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REACTION OF CITRUS GERMPLASM TO DIFFERENT FUNGAL DISEASES IN MEGHALAYA

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Citrus occupies a prominent place among the fruit crops in India. It is third largest crop grown after mango and banana. In the north eastern hilly (NEH) region of the country it is the major horticultural fruit crop and this region is considered to be the natural homes of citrus. There is a large genetic variation among the citrus species in this region which serves as a breeding / root stock material for disease resistance against the many pathogens. In the present study the reaction of the different citrus species against the fungal pathogens under natural disease pressure was recorded. The common fungal diseases viz; Scab *(Elsinoe fawcettii)*, *Alternaria* leaf spot *(Alternaria citri)*, Powdery mildew *(Oidium tingitaninum)*, greasy leaf spot *(Mycosphaerella horii)* and felt disease *(Septobasidium pseudopedicellatum)* were observed with varying degrees of intensities on different citrus species.

Seventeen indigenous species of citrus plants were assessed for their reaction to different fungal diseases. In each species, three plants were considered as replications. Fifteen newly emerging leaves from each plant were scored for the diseases viz. Scab *(Elsinoe fawcettii)*, *Alternaria* leaf spot *(Alternaria citri)*, Powdery mildew (Oidium tingitaninum) and greasy leaf spot *(Mycosphaerella horii)* under natural disease pressure. Reaction against felt disease *(Septobasidium pseudopedicellatum)* was recorded at different location under poorly maintained conditions. PDI (Percent disease incidence) was calculated.

Among the fungal diseases citrus scab is becoming one of the important disease. The infection is more common on emerging new leaves and in severe cases on the fruits also. Its intensity was recorded on two flushes of the growth (March and September flushes). The maximum disease intensity (30.7%) in September and minimum in December (8.3%) was observed (Table 1 &2).

There was significant difference in the disease intensity among the citrus species also on both the flushes. On march flush highest percent disease was recorded on rough lemon (30.4) followed by Sikkim oranges (19.3) *Citrus latipes* (17.5) and East rough lemon (13.7) and the lowest was recorded on adajamir (1.8) followed by Khasi mandarin (1.9). Gradual increase in disease incidences from March (6.8) to June was observed (13.7).

On September flush also, there was a significant difference in the disease incidence between the cultivars and months. A gradual decrease in disease incidence from September (30.7%) to December (8.3%) was observed. Sikkim oranges showed maximum disease intensity (67.5%) followed by rough lemon (54.6%). The minimum incidence was observed in *Citrus latipes* (5%), Karun jamir (9.4%), Soh joh (10.3%) and Adajamir (10.5%).

Reddy *et al.* (1986) observed that intensity of the scab disease varies with different species of citrus.

Felt disease incidence on different citrus species /varieties was recorded at another location under poorly maintained conditions. Except *C. ichangensis* all had shown severe disease incidence.

The intensity of *Alternaria* leaf spot was more on rough lemons (37.3%) compared to others and there was no disease on *Carrizo citron* and Kalamandarin (Table 3). Powdery mildew was recorded on rough lemons (56%), Soh nariange (48%) and rest of the species were found to be disease free. On Pummello the greasy spot intensity was more (20%) followed by Karun jamir (13.6%)

It may be concluded that the study will provide basic information on the resistance of the citrus germ plasm to identify the resistant root stock material against plant pathogens.

REFERENCE

Reddy, M.R.S.; Naidu, P.H. and Reddy, G.S. (1986) Current Science, 55 : 152-153

Table 1 Incidence of scab in different indigenous species of citrus on March flush

	Month				
Variety	March	April	May	June	Mean
Rough lemon	11.8 (20.2)	14.6 (22.5)	61.4 (51.7)	40.6 (39.6)	30.4 (33.5)
Adajamir	1.3 (6.7)	2.6 (9.3)	0.9 (5.6)	2.8 (9.6)	1.8 (7.8)
Gandharaj citron	5.9 (14.1)	5.0 (12.9)	2.0 (8.1)	18.7 (8.7)	5.4 (13.5)
East rough lemon	11.3(19.7)	10.2 (18.7)	27.4 (31.6)	17.1 (12.5)	13.7 (21.8)
Karun jamir	7.3 (15.7)	9.4 (17.8)	6.0 (14.0)	12.5 (20.8)	8.6 (17.0)
Pumello	0.9 (5.6)	2.0 (8.1)	10.8 (19.2)	12.3 (20.6)	5.4 (13.3)
Citrus gal gal	6.6 (14.9)	7.9 (16.3)	6.9 (15.3)	13.0 (21.2)	8.5 (16.9)
Carrizo citron	0.9(5.6)	3.2 (10.4)	6.5 (14.8)	10.4 (18.8)	4.6 (12.4)
Citrus latipes	22.4 (28.3)	27..6 (31.7)	3.2 (10.4)	23.1 (28.73)	17.5 (24.8)
Kalamandarin	11.9 (20.2)	13.1 (21.2)	10.2 (18.6)	13.6 (21.6)	12.2 (20.4)
Sweet lime	3.8 (11.2)	4.4 (12.0)	6.0 (14.2)	19.8 (26.4)	7.5 (15.9)
Soh nariange	5.5 (13.5)	6.6 (14.9)	9.1 (17.6)	14.8 (22.7)	8.7 (17.2)
Kagzi lime	4.6 (12.4)	5.9 (14.1)	6.9 (15.3)	15.2 (22.9)	7.7 (16.9)
Karuna Katta	7.7 (16.8)	7.9 (16.4)	7.0 (15.5)	7.6 (16.0)	7.5 (15.9)
Soh joh	4.6 (12.4)	5.2 (13.2)	5.9 (14.0)	27.4 (31.6)	9.3 (17.8)
Khasi mandarin	2.6 (9.3)	3.7 (11.2)	0.9 (5.6)	1.0 (5.8)	1.9 (7.9)
Sikkim mandarin	23.8 (29.3)	30.3 (33.4)	5.7 (13.8)	21.5 (27.6)	19.3 (26.9)
Mean	6.8 (15.0)	7.6 (16.7)	8.4 (16.8)	13.7 (21.7)	

