

Variability in the isolates of *Rhizoctonia solani* the incitant of damping off of fenugreek

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Damping off of fenugreek, caused by *Rhizoctonia solani*, is one of the important diseases which causes substantial yield losses. In the present study 5 isolates of *R. solani* were isolated from the diseased samples of fenugreek collected from different locations. The morphological and cultural characters, of the isolates were studied by growing on PDA. On the basis of morphological characters the isolates of *R. solani* obtained, were classified into five categories and designated as I₁ to I₅. All the isolates differed in rate and type of growth, colony colour, hyphal width and sclerotial production. Isolate I₃ showed maximum growth on PDA and during pathogenicity test it showed maximum disease percentage.

Key words : Fenugreek, damping off, *Rhizoctonia solani*, variability

INTRODUCTION

Fenugreek is an important vegetable and spice crop. It is a cool season crop but it can be grown very successfully under hot climatic conditions. It is subjected to attack by number of diseases. Among these diseases damping off is one of the most important disease of fenugreek. It is caused by *Rhizoctonia solani* Kuhn (Singh *et al.*, 1973). *Rhizoctonia solani* Kuhn has a wide host range and its isolates shows the variability in nature, with different cultural characters (Kotila, 1929 ; Flentje and Hagedorn, 1964 ; Whitney and Parmeter, 1963 ; Stretton, 1964 and Papavizas, 1965), still there is a need for precise information about the various isolates, which could help in devising the crop improvement programme. These isolates obtained from different locations of Jabalpur district. Isolates I₁ from Adhartal and Maharajpur, I₂ Ranjhi, I₃ Gohalpur and Amkhera, I₄ Gorakhpur and I₅ were isolated from the samples collected from Sadar.

MATERIALS AND METHODS

The morphological and cultural characters of the isolated fungus were studied by growing it on PDA medium. Twenty ml of agar medium was poured into 90 mm diameter Petriplates and allowed to set.

Five-mm disc cut from the periphery of seven days old culture of *R. solani* was used for inoculation. Plates were incubated at $25 \pm 2^\circ\text{C}$ for seven days. Colony radial growth is expressed in mm as the average linear growth and measured at 24 hrs. interval. Colony colour, growth pattern were recorded after ten days and sclerotial formation and frequency of production observed up to 30 days of incubation.

Five isolates of *R. solani* obtained from the infected collar portion of fenugreek seedling were examined critically according to the current species concept (Parmeter and Whitney, 1970) and were tested for pathogenicity and virulence.

The culture of all the five isolates was multiplied at 25-30°C. After fifteen days, cultures were used for infesting sterilized soil in pots at 2% inoculum level (w/w). Twenty surface sterilized seeds of fenugreek variety RMT-1 were sown in three replicatons for each isolate. Moisture level was maintained at 30 per cent of moisture holding capacity using sterilized water. Un-inoculated checks were maintained by sowing the surface sterilized seeds of the RMT-1 variety in sterilized soil. The pots were kept for incubation at $28 \pm 2^\circ\text{C}$ for ten days. Observations were recorded at 24 hrs. interval. To

know the most virulent isolate, the relative virulence of these isolates were tested and recorded on the basis of disease incidence.

RESULTS AND DISCUSSION

The data on colony growth rate of the above five isolates presented in Table 1, revealed that all five isolates of *R. solani* grew well on PDA but differed in the rate of growth. Isolate 3 showed maximum growth (21.8 mm) within 24 hrs, whereas isolate 1 exhibited minimum growth (13.6 mm), other isolates (2, 3 and 5) attained the maximum (90 mm) growth in 72 hrs, whereas isolate 1 and 4 attained the maximum growth (90 mm) in 96 hrs.

Table 1 : Growth rate of five isolates of *Rhizoctonia solani* on PDA

Isolates	Growth rate in mm at 24 hrs interval			
	24	48	72	96
I ₁	13.6	54.2	81.0	96
I ₂	19.6	61.2	90.0	90.0
I ₃	21.8	63.8	90.0	90.0
I ₄	17.6	59.0	84.0	90.0
I ₅	19.0	60.3	90.0	90.0

Table 2 : Comparative morphological characters of isolates of *Rhizoctonia solani* from fenugreek

Isolates	Type of growth & colony colour after 10 days	Days taken for sclerotial formation	Sclerotial production	Hyphal width (after 20 days) width in μm	Per cent disease (Pre + Post emergence rot)
I ₁	Sm, Pale brown	—	—	6.08	81.67
I ₂	MSM & A, Light brown	25	++	5.67	76.67
I ₃	SM & A, Creamy white	30	+++	6.24	100
I ₄	PSm & A, Creamy brown	23	+	5.60	88.34
I ₅	PSm & A, Light brown	25	++	6.00	76.67

Sm = Submerged growth

MSM & A = Mostly submerged growth in the center & aerial at margin

Sm & A = submerged growth in the center & aerial at margin

PSm & A = Partially submerged & aerial growth

— = Absent

+ = Poor

++ = Fair

+++ = Good

Table 2 represented comparative morphological characters of *R. solani* isolates of fenugreek such as type of growth and colony colour, days taken for sclerotial formation, sclerotial production and hyphal width. All the five isolates varied in one or the other cultural characters. Growth of isolates 4 and 5 were partially submerged and aerial, whereas isolate 1 had submerged growth, isolate 2 was mostly submerged in the centre and aerial at

margin, similarly isolate 3 had also submerged growth in the center and aerial at margin. The colony color ranged from creamy white to light brown.

Sclerotial formation occurred between 23-30 days in case of isolates I₂, I₃, I₄ and I₅. However no sclerotial formation occurred in I₁. Singh and Singh (1979) and Tiwari and Khare (1998) reported similar findings on sclerotial formation of *R. solani*.

Hyphal width of the isolates ranged from 5.60 to 6.24 μm , with maximum width observed in I₃ (6.24 μm) followed by I₁ (6.08 μm) and I₂ (5.76 μm) and minimum in I₄ (5.6 μm).

All the five isolates found pathogenic in pathogenicity test by soil inoculation. The maximum disease percentage (100%) was recorded in case of I₃, whereas in case of I₂ and I₅ minimum (76.67%) disease percentage was recorded.

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(Accepted for publication July 02, 2005)