

Crop Husbandry

Quality of ginger genotypes grown under open and coconut shade

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ABSTRACT: Performance of ginger genotypes under open and coconut shade was assessed at Agricultural Research Station, Arabhavi, Tq. Gokak, Karnataka to know the quality with particular reference to the content of essential oil, oleoresin and crude fibre in the rhizome. The cultivar *Rio-de-Janeiro* had maximum essential oil content (2.40% in open and 2.35% under coconut shade). The genotypes Humnabad (8.7% and 8.6%) and *Rio-de-Janeiro* (8.35% and 8.01%) recorded higher oleoresin content when grown in open and as intercrop with coconut respectively. Higher the content of crude fibre lower will be the quality. Higher content of crude fibre was recorded by the genotype Mahim under both the conditions (5.18% in open and 4.95% under coconut shade). The ginger genotype Humnabad is found to be promising with high yield of good quality in both open (24.42 t/ha) and under coconut shade (21.32 t/ha).

Key words: *Zingiber officinale* Rosc., essential oil, oleoresin, fresh rhizome yield.

Ginger (*Zingiber officinale* Rosc.) is one of the major rhizomes spices cultivated in India. It is used as a spice and medicine. Ginger forms a major ingredient in the traditional medicines of India. Ginger oil is used in pharmaceutical preparation as a carminative and stimulant. Quality of ginger is mainly determined by its

essential oil, non-volatile ether extract (oleoresin) and crude fibre content. India is the leading producer exporter of ginger in the world. There is a need for superior genotypes containing high essential oil and oleoresin content. Besides obtaining higher yields, superior quality of the produce is also important for export to fetch

premium price in the international market. Quality of the produce is largely determined by the lower fibre content with good aroma. Oleoresin content is important attribute to decide the quality of ginger rhizomes. Variation in oleoresin content among ginger genotypes from 3.69 per cent (Cv. Haveri) to 8.73 per cent (Cv. Rio-de-Janeiro) is reported².

In a study on the effect of shade on the quality of ginger the highest content of essential oil (2.18 %) and non volatile ether extract (5.38 %) was reported under 25 per cent shade in the ginger cv. *Rio-de-Janeiro*⁶.

Materials and Methods

The experiment was undertaken at Agricultural Research Station, Arabavi (UAS, Dharwad), Belgaum district, Karnataka during the year 2001-2002. Arabavi is in northern dry zone of Karnataka and the mean rainfall of this area is about 530 mm which is distributed from May to October with a peak during September and October (153.3 mm and 106.7 mm respectively). The trial was laid out as RBD on medium black soil with fifteen genotypes replicated thrice. Rhizome bits (15-20 g) were planted at a recommended spacing in a raised bed of 3 m x 1m size and cultivation practices were adopted as per package of practice of U.A.S., Dharwad.¹

Essential oil content (on fresh weight basis), oleoresin and crude fibre

contents were recorded after harvesting of rhizomes under both the condition. Essential oil content on fresh weight basis was determined by steam distillation of freshly harvested rhizomes using Clevenger type apparatus. The fresh rhizomes were boiled for about 8 to 10 hours in the clevenger's apparatus and oil content was noted.

For extraction of ginger oleoresin, pre-weighed finely ground ginger powder was extracted for about 18 hours in soxhlets apparatus with anhydrous petroleum ether adopting standard analytical procedure.⁸

Results and Discussion

The quality attributes and fresh rhizome yield (t/ha) recorded in ginger genotypes grown in open area and under coconut shade is presented in Table 1.

Among fifteen ginger genotypes under evaluation, Mahim recorded significantly higher crude fibre content of 5.18 per cent followed by the genotype Bhaisa (4.58%) while the lowest was recorded in the genotype Basavakalyan (3.10%) when grown under open condition. Similarly under coconut shade, crude fibre content of different genotypes differed significantly ranging from 2.86 per cent (Basavakalyan) to 4.95 per cent (Mahim). Such variation in crude fibre content under shade condition was reported.^{2,6}

Table 1: Crude fibre, essential oil, oleoresin content and yield of different ginger genotypes in open area and under coconut shade as intercrop.

