (7.80). Data pertaining to the yield attributing characters like number of primary rhizomes, number of secondary rhizomes, fresh ginger yield per plant and fresh rhizome yield per hectare, dry ginger recovery in per cent are presented in Table 1.

Table 1: Evaluation of ginger cultivars for their performance in hilly zone (pooled data of two years)

Ginger cultivars	Plant height (cm)	No of tillers/clump	No. of primary rhizome	No of secondary rhizome	Fresh rhizome yield (g/plant)	Fresh rhizome yield /ha (tonnes/ha)
IISR-Varada	64.5	8.40	5.2	20.6	278.5	22.28
IISR-Mahima	62.1	9.80	6.2	16.4	248.2	19.86
IISR-Rajatha	58.6	7.80	4.2	18.4	260.4	20.83
IISR-Vajra	68.8	12.1	7.1	23.1	308.6	24.70
Himachala	65.2	9.20	4.8	20.8	298.4	23.87
Rio-de-Janeiro	72.8	13.4	7.8	24.2	360.8	28.86
S.Em (±)	2.82	1.2	0.49	0.81	7.2	1.22
CD @5%	8.46	3.6	1.47	2.43	21.6	3.66

The number of primary and secondary rhizome per plant differed significantly among the six ginger genotypes evaluated. Maximum number of primary rhizomes were recorded in genotype Rio-de- Janeiro (7.8) which was on par with IISR-Vajra (7.1) whereas, the minimum number of primary rhizomes was recorded in the IISR-Rajatha (4.2). The number of secondary rhizomes per plant differed significantly among the genotypes. the maximum number of secondary rhizomes per plant was recorded in genotype Rio-de- Janeiro (24.20), which was statistically on par with IISR Vajra (23.1). The minimum number of secondary rhizomes per plant was recorded in the genotype IISR Mahima (16.4). The genotype Rio-de- Janeiro recorded the maximum yield per plant and yield per hectare (360.80 g and 28.86 t) respectively, next position for yield level was recorded with IISR-Vajra (308.6 g and 24.7 t) respectively and the lowest was recorded in the genotype IISR Mahima (248.2 g and 19.86 t) respectively. Genotype Rio-de- Janeiro produced higher fresh rhizome yield per plant (360.80 gm) and yield per hectare (28.86 t). Such varietal variation in the different rhizome characters grown under similar conditions has been reported earlier also Chongtham *et al* (2013) [1] and Goudar *et al* (2017) [3].

Conclusion

Among the different genotypes evaluated, the genotype Rio-de- Janeiro performed better with respect growth and yield parameters. Hence, it can be recommended for commercial

cultivation of ginger in Sakleshpur area of Karnataka. Next level of yield was achieved by IISR Vajra. Yield level of IISR Vajra found to be consistent in both the seasons even in high rainfall condition also.

References

- Chongtham T, Chatterjee R, Hnamte V, Chattopadhyay PK, Khan SA. Ginger germplasm evaluation for yield and quality in Southern West Bengal. *J Spices and Arom Crops*, 2013, 22:88-90.
- Gomez KA, Gomez AA. *Statistical Procedures for Agricultural Research*. 1984. 2nd Edition, John Wiley and Sons, New York, 680 p.
- Goudar SA, Gangadharappa PM, Dodamani SM, Lokesh C, Dharamatti VU. Evaluation of Ginger (*Zingiber officinale* Rosc.) Genotypes for Growth and Yield Attributes. *Int. J. Pure App. Biosci.*, 2017;5(2):994-999. doi: <http://dx.doi.org/10.18782/2320-7051.2888>