

## IISR Varada - a new high yielding ginger (*Zingiber officinale* Rosc.) variety

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### ABSTRACT

IISR Varada (Acc. 64) developed at the Indian Institute of Spices Research, Calicut and recommended for release by the All India Co-ordinated Research Project on Spices, is a good quality, high yielding, ginger (*Zingiber officinale*) variety developed through germplasm selection. Maturing in 200 days, the variety has an average yield of 22.66 t/ha (fresh), low fibre and dry recovery of 20.7 per cent. The dry ginger of this variety is less prone to storage insect damage.

Key words: ginger, high yielding variety, *Zingiber officinale*.

### Introduction

Ginger (*Zingiber officinale* Rosc.) is an important rhizomatous spice produced and exported from India. India produces about 1,48,520 t of ginger annually from an area of 53,300 ha. Kerala is a leading State in India in area and production of ginger followed by Orissa, Meghalaya, Himachal Pradesh and Karnataka (Source : Directorate of Economics and Statistics, New Delhi). Ginger is cultivated in an area of 14,040 ha in Kerala with a production of 44,500 t. Apart from the three high yielding ginger varieties, namely, Suprabha, Suruchi and Suravi, released from the High Altitude Research Station of Orissa Agricultural University and Technology, Pottangi, Orissa, all the other existing ginger cultivars are land races

or introductions. Even though many of these cultivars are good with respect to yield and quality, clonal admixture coupled with lack of clone specific distinguishing features render the cultivars often as poor performers. This has necessitated the development of high yielding, good quality, pure clones of ginger.

### Materials and methods

The National Repository of Ginger Germplasm at Indian Institute of Spices Research (IISR), Calicut possesses one of the largest collections of ginger gene pool. Systematic evaluation of this germplasm is being carried out for yield and quality. From a preliminary evaluation of 100 accessions done during 1990-91, the best 11 accessions (Acc. Nos. 51,64,141,251,222,63,151,53,11,249

and 65 (Acc. 222 is a tetraploid derivative of Maran) along with 4 controls, namely, Suprabha, Himachal, Muvattupuzha Local and Maran were evaluated in replicated trials during 1991-95 at different locations in Kerala, namely, Peruvannamuzhi (Kozhikode District), Muvattupuzha (Ernakulam District), Ambalavayal, Niravilpuzha (Wynad District) and Peechi (Trichur District). Ambalavayal, Niravilpuzha and Peechi were included in the final year of evaluation only. The experiment was set to a RBD having three replications with a plot size of 3m<sup>2</sup>. Observations were recorded on fresh yield of rhizomes, dry recovery and quality traits such as crude fibre, oleoresin and essential oil contents. The crop was raised adopting standard package of practices. The data were analysed statistically as per standard procedures.

## Results and discussion

The fresh rhizome yield per plot was significantly different among the entries during all years at all locations except during 1992-93 at Muvattupuzha (Table 1). Pooled analysis of yield data over locations and years also revealed significant differences among the entries (Table 2). Acc. 64, though at par with the controls, ranked first for fresh rhizome yield per plot over locations and seasons.

Acc. 64 had a dry recovery of 20.7 per cent (Table 3), next only to Himachal which had 21.6 per cent dry recovery. Year to year as well as location-wise fluctuations in dry recovery and other quality traits such as essential oil content, crude fibre and oleoresin percentage were noticed in almost all the entries. However, Acc. 64 had comparatively less crude fibre percent-

age (4.50 per cent; 3.29 per cent as per the data obtained from the Quality Evaluation and Upgradation Laboratory, Spices Board, Cochin) and good oleoresin content (6.73 per cent). Its essential oil content was 1.75 per cent. The salient yield and quality features of Acc. 64 and the controls are given in Tables 4 and 5. Even though Acc. 64 had comparatively low oleoresin content as compared to the controls, it had highest average yield (22.6 t/ha), good dry recovery (20.7 per cent), low crude fibre (3.29-4.50 per cent) and early maturity (200 days). A preliminary study on the shelf-life of dry ginger of Acc. 64 indicated that it is less preferred by storage pests. Hence this accession was proposed for release as IISR Varada for cultivation in Kerala State and recommended by the XIII Group Meeting of All India Coordinated Research Project on Spices held at Jaipur during 23-25 August 1995.