Sl. No.	Cultivars / Genotypes	Crude fibre (%)			Essential oil (%)			Oleoresin (%)			Fresh rhizome Yield (t/ha)		
		Open	Coco nut shade	t-value	Open	Coco nut shade	t-value	Open	Coco nut shade	t-value	Open	Coco nut shade	t-value
1.	Basavakalyan	3.10	2.86	1.30	1.29	1.50	1.05	5.30	4.89	0.96	16.17	14.46	9.05*
2.	Bhaisa	4.58	4.75	0.78	1.30	1.28	1.26	4.20	3.91	0.83	12.50	10.54	16.30*
3.	Bidar	4.51	4.82	0.96	1.15	1.10	0.08	4.35	4.20	1.03	16.17	13.57	15.97*
4.	Banavasi	3.99	3.75	1.05	1.74	1.70	0.98	5.00	4.83	1.76	17.51	14.88	13.80*
5.	Humnabad	4.23	4.32	1.95	2.00	1.90	1.09	8.70	8.60	1.89	24.42	21.32	17.67*
6.	Hirekerur	4.06	4.18	1.35	1.59	1.63	0.92	7.30	7.13	0.99	21.20	18.97	8.09*
7.	Karkal	4.05	3.60	0.93	2.20	2.00	0.63	4.25	4.07	0.69	13.16	12.19	8.39*
8.	Kundapur	3.98	3.87	0.07	1.30	1.20	0.29	4.00	3.81	0.36	14.60	12.58	9.23*
9.	Mahim	5.18	4.95	0.09	1.10	1.00	1.39	3.20	2.45	1.29	10.99	10.73	2.86*
10.	Maran	4.34	4.27	0.89	1.70	1.60	1.02	3.50	3.41	1.36	17.44	15.42	8.31*
11.	Rio-de-Janeiro	4.17	4.23	1.02	2.40	2.35	1.29	8.35	8.01	1.85	22.34	20.29	12.86*
12.	Suruchi	3.22	3.29	1.35	1.80	1.70	0.09	8.20	7.78	1.25	19.08	16.73	19.10*
13.	Suravi	4.10	3.89	0.91	2.00	1.80	1.08	8.00	7.89	1.36	18.89	16.45	18.25*
14.	Varada	4.32	4.37	0.73	1.70	1.68	1.32	6.83	6.20	0.92	19.64	17.50	13.46*
15.	Wynad	3.97	3.75	0.09	1.30	1.35	0.06	4.90	4.43	0.32	14.62	13.20	10.65*
S.E.m±0.23		0.27	-	0.13	0.10	-	0.36	0.12	-	0.99	1.40	-	-
C.D (0.05)		0.68	0.82	-	0.39	0.30	-	1.04	0.38	-	2.88	4.27	-
C.V (%)		9.96	9.44	-	14.22	9.00	-	10.92	3.27	-	10.00	13.05	-

* Significant at 5 per cent between open crop and under coconut shade as intercrop (n=25)

The higher essential oil was recorded in the genotype Rio-de-Janeiro (2.40%) followed by Karkal (2.20%) and the lower essential content was recorded in the genotype Mahim (1.10%) grown under open condition. Under intercropping situations, higher essential oil was recorded in the genotype Rio-de-Janeiro (2.35%) and the lower oil content was recorded in the genotype Mahim (1.00%). In open condition, the high yielding genotype Humnabad recorded significantly higher oleoresin content of 8.70 per cent closely followed by Cv. Rio-de-Janeiro (8.35%), Suruchi (8.20%), Suravi (8.00%) and the genotype Mahim recorded the lowest oleoresin content (3.20%). Such variation in oleoresin content was reported by earlier workers^{2,3,4,6}.

Similarly in intercropping situation the genotype Humnabad recorded higher oleoresin content of 8.60 per cent closely followed by Cv. Rio-de-Janeiro (8.01%), Suravi (7.89%), Suruchi (7.78%) and the genotype Mahim recorded the lowest oleoresin content (2.45%). Such variation in oleoresin content also observed in cultivar Rio-de-Janeiro under Shade condition⁹.

In open condition, the genotype Humnabad recorded a higher fresh rhizome yield (24.42 t/ha), closely followed by Cv. Rio-de-Janeiro (22.34 t/ha), Hirekerur (21.20 t/ha) and Varada (19.64 t/ha) and the lowest yield per hectare was recorded in the genotype

Mahim (10.99 t/ha). Higher fresh rhizome yield for genotype Humnabad (28.45 t/ha) under Ghataprabha left bank command area of northern Karnataka is also reported².

Under coconut shade also the genotype Humnabad produced the highest fresh rhizome yield of 21.32 tonnes per hectare followed by Rio-de-Janeiro (20.29 t/ha), Hirekerur (18.97 t/ha), Varada (17.50 t/ha) and Suruchi (16.73 t/ha) when grown as intercrop. The variation in the yield of different genotypes grown under similar conditions has been reported by several workers^{5,7,9}. Thus the genotype Humnabad is found to be promising with higher yield of good quality.

References

- ¹ Anonymous. 2001. Statistical data on horticultural crops in Karnataka state at a glance. Directorate of Horticulture, Lalbagh, Bangalore. pp. 66-71.
- ² Kale U B. 2001. Evaluation of ginger (*Zingiber officinale* Rosc.) genotypes under Ghataprabha Left Bank Command Area of Northern Karnataka. M.Sc. (Hort) Thesis. Univ. of Agric. Sciences, Dharwad.
- ³ Guruprasad T R. 1997. Studies on Evaluation of ginger cultivars and standardization of nutrient requirement of ginger (*Zingiber officinale* Rosc.) for Coastal Karnataka. Ph.D. Thesis. Univ. of Agric. Sciences, Bangalore.
- ⁴ Kempegowda K. 1996. Evaluation of ginger (*Zingiber officinale* Rosc.)

Cultivars and nutritional requirements of ginger in the Southern dry region of Karnataka, *Ph. D. Thesis*, Univ. of Agric. Sciences, Bangalore.

⁵ Sujatha, K., P. Muralidharan, P. Latha and N.K. Nair. 1994. *South Indian Horticulture*. 42(5): 339.

⁶ Ancy, J. And B.K. Jayachandran. 1993. *South Indian Horticulture*. 41(4): 219-222.

⁷ Jayachandran, B.K., M. Meera Bai, M. Abdul Salam, And K.P. Mathew. 1992. Performance of ginger under

shade and open conditions. *Indian cocoa, Arecanut and spices J.* 15(3): 40-41.

⁸ A.O.A.C., 1984. *Association of Official Analytical Chemists*, 14th Edition, Washington, p. 153.

⁹ Thangaraj, T., S. Muthuswamy, C.R. Muthukrishnan and J.B.M.M. Khader. 1983. A performance of ginger (*Zingiber officinale* Rosc.) varieties at Coimbatore. *South Indian Horticulture*. 31(1): 45-46.