

## REACTION OF DIFFERENT TYPES OF GINGER TO BACTERIAL WILT CAUSED BY *PSEUDOMONAS SOLANACEARUM* (SMITH) SMITH

Ginger, an important spice crop grown in Kerala, is attacked by a number of diseases (Sharma and Jain, 1977) resulting in varying degrees of crop damage and reduction in production. Recently, bacterial wilt caused by *Pseudomonas solanacearum* (Smith) Smith, Biotype III of Hayward, has inflicted great loss to ginger in Wynad (Sarma *et al.*, 1978) and created concern among growers in view of the enormous loss it caused to ginger and the absence of any effective control measures. The disease for the first time was reported from Mauritius by Orian (1953). In India the disease has recently been reported from Kerala (Sarma, *et al.*, 1978, James Mathew *et al.*, 1979). During 1978, there was an outbreak of bacterial wilt at the Horticultural Research Station, Ambalavayal and the adjoining areas of Wynad. The germplasm of ginger comprising of 30 types maintained at the station was affected at varying intensities besides large scale infection which was noticed in the bulk plantings of types Rio-de-Janeiro and Maran. As part of a project on the new disease, screening of the types of ginger available at this station was undertaken during 1980-81 season to ascertain the relative reaction of these varieties to the pathogen and the results are presented in this research note.

The experiment was conducted in pots of 30 cm diameter. The pots were filled with soil containing diseased plant debris from the infected area. The seed material of 30 different types of ginger in the germplasm bank was collected from previous years crop (positively contaminated) and treated with 0.25% Agallol-3 - (methoxy ethyl mercuric chloride) for 30 minutes. The seed material of each type was then planted in 5 pots at 3 pieces per pot on 20-4-1980.

In an earlier study on survival of the pathogen, it was seen that *P. solanacearum* survived in soil and seed rhizome for a long time and formed potential source of primary inoculum (Indrasenan. *et al.*, 1981 unpublished). However, a 48 hour old culture of the bacterium grown in nutrient agar and ginger sprout extract supplemented with 0.1% casein hydrolysate, 2% sucrose and 2% agar was made into a suspension by adding water. The population of the bacteria was adjusted approximately to  $10^7$ /ml and poured at 3 nil/plant at 45th day after the germination count was taken, to ensure uniform inoculum potential under the test conditions. The recommended package of practices was adopted. The disease intensity was assessed on the 90th day after planting. The following grading was adopted for measuring disease incidence: 0-5%—resistant, 6-10%—moderately resistant, 11-25%—mildly susceptible, 26-40%—moderately susceptible and above 40%—highly susceptible. The disease intensity was calculated from

$$\frac{\text{Number of plant infected} \times 100}{\text{Total number of plants}}$$

obtained from each type was recorded after harvesting the crop on 1-1-1981.

Table 1

Percentage infection, cultivar reaction and yield of different types of ginger

Sl. No.	Variety	Percent infection	Cultivar reaction	Yield in kg
1	Nadia	26.6(31.05)*	M S	0.660
2	Narassapattom	20.0(26.57)	m s	0.780
3	Himachal Pradesh	20.0(26.57)	m s	0.720
4	Sierra Leone	26.6(31.05)	M S	0.570
5	Wynad Kunnamangalam	26.6(31.05)	M S	0.490
6	Jugijan	40.0(39.23)	M S	0.290
7	Arippa	55.3(48.04)	H S	0.190
8	Thodupuzha	26.6(31.05)	M S	0.720
9	Vengara	33.3(35.24)	M S	0.530
10	Jorhut	46.6(43.05)	H S	0.380
11	Taffinjiva	26.6(31.05)	M S	0.930
12	Thinladium	33.3(35.24)	M S	0.780
13	China	33.3(35.24)	M S	0.810
14	Baj pai	46.6(43.05)	H S	0.600
15	Uttar Pradesh	60.0(50.77)	H S	0.500
16	Taiwan	55.3(46.04)	H S	0.470
17	Ernad Chernad	33.3(35.25)	M S	0.770
18	Assam	55.3(48.04)	H S	0.120
19	Ernad Manjeri	73.3(58.89)	H S	0.160
20	Burdwan	66.6(54.70)	H S	0.150
21	Wynad Manantody	73.3(58.89)	H S	0.140
22	Karakkal	26.6(31.05)	M S	0.660
23	Thingpui	40.0(39.23)	M S	0.340
24	Poona	46.6(43.05)	H S	0.520
25	Maran	33.3(35.24)	M S	0.780
26	Rio-de-Janeiro	60.0(50.77)	H S	0.480
27	Kuruppampadi	46.6(43.05)	H S	0.570
28	Tura	20.0(26.57)	m s	0.820
29	Valluvanad	46.6(43.05)	H S	0.680
30	Wynad Local	55.3(48.04)	H S	0.520

C D (0.05) = 13.69

\* Transformed values are given in parenthesis.

F - Highly significant

m s - Mildly susceptible

M S - Moderately susceptible

H S - Highly susceptible

The results are presented in Table 1. The data indicated that no variety was entirely resistant to *P. solanacearum*. However, the types varied markedly and significantly in their degree of susceptibility when planted under uniform test conditions. While 3 types were mildly susceptible to *P. solanacearum*, 13 types were moderately susceptible and the remaining ones were highly susceptible. The yield data (Table 1) did not show any relationship between various degrees of susceptibility and yield loss in different types and all types gave poor yield. This indicated how enormous the loss could be due to the disease.

This study constitutes a pioneer attempt in the relative susceptibility of ginger varieties to *P. solanacearum* (Smith) Smith.

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സംഗ്രഹം

ഇഞ്ചിയുടെ വിവിധ ഇനങ്ങൾക്ക് വാട്ടർമോഗത്തെ ചെറുത്തുനിറുത്തുവാനുള്ള കഴിവിനെപ്പറ്റി നടത്തിയ ഒരു പഠനത്തിൽ ഒരു ഇനത്തിനും ഇതിനെ അതിജീവിക്കുവാനുള്ള കഴിവില്ലെന്ന് മനസ്സിലാക്കി. ഇതിന്റെ അടിസ്ഥാനത്തിൽ ഇഞ്ചിയുടെ മൂപ്പതോളം ഇനങ്ങളെ കൂറേൾഗ് വിധേയത്വമുള്ളത്, വിധേയത്വമുള്ളത്, അധികം വിധേയത്വമുള്ളത് എന്നീ മൂന്നു വിഭാഗങ്ങളിൽ പെടുത്താവുന്നതാണ്.

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