

Host range of *Pythium ultimum* infecting tomato

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Tomato crop face the problem of pre-emergence damping off and post emergence damping off, reducing production of tomato crop. Damping off of seedlings in crop is caused by a group of fungi belonging to class oomycetes amongst which *Pythium* species are most important. There are two clear phases of the damping off *i.e.* pre-emergence and post-emergence.

The plants belonging to families of solanaceae, leguminosae, chenopodiaceae and cruciferae vary in susceptibility to *Pythium* species. Therefore, to find out the different host of the *Pythium* spp., experiment was undertaken by inoculating *Pythium ultimum* on different hosts.

In order to assess the host range of *P. ultimum* this experiment was conducted at Department of Plant Pathology, College of Agriculture, Latur in 2006, an experiment in Split Plot Design was planned with four replications and following treatments:

Main treatments : 20 crops

C₁-Chilli (*Capsicum annum* L.), C₂-Brinjal (*Solanum melongena* L.), C₃-Cabbage (*Brassica oleracea* var capitata), C₄-Cauliflower, (*Brassica oleracea* var botrytis), C₅-Cluster bean (*Cyamopsis tetragonoloba* L.), C₆-Fenugreek (*Trigonella foenum* L.), C₇-Bitter gourd (*Memordia charantia* L.), C₈-Ridge gourd (*Luffa acutangula* L.), C₉-Cucumber (*Cucumis melo* L.), C₁₀-Bottle gourd (*Lagenaria siceraria* L.), C₁₁-Pigeonpea (*Cajanus cajan* L.), C₁₂-Soybean (*Glycine max* L.), C₁₃-Cotton (*Goyssypium hirsutum* L.), C₁₄-Sunflower (*Helianthus annus* L.), C₁₅-Safflower (*Carthmus tintorius* L.), C₁₆-Green gram (*Vigna mungo* L.), C₁₇-Wheat (*Triticum aestivum* L.), C₁₈-Sorghum (*Sorghum bicolor* L.), C₁₉-Bajra (*Pennisetum americanum* L.) and C₂₀-Maize (*Zea mays* L.)

Sub treatment 2 :

I₀-Uninoculated control (Sterile water), I₁ - Inoculation (with 100 % culture filtrate).

Seeds of 20 crops were procured either from Agronomy /Horticulture Department of the College of Agriculture, Latur. Seeds were treated with thirum and then seeded in sterile soil in earthen pots. Sterile water was used for watering. After 15 to 20 days 4 seedlings of each crops were transferred to each pot containing either culture filtrate (I₁) or sterile water (I₀).

The observations on seedling mortality were recorded after 7 days of transfer of seedlings to inoculum or sterile control.

Inoculation (I₁) in all the crops have significantly induced the seedling mortality over control (I₀). In 20 inoculated crops pathogen induced in general 51(%) seedling mortality. In cucumber significantly highest mortality was noted, which was followed by cauliflower, cabbage, soybean and green gram. Most susceptible crop were cauliflower, cucumber, soybean, green gram which had mortality ranging from 67.62 to 90 per cent. Moderately susceptible crops were pigeonpea, safflower, cotton and sorghum. Significantly least, mortality was expressed in wheat and maize, sunflower and bottle gourd.

This experiment has clearly shown that the pathogen *P. ultimum* possessed capability to cause infections in wide range of crops, belonging to family *Solanaceae*, *Brassicaceae*, *Leguminosae*, *Compositae*, *Malvaceae*, *Cucurbitaceae* and *Graminae*. If the resistance to this pathogen is detected it will impart a broad based non-race specific durable horizontal resistance.

These findings are in agreement with Sands *et al.* (1993) who noted host range of *P. ultimum*.

