

Field tolerance of ginger (*Zingiber officinale*) genotypes to soft rot under rainfed up-land situation

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Abstract

Eleven genotypes of ginger were screened for reaction to soft rot and rhizome yield at AICRP on Dryland Agriculture (OUAT), Phulbani, Orissa during 2006-07. The trial was laid out in RBD with three replications. The crop was planted during last week of June at the site where turmeric was grown in the previous year. Soft rot incidence in ginger was recorded at 60, 75, 90 and 135 days after planting (DAP). Over 8% soft rot incidence was found in ACC-35, ACC-117 and SG-666 at 60 DAP. These genotypes had severe soft rot incidence at 135 DAP. No observation on soft rot was made after 135 DAP due to senescence of some plants for dry weather. The genotypes showing minimum soft rot were Suprabha, Phulbani Local and VIC-8. Soft rot incidence was very high in ACC-117 and no yield was realized from this genotype. Due to severe soft rot incidence, premature drying of plants was observed in some genotypes. Rhizome yield varied from zero (ACC-117) to 46.27 q/ha (VIC-8). However, rhizome yields of Suprabha, VIC-8 and Phulbani Local were found to be at par. Poor performance of different genotypes was attributed to dry weather during peak growth stage and soft rot incidence.

Key words: Ginger, genotypes, soft rot, field resistance, rhizome yield

Among different spices grown in Orissa, ginger (*Zingiber officinale* Roscoe) holds an important position. It is mostly grown in Koraput, Kandhamal and Rayagada districts of Orissa by small and marginal farmers. The problem of soft rot poses economic loss to the farmers. Non adoption of chemical method of soft rot management in one of the reasons for recurrence of soft rot in the field. Use of a tolerant variety in soft rot endemic area seems to be an important measure for keeping the disease incidence at minimum level. In Orissa, a lot of work has been done in the Department of Plant Pathology on identification and characterization of fungi associated with soft rot in ginger (Mishra,

1990; Rath and Mishra, 1993). However, research on varietal resistance to soft rot disease at this location is lacking. Keeping this in view, the present investigation was carried out to evaluate ginger the varieties to soft rot and its impact on final rhizome yield.

An experiment was conducted to evaluate 11 promising genotypes of ginger for reaction to soft rot and rhizome yield at the Research Farm of AICRP on Dryland Agriculture (OUAT), Phulbani, Orissa during 2006-07. The ginger genotypes were received from High Altitude Agriculture Research Station (OUAT), Pottangi, Koraput, Orissa. The trial was laid out in RBD with three replications.

Table 1. Soft rot incidence of ginger genotypes at DLAP (OUAT), Phulbani during Kharif 2006-07

Sl. No.	Genotype	Germination* (%)	Soft rot (%)			
			60DAP	75DAP	90DAP	135DAP
1.	VIE 8-2	77.08	0.90	9.91	24.32	45.95
2.	Suprabha	89.58	0.00	1.55	4.65	5.43
3.	ACC 35	88.90	8.59	16.41	25.78	61.72
4.	ACC 117	91.67	8.33	31.82	43.94	86.36
5.	Suravi	82.63	0.84	9.24	22.69	44.54
6.	S 646	79.17	0.00	3.51	14.04	56.14
7.	ZO 2	89.58	4.65	11.63	16.28	44.96
8.	SG 666	90.27	8.46	13.85	19.23	59.23
9.	VISI 8	77.77	3.57	16.07	25.89	61.61
10.	VIC 8	79.17	0.00	0.00	1.75	13.16
11.	Phulbani Local	84.72	0.00	0.82	4.10	10.66

* Observation at 30 days after planting (DAP)

The crop was planted in a sick plot during the last week of June at the site where turmeric was grown in the previous year and showed sporadic soft rot incidence.

Ginger rhizomes were planted on beds of 1m widths and 3m lengths at spacing of 25 cm between rows. A basal dose of 20t FYM, 100 kg P₂O₅ and 50 kg K₂O per hectare was applied at the time of planting. First and second top

dressing of fertilizers were made at 45 and 90 days after planting with 62.5 kg N and 62.5 kg N + 50 kg K₂O, respectively. Normal agronomic practices were followed for raising the crop.

Observation on soft rot incidence in ginger genotypes was made at 60 days after planting (DAP) when the disease started appearing and thereafter at 75, 90 and 135 DAP. The

Table 2. Performance of ginger genotypes at DLAP (OUAT), Phulbani during Kharif 2006 - 07

Sl. No.	Genotype	Plant height (cm)	Tillers/plant	Days to maturity/toppling	Rhizome yield (q/ha)
1.	VIE 8-2	36.0	5.9	180	24.3 (4.98)**
2.	Suprabha	40.7	6.3	180	42.8 (6.57)
3.	ACC 35	33.2	5.6	-*	23.0 (4.85)
4.	ACC 117	25.4	4.0	-	0.00 (0.71)
5.	Suravi	37.3	6.5	185	26.7 (5.21)
6.	S 646	34.7	5.1	185	26.5 (5.18)
7.	ZO 2	34.9	4.4	-	18.8 (4.37)
8.	SG 666	34.9	4.1	-	12.3 (3.56)
9.	VISI 8	29.2	6.0	-	5.3 (2.39)
10.	VIC 8	37.7	6.7	182	46.3 (6.84)
11.	Phulbani Local	44.0	8.4	187	43.2 (6.60)
	SE(m)+	1.5	0.3	-	0.2***
	CD (0.05)	4.5	0.8	-	0.5***

* premature drying of plants; **transformed value (square root); ***based on transformed value

disease incidence was expressed in terms of percentage of affected plants. The data on rhizome yield was taken at the time of harvest.

Cultivation of turmeric in the previous season coupled with high soil moisture during August favoured multiplication of soft rot pathogen to attack the ginger crop. The percentage of germination was good (over 70%) in all the genotypes to give an adequate plant stand (Table1). The germination % ranged from 77.08% in VIE 8-2 to 91.67% in ACC 117. However, there was variable intensity of soft rot in different genotypes of ginger. In some genotypes, incidence of soft rot was so severe that all the plants died and no yield was realized. Over 8% soft rot incidence was found in ACC-35, ACC-117 and SG-666 at even 60 DAP. These genotypes had also severe soft rot incidence at 135 DAP. The genotypes showing minimum soft rot were Suprabha, Phulbani Local and VIC-8. Even at 90 DAP, the disease intensity in these three genotypes was less than 5%. Soft rot incidence was very high in ACC-117 and no yield was realized from this genotype.

Significant variation among genotypes was observed with respect to plant height and

tillers/plant, which have indirect correlation with rhizome yield (Table 2). Among 11 genotypes of ginger, Phulbani Local had maximum height (44.0cm) and maximum number of tillers/plant (8.4) while ACC-117 had lowest height (25.4cm) and lowest number of tillers/plant (4.0). Days taken to maturity observed in some varieties was around 180 days. In other genotypes, maturity duration could not be recorded due to premature drying of plants. Due to severe soft rot incidence, rhizome yield varied from zero (ACC-117) to 46.27 q/ha (VIC-8). However, rhizome yields of Suprabha, VIC-8 and Phulbani Local were found to be at par. Poor performance of different genotypes was attributed to dry weather during peak growth stage and soft rot incidence.

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