This variety, resembling the popular cultivar Himachal is characterised by plumpy rhizomes with flattened fingers and medium sized reddish brown scales (Fig. 1). The periphery of the inner core of rhizomes is bluish yellow.

Mohanty & Sarma (1979) pointed out the effectiveness of straight selection in improving yield and quality of ginger. Good variability for rhizome yield and yield attributes in ginger germplasm maintained at IISR, Calicut was already reported (Sasikumar *et al.* 1992). IISR Varada is the first ginger variety recommended for release from Kerala. This new variety will help the farmers of the state to have a better varietal choice without sacrificing clonal purity.

Table 1. Performance of ginger accessions at different locations

Accession	1991-92		1992-93		1993-94		1994-95				
	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Amb- alava- yal	Nirav- ilpu- zha	Peechi
51	11.70	8.88	14.80	15.98	11.00	9.40	9.50	9.43	6.28	11.08	7.17
64	13.48	10.51	15.25	16.10	14.67	11.23	11.23	11.50	7.38	11.00	9.83
141	12.05	10.49	13.23	15.08	10.83	10.77	9.83	9.83	6.78	10.00	8.00
251	15.53	13.15	14.87	14.67	10.00	10.33	12.33	8.17	6.09	9.44	8.83
222	10.40	8.43	11.97	12.10	9.17	9.28	10.17	8.00	5.17	6.92	7.83
63	13.95	10.69	12.81	12.40	10.67	9.89	10.83	9.00	6.87	10.83	7.67
151	9.93	11.26	13.02	14.45	10.33	9.50	11.00	9.27	6.30	8.10	8.17
53	13.93	11.31	13.42	15.40	12.33	10.27	11.00	10.33	6.41	9.60	9.83
11	14.10	12.06	12.67	15.83	10.67	9.53	10.60	9.00	6.47	9.67	7.17
249	10.75	12.23	14.69	14.50	12.00	10.33	10.10	10.00	6.00	9.16	8.33
65	12.45	11.39	13.45	15.57	10.33	8.63	9.83	10.50	5.33	11.00	7.33
*250	12.45	11.84	13.46	15.63	11.17	9.50	10.17	10.50	6.10	10.23	8.16
*293	14.38	10.31	15.67	16.00	9.17	9.15	11.17	9.67	7.25	11.20	7.83
*295	12.65	11.71	12.71	16.00	9.67	12.15	10.17	8.83	7.23	7.36	9.00
*252	11.15	10.56	12.79	12.79	10.83	9.06	11.00	8.83	6.70	7.83	8.16
CD (5%)	2.92	2.23	2.09	NS	0.97	0.68	0.62	0.51	0.54	0.90	0.75
CV (%)	10.80	9.50	9.01	9.00	11.90	9.17	7.88	7.19	11.27	12.60	12.10

Values denote mean yield/3m<sup>2</sup> bed in kg

\* Controls (Acc. 250 = Himachal; Acc. 293 = Suprabha; Acc 295 = Maran; Acc 252 = Muvattupuzha Local)