Sr. No.	Treatment key	Treatments	mortality			Arcsine value
			Original value	$\sqrt{X+1}$ Trans-formation	$(\sqrt{X+1})^2$ value	
1.	C ₁ I ₀	Chilli control	0/16	1.00	1.00	0.50
2.	C ₁ I ₁	Chilli inoculated	10/16	7.06	63.47	52.7
3.	C ₂ I ₀	Brinjal control	0/16	1.00	1.00	0.50
4.	C ₂ I ₁	Brinjal inoculated	10/16	7.06	63.47	52.7
5.	C ₃ I ₀	Cabbage control	0/16	1.00	1.00	0.50
6.	C ₃ I ₁	Cabbage inoculated	12/16	6.82	88.47	75.1
7.	C ₄ I ₀	Cauliflower control	0/16	1.00	1.00	0.50
8.	C ₄ I ₁	Cauliflower inoculated	16/16	10.05	100.00	89.9
9.	C ₅ I ₀	Cluster bean control	0/16	1.00	1.00	0.50
10.	C ₅ I ₁	Cluster bean inoculated	6/16	5.60	38.42	23.0
11.	C ₆ I ₀	Fenugreek control	0/16	1.00	1.00	0.50
12.	C ₆ I ₁	Fenugreek inoculated	6/16	4.19	38.42	30.4
13.	C ₇ I ₀	Bitter gourd control	0/16	1.00	1.00	0.50
14.	C ₇ I ₁	Bitter gourd inoculated	8/16	5.52	51.00	45.2
15.	C ₈ I ₀	Ridge gourd control	0/16	1.00	1.00	0.50
16.	C ₈ I ₁	Ridge gourd inoculated	6/16	5.60	38.42	23.0
17.	C ₉ I ₀	Cucumber control	0/16	1.00	1.00	0.50
18.	C ₉ I ₁	Cucumber inoculated	16/16	10.05	100.00	89.9
19.	C ₁₀ I ₀	Bottle gourd control	0/16	1.00	1.00	0.50
20.	C ₁₀ I ₁	Bottle gourd inoculated	2/16	2.53	13.47	8.07
21.	C ₁₁ I ₀	Pigeonpea control	0/16	1.00	1.00	0.50
22.	C ₁₁ I ₁	Pigeonpea inoculated	10/16	7.06	63.47	52.7
23.	C ₁₂ I ₀	Soybean control	0/16	1.00	1.00	0.50
24.	C ₁₂ I ₁	Soybean inoculated	12/16	8.59	75.95	60.2
25.	C ₁₃ I ₀	Cotton control	0/16	1.00	1.00	0.50
26.	C ₁₃ I ₁	Cotton inoculated	8/16	5.52	51.00	45.2
27.	C ₁₄ I ₀	Sunflower control	0/16	1.00	1.00	0.50
28.	C ₁₄ I ₁	Sunflower inoculated	4/16	4.07	22.95	15.5
29.	C ₁₅ I ₀	Safflower control	0/16	1.00	1.00	0.50
30.	C ₁₅ I ₁	Safflower inoculated	10/16	7.86	63.47	45.4
31.	C ₁₆ I ₀	Green gram control	0/16	1.00	1.00	0.50
32.	C ₁₆ I ₁	Green gram inoculated	12/16	8.59	75.95	60.2
33.	C ₁₇ I ₀	Wheat control	0/16	1.00	1.00	0.50
34.	C ₁₇ I ₁	Wheat inoculated	2/16	2.53	25.95	8.7
35.	C ₁₈ I ₀	Sorghum control	0/16	1.00	1.00	0.50
36.	C ₁₈ I ₁	Sorghum inoculated	8/16	7.14	51.00	30.5
37.	C ₁₉ I ₀	Bajra control	0/16	1.00	1.00	0.50
38.	C ₁₉ I ₁	Bajra inoculated	12/16	8.59	75.95	60.2
39.	C ₂₀ I ₀	Maize control	0/16	1.00	1.00	0.50
40.	C ₂₀ I ₁	Maize inoculated	4/16	4.07	25.95	15.5
				C	T	C x T
		S.E. \pm		7.9	1.8	11.2
		C.D. (P=0.05)		22.0	5.2	31.1

