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Short Communication

Effect of meteorological parameters on severity of storage rot of ginger

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Ginger (*Zingiber officinale* Rosc.) is the rhizome or root stock of herbaceous perennial crop which is grown in Udaipur and Dungarpur districts of Southern Rajasthan. This crop is used as medicine and is highly perishable. During transit and storage, the quality of ginger gets deteriorated (Quibo *et al.*, 1997). *Fusarium solani* and *Pythium aphanidermatum* are the most important pathogens of storage rot of ginger. Temperature and relative humidity play an important role in the severity and spread of storage rot. Since very little information is available on the effect of weather parameters on ginger rhizome during storage, an attempt was made to study their effects on development of storage rot.

The Potato Dextrose Agar (PDA) and Corn Meal Agar (CMA) containing plates were incubated by 2 mm disc of 5 day old culture of the pathogens. Four plates for each treatment were kept at different temperature levels i.e., 10, 20, 25, 30, 35 and 40 ± 2 °C.

Fresh and healthy rhizomes of ginger obtained from market were surface sterilized by dipping in 0.1 per cent $HgCl_2$ solution for 1 minute and subsequently washed in sterile distilled water. The rhizomes were inoculated with 5-day old culture of *Fusarium solani* and *P. aphanidermatum*, and then placed in sterile polythene bags as one rhizome/bag. The inoculated rhizomes were stored at different temperature levels from 10-40 °C and with relative humidity varying from 30-100 percent. The RH levels were maintained following Buxton and Mellanby (1934). The disease development was recorded on the basis of rhizome infected after 3rd, 5th and 8th day of inoculation in percentage.

Table 1: Effect of different temperatures on mycelial growth of *F. solani* and *P. aphanidermatum*

Temperature (±2°C)	Mycelial growth in diameter (mm)*	
	F. solani	*P. aphanidermatum*
10	0.00	0.00
20	27.49	28.87
25	85.25	82.90
30	89.63	89.89
35	16.62	28.11
40	0.00	0.00
SEm ±	0.30	0.48
CD 5 %	0.89	1.44
CD 1 %	1.23	1.97
CV %	1.82	3.03

* Average of four replications.

Table 2: Effect of different temperatures on severity of storage (percent) rot of ginger incited by *F. solani* and *P. aphanidermatum*

Temperature (±2°C)	Infected index*					
	F. solani			*P. aphanidermatum*		
	3rd day of inoculation	5th day of inoculation	8th day of inoculation	3rd day of inoculation	5th day of inoculation	8th day of inoculation
10	0.00	0.00	0.00	0.00	0.00	0.00
20	2.98	16.76	24.16	3.89	18.10	26.32
25	4.36	35.18	48.32	6.05	38.25	54.42
30	8.55	37.69	80.92	9.42	40.08	60.65
35	4.07	14.52	21.76	5.96	20.12	28.18
40	0.00	0.00	0.00	0.00	0.00	0.00
SEm ±	0.44	0.56	0.73	0.43	0.6623	0.8224
CD 5 %	1.31	1.68	2.16	1.27	1.9678	2.4434
CD 1 %	1.79	2.29	2.96	1.74	2.6960	3.3477
CV %	10.47	5.61	5.95	8.92	6.15	6.11

Table 3: Effect of relative humidity on severity of storage (percentage) rot of ginger incited by *F. solani* and *P. aphanidermatum*

Relative Humidity (%)	Infected index*					
	F. solani			*P. aphanidermatum*		
	3rd day of inoculation	5th day of inoculation	8th day of inoculation	3rd day of inoculation	5th day of inoculation	8th day of inoculation
30	0.00	3.05	20.80	0.00	5.58	24.78
40	2.92	20.96	37.88	3.34	23.52	43.82
50	8.20	29.68	44.62	9.82	32.15	48.42
60	8.98	31.56	50.53	10.96	36.36	54.65
70	10.48	35.61	57.09	12.22	39.95	62.24
80	12.32	37.82	62.77	14.48	42.18	67.68
90	14.68	48.74	68.75	16.75	52.08	72.32
100	15.42	58.18	74.04	18.06	62.38	78.48
SEm ±	0.6027	0.99	1.22	0.71	1.0491	1.2296
CD 5 %	1.81	2.98	3.66	2.14	3.1452	3.6864
CD 1 %	2.49	4.10	5.05	2.95	4.3334	5.0790
CV %	6.47	5.04	4.59	7.04	4.97	4.36

The maximum growth of *F. solani* and *P. aphanidermatum* was observed at 30 °C, while the least growth was observed at 35 and 20 °C. (Table 1). The growth of both the pathogens was completely inhibited at 10 and 40 °C. It is evident that optimum temperature requirement for natural growth of both the pathogens is 25 to 30 °C .

The severity of *F. solani* and *P. aphanidermatum* was the highest when the rhizomes were incubated at 30 ± 2 °C (81 % and 61 % respectively) in both pathogens followed by 25 ± 2 °C (48 % and 54 %) while there was no rotting of rhizomes at 10 and 40 °C even after 8th days of inoculation (Table 2).

Increase in relative humidity from 30 to 100 per cent resulted in increase in percentage of rot (Table 3) as indicated earlier by Rana and Singh (1992) in case of sweet orange. These results suggest that to reduce storage rot of ginger rhizomes may be stored at 10 °C and below 30 percent relative humidity.

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