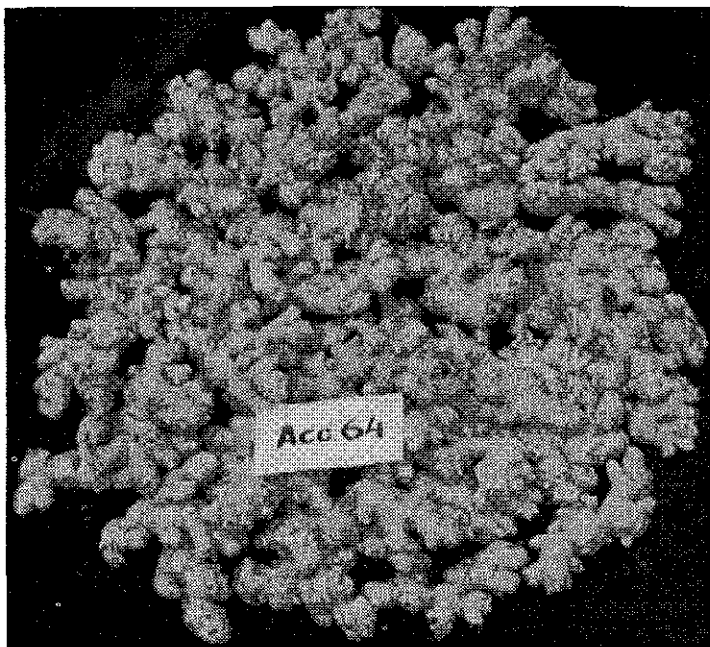


Fig.1. IISR Varada, a high yielding ginger variety

**Table 2. Pooled analysis of mean yield of ginger accessions**

Accession	Pooled analysis over years- and locations	Pooled analysis over locations only
51	11.33	8.63
<b>64</b>	<b>12.49</b>	<b>10.17</b>
141	11.54	8.89
251	12.35	8.98
222	9.94	7.63
63	11.28	9.01
151	11.10	8.54
53	12.28	9.43
11	11.86	8.71
249	11.82	8.72
65	11.55	8.80
*250	11.82	9.02
*293	12.19	9.39
*295	11.70	8.53
*252	10.96	8.51
CD (5%)	1.94	1.80
CV %	10.41	12.74

Values denote mean yield/3m<sup>2</sup> bed in kg

\* Controls (Acc. 250 = Himachal; Acc.293 = Suprabha; Acc. 295 = Maran; Acc. 252 = Muvattupuzha Local)

**Table 3. Dry recovery of ginger accessions at different locations**

Accession	1991-92		1992-93		1993-94		1994-95				Mean
	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Peruv- anna- muzhi	Muva- ttu- puzha	Amb- alava- yal	Nirav- ilpu- zha	
51	19.5	13.9	20.0	22.4	17.0	19.8	19.0	24.0	24.0	16.0	19.6
64	20.0	20.0	19.0	22.9	17.5	20.0	21.0	23.0	24.0	20.0	20.7
141	15.0	16.0	17.0	22.8	20.0	17.5	20.5	18.0	20.0	19.0	18.5
251	15.0	10.0	17.0	16.6	15.5	14.5	20.0	23.0	19.0	19.5	18.6
222	16.0	15.5	21.5	22.3	22.0	21.0	20.5	22.0	22.0	22.0	20.4
63	22.5	17.3	18.5	17.1	16.0	14.5	18.5	21.0	17.0	14.0	17.6
151	20.0	13.4	16.0	21.3	15.0	16.0	20.0	19.0	24.0	20.0	18.5
53	25.5	14.5	17.0	17.9	17.0	15.0	20.0	15.0	20.5	19.4	18.2
11	25.0	13.7	18.0	21.2	17.5	15.5	17.5	14.0	20.5	19.5	18.2
249	19.5	19.8	20.5	20.8	20.5	19.0	17.5	17.0	20.5	20.5	19.6
65	16.0	14.0	15.0	19.5	18.0	15.5	20.0	20.5	21.5	20.0	18.0
*250	23.0	19.0	21.0	22.2	17.5	21.0	21.0	22.5	23.0	21.4	21.2
*293	17.0	11.0	14.5	21.6	16.0	15.9	18.5	15.0	19.0	15.1	16.3
*295	22.0	17.2	19.5	19.5	20.0	19.0	21.5	19.0	20.0	22.2	20.0
*252	-	-	22.6	22.6	18.0	17.0	20.0	16.0	19.0	19.3	19.3

Values denote % dry recovery

\* Controls (Acc. 250 = Himachal; Acc. 293 = Suprabha; Acc 295 = Maran; Acc 252 = Muvattupuzha Local)