Figures in the parentheses are arc sin transformed values and data represented here are the per cent disease incidence.

CD at 5% = Varieties 3.99 (var); Months 1.93 (mon)

Var X Month = 7.97

Table 2. Incidence of Scab in different indigenous species of citrus on September flush

Variety	Month				
	September	October	November	December	Mean
Rough lemon	62.60 (52.30)	69.70 (56.62)	50.00 (45.00)	35.80 (36.76)	54.60 (47.67)
Adajamir	7.20 (15.60)	13.20 (21.27)	11.80 (20.09)	10.50 (18.95)	10.50 (18.98)
Gandharaj citron	17.20 (24.51)	16.80 (24.23)	32.00 (34.43)	8.60 (17.10)	18.00 (25.07)
East rough lemon	14.50 (22.37)	25.30 (30.20)	0.22 (2.71)	0.00 (0.00)	5.70 (13.82)
Karun jamir	32.20 (34.59)	6.10 (14.33)	3.50 (10.87)	4.00 (11.48)	9.40 (17.82)
Pumello	19.80 (26.42)	6.60 (14.92)	12.60 (20.79)	6.10 (14.33)	10.70 (19.12)
Citrus gal gal	12.60 (20.79)	19.00 (25.83)	25.10 (30.09)	3.30 (10.40)	13.80 (21.78)
Carrizo citron	22.40 (28.24)	40.50 (39.52)	31.30 (34.00)	8.00 (16.43)	24.3 (29.55)
Citrus latipes	4.10 (11.71)	3.50 (10.87)	15.10 (22.86)	1.30 (6.56)	5.00 (12.99)
Kalamandarin	40.90 (39.77)	34.60 (36.01)	35.60 (36.64)	3.40 (10.60)	26.20 (30.76)
Sweet lime	22.70 (28.43)	38.40 (38.27)	28.50 (32.24)	0.45 (3.85)	18.80 (25.69)
Soh Nariange	34.60 (36.06)	18.40 (25.39)	17.90 (25.02)	0.22 (2.71)	14.40 (22.29)
Kagzi lime	54.90 (47.81)	22.90 (28.60)	43.60 (41.31)	11.80 (20.09)	32.00 (34.45)
Karuna Katta	46.30 (42.88)	54.70 (47.68)	28.90 (32.50)	32.00 (34.45)	40.20 (39.38)
Soh joh	14.40 (22.32)	21.20 (27.41)	17.90 (25.03)	0.00 (0.00)	10.30 (18.69)
Khasi mandarin	72.00 (58.04)	30.60 (33.57)	36.80 (37.36)	13.40 (21.44)	37.20 (37.60)
Sikkim mandarin	75.50 (60.32)	67.60 (55.29)	51.00 (45.58)	74.60 (59.77)	67.50 (55.24)
Mean	30.70 (33.65)	26.80 (31.17)	23.80 (29.20)	8.30 (16.76)	

Figures in the parentheses are arc sin transformed values and data represented here are the per cent disease incidence.

C.D. at 5% = Varieties 6.5 (var); Months 4.16 (mon)

Var X Month = 13.07

Table 3. Reaction of citrus species to different fungal pathogens

Variety	PDI				
	Alternaria la leaf Spot	Powdery mildew	Greasy spot	Scab	
				March flush	September flush
Rough lemon	37.3	56	0.0	30.4	54.60
Adajamir	5.3	0.0	0.0	1.8	10.50
Gandharaj Citron	4.0	0.0	10.6	5.4	18.00
Eastrough lemon	14.6	0.0	0.0	13.7	5.70
Karun jamir	16.6	0.0	13.6	8.6	9.40
Pumello 13.3	0.0	20.0	5.4	10.70	
Citrus gal gal	9.0	0.0	0.0	8.5	13.80
Carrizo citron	0.0	0.0	0.0	4.6	24.3
Citrus latipes	13.3	0.0	9.3	17.5	5.00
Kalamandarin	0.0	0.0	0.0	12.2	26.20
Sweet lime	10.6	0.0	0.0	7.5	18.80
Soh Nariange	17.3	48.0	0.0	8.7	14.40
Kagzi lime	13.0	0.0	0.0	7.7	32.00
Karuna Katta	2.6	0.0	6.6	7.5	40.20
Soh joh	9.3	0.0	0.0	9.3	10.30
Khasi mandarin	1.3	0.0	9.3	1.9	37.20
Sikkim mandarin	1.3	0.0	9.3	19.3	67.50