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# Variation in *Fusarium Solani* Inciting Wilt of Gram

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Morphological characteristics, quantitative growth and virulence of 22 isolates of *Fusarium solani* islolated from wilted gram plants collected from different localities of Varanasi and Mirzapur (Uttar Pradesh) were studied. A positive correlation between virulence and growth was observed.

**Key Words:** *Fusarium Solani*, **Gram wilt**,

## Introduction

*Fusarium solani* (Mart.) Sacc. inciting wilt of gram was first reported by Grewal et al. (1974). The genus *Fusarium* exhibits wide variability in its morphological and pathological characteristics. Snyder et al. (1959) found physiological variation in *F. solani* f. *phaseoli*. Prasad (1949) observed variation in culture types, rate of growth, size of micro- and macro conidia in *F. solani* f. *cucurbitae* but did not find any correlation between growth and pathogenicity. Keeping this in view the present investigation was carried out to see if *F. solani* from gram exhibits any variation.

## Materials and Methods

Gram plants showing typical symptoms of wilt incited by *F. solani* were collected from 22 widely separated localities in Varanasi and Mirzapur Districts. The isolates thus obtained were purified by monospore culture and maintained on PDA for the study.

Morphological characters were observed on PDA. A 7 mm disc cut from the edge of actively growing culture of each isolate was placed in the centre of 9 cm culture plate having 20 ml PDA and incubated at 25 ($\pm$2)°C for 7 days. Conidial measurement and septation was noted in 100 micro-and macro-conidia of each isolate. Types and size of chlamydospores were also recorded.

For quantitative growth 50 ml Richards' solution in 250 ml flask was inoculated and incubated at 25°C for 21 days. The amount of growth was measured by mycelial dry weight method. Three replications for each isolate were taken.

The virulence was tested in pot culture. Inoculum was raised in sand-maize meal

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medium and pots were infested with a isolate @ 10 g/100 g of soil and left outside for seven days. Afterwards a layer of fresh soil 2.5 cm thick was added to each pot and 10 surface-sterilized seeds of gram cv. T-3 were sown. Pots were irrigated whenever necessary. Three pots of each isolate were kept. Observation on disease development was recorded from germination till maturity. Data obtained were analysed statistically.

## Results

In all the isolates, on an average, macroconidia were three septate but the number varied from 0–9 and the average size varied from 24.02-44.95 μ. Two types of chlamydospores were formed—smooth and rough walled developing terminally but in some cases intercalary chlamydospores were also seen. Chlamydospores were in chains except in isolates 3 and 22. Pinnotes were formed only in isolates 1, 11, 13, 19 and 22.

Quantitative growth revealed good growth in isolates 1, 11, 13, 19 and 22. The dry weight in these isolates were significantly higher than the rest. Percentage of plants showing symptoms varied between 82.45 and 18.43. Subjecting the percentage of plants showing symptoms to 'F' test (LSD=6.61) the following groups were obtained:

Group 1: Isolates 11, 19, 13, 22 and 1 (Av. growth 660 mg)

Group 2: Isolates 2, 21, 4, 6, 12, 17, 9 and 3 (Av. growth 523 mg)

Group 3: Isolates 8 and 16 (Av. growth 453 mg)

Group 4: Isolates 20, 18, 7, 5, 10, 14 and 15 (Av. growth 579.33 mg)

## Discussion

The present investigation revealed that although no marked difference was observed amongst isolates there was positive correlation between growth and virulence. In isolates 1, 11, 13, 19 and 22 the dry weight was maximum and so was the virulence. In these isolates pinnotes were also formed. Subramaniam (1955) observed that there is prolific production of macroconidia in pinnotes or sporodochia in *F. udum*. Cultures of *F. vasinfectum* (Armstrong et al. 1940) and *F. oxysporum* f. sp. *lini* (Borlaug 1945, Millikan 1949, Sharma & Mathur 1971) showing rapid growth were highly pathogenic. The present observation corroborates earlier observation of Haymaker (1928) that pinnote producing isolates of *F. lycopersici* were highly virulent. Sati (1977) has also observed that isolates of *F. solani* with abundant sporulation were highly pathogenic. Thus it appears that there is existence of physiologic variation amongst isolates of *F. solani* from gram.

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