Table 2: Interaction (C x I) expressed as seedling mortality

Sr. No.	Main treatment variety	Treatment key	Sub-treatment		
			Seedling mortality		
			I ₀ (Control)	I ₁ (inoculated)	Mean
1.	Chilli	C ₁	0.5	52.7	26.6
2.	Brijal	C ₂	0.5	52.7	26.6
3.	Cabbage	C ₃	0.5	73.1	37.8
4.	Cauliflower	C ₄	0.5	89.9	43.2
5.	Cluster bean	C ₅	0.5	23.0	11.8
6.	Fenugreek	C ₆	0.5	30.4	15.5
7.	Bitter gourd	C ₇	0.5	45.2	22.9
8.	Ridge gourd	C ₈	0.5	23.0	11.8
9.	Cucumber	C ₉	0.5	89.9	45.2
10.	Bitter gourd	C ₁₀	0.5	8.0	4.3
11.	Pigeonpea	C ₁₁	0.5	52.7	26.6
12.	Soybean	C ₁₂	0.5	60.2	30.4
13.	Cotton	C ₁₃	0.5	45.2	22.9
14.	Sunflower	C ₁₄	0.5	15.5	8.0
15.	Safflower	C ₁₅	0.5	45.4	23.0
16.	Green gram	C ₁₆	0.5	60.2	30.4
17.	Wheat	C ₁₇	0.5	8.0	4.3
18.	Sorghum	C ₁₈	0.5	30.5	15.5
19.	Bajra	C ₁₉	0.5	60.2	30.4
20.	Maize	C ₂₀	0.5	15.5	8.0
	Mean		0.5	44.2	22.4
			C	I	C x I
	S.E. ±		7.9	1.8	11.2
	C.D. (P=0.05)		22.0	5.2	31.1

Statistical significance for crop (c)

1	2	3	4	5	6	7	8	9	10
C ₁₀	C ₁₄	C ₂₀	C ₅	C ₈	C ₆	C ₁₈	C ₇	C ₁₃	C ₁₅
Bottle gourd	Sun-flower	Maize	Cluster bean	Ridge gourd	Fenu greek	Sorghum	Bitter gourd	Cotton	Saff-lower
4.3	8.0	8.0	11.8	11.8	15.5	15.5	22.9	22.9	230
11	12	13	14	15	16	17	18	19	20
C ₁	C ₂	C ₁₁	C ₁₂	C ₁₆	C ₁₉	C ₃	C ₁₇	C ₄	C ₉
Chilli	Brinjal	Pigeonpea	Soy bean	Green gram	Bajra	Cabbage	Wheat	Cauli flower	Cucumber
26.6	26.6	26.6	30.4	30.4	30.4	37.8	43.2	45.2	45.2
11	12	13	14	15	16	17	18	19	20
Statistical significance for interaction (C x I)									
1	2	3	4	5	6	7	8	9	10
C ₁₀	C ₁₇	C ₁₄	C ₂₀	C ₅	C ₈	C ₆	C ₁₈	C ₇	C ₁₃
Bottle gourd	Wheat	Sun flower	Maize	Cluster bean	Ridge gourd	Fenu greek	Sorghum	Bitter gourd	Cotton
8.0	8.0	15.5	15.5	15.5	23	23	30.4	30.4	45.2
11	12	13	14	15	16	17	18	19	20
C ₁₅	C ₁	C ₂	C ₁₁	C ₁₂	C ₁₆	C ₁₉	C ₃	C ₄	C ₉
Safflower	Chilli	Brinjal	Pigeonpea	Soy bean	Green gram	Bajra	Cabbage	Cauli flower	Cucumber
45.2	52.7	52.7	52.7	60.2	60.2	60.2	75.1	89.9	89.9

LITERATURE CITED

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