Table 4. Quality attributes of ginger accessions at different locations

Acce- ssion	1993						1994						1995		Mean		
	Peruvannamuzhi			Muvattupuzha			Peruvannamuzhi			Muvattupuzha			Peruv- anna- muzhi	Muv- attu- puzha			
	EO %	OR %	CF %	EO %	OR %	CF %	EO %	OR %	CF %	EO %	OR %	CF %	CF %	CF %	EO %	OR %	CF %
51	2.1	6.8	-	2.6	11.4	-	2.3	10.0	5.0	2.2	5.8	3.5	3.1	3.0	2.3	8.5	3.7
<b>64</b>	<b>1.9</b>	<b>6.5</b>	<b>4.8</b>	<b>1.8</b>	<b>6.4</b>	<b>5.1</b>	<b>1.5</b>	<b>7.0</b>	<b>4.9</b>	<b>1.8</b>	<b>7.0</b>	<b>3.5</b>	<b>5.0</b>	<b>3.7</b>	<b>1.75</b>	<b>6.7</b>	<b>4.5</b>
141	1.9	6.5	-	1.8	7.0	-	2.4	7.0	5.0	1.9	7.0	4.6	4.3	4.4	2.0	6.7	4.6
251	2.4	9.0	-	2.5	8.1	5.7	2.1	11.0	6.3	2.3	7.7	5.4	5.6	4.0	2.3	8.9	5.4
222	2.0	7.0	-	1.2	7.0	-	1.7	9.0	3.9	1.3	5.5	4.0	-	4.1	1.6	7.1	4.0
63	2.3	7.0	-	2.3	8.0	-	2.2	10.0	5.0	1.7	6.0	4.1	6.5	3.3	2.1	7.8	4.6
151	2.0	7.3	-	3.0	10.0	-	2.3	8.9	5.0	2.5	9.0	6.5	3.0	5.4	2.5	8.8	5.0
53	-	-	-	2.5	10.0	5.5	1.9	7.5	4.8	1.3	6.0	5.6	4.6	5.2	1.9	7.8	5.1
11	2.0	7.0	-	-	-	-	1.7	7.6	4.0	2.5	8.5	4.5	5.6	4.8	2.1	7.7	4.7
249	2.4	6.5	-	2.0	8.6	-	1.4	7.0	5.0	1.8	6.0	4.2	4.5	4.8	2.1	7.0	4.6
65	-	-	-	2.7	8.0	4.3	2.2	8.2	5.1	2.3	7.5	6.2	4.4	4.4	2.4	7.9	4.9
*250	1.2	6.0	-	1.5	7.0	-	1.9	9.0	4.7	2.0	8.0	3.8	4.6	4.8	1.7	7.5	4.5
*293	1.9	6.5	-	-	-	-	2.8	7.4	4.5	2.1	6.5	5.0	5.7	4.8	2.3	6.8	5.0
*295	2.0	7.5	-	2.0	8.0	-	1.8	7.5	4.2	2.0	7.0	5.5	4.9	3.0	2.0	7.5	4.4
*252	1.9	6.0	-	1.5	6.2	-	2.2	7.0	4.5	1.8	6.5	6.0	6.0	4.8	1.9	6.4	5.3

EO = Essential oil; OR = Oleoresin; CF = Crude fibre

\* Controls (Acc. 250 = Himachal; Acc. 293 = Suprabha; Acc. 295 = Maran; Acc. 252 = Muvattupuzha Local)

**Table 5. Salient features of Acc. 64 and controls**

Variety	Av. fresh yield (t/ha)	Dry reco- very (%)	Essential oil (%)	Crude fibre (%)	Oleore- sin (%)	Matu- rity (Days)
<b>Acc. 64</b>	<b>22.60</b>	<b>20.70</b>	<b>1.75</b>	<b>4.5</b>	<b>6.7</b>	<b>200</b>
Suprabha	21.58	16.30	2.26	5.0	6.8	202
Maran	20.23	20.00	1.95	4.4	7.5	203
Himachal	20.84	21.16	1.65	4.5	7.5	204

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