

SHORT COMMUNICATION

Pathogenic variability of *Fusarium oxysporum* f. sp. cumini

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J. Mycopathol, Res, 55(4) : 000-000, 2018;
ISSN 0971-3719

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Pathogenic variability of *Fusarium oxysporum* f. sp. *cumini*

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Received : 10.11.2017

Accepted : 13.11.2017

Published : 29.01.2018

Fusarium oxysporum f. sp. *cumini* is a serious disease of cumin (*Cuminum cyminum* L.). Isolates of *Fusarium oxysporum* f. sp. *cumini* were isolated from major cumin growing districts of Gujarat state, India. The pathogenicity of 15 isolates with two inoculation rate was done. Highest disease incidence was recorded in Junagadh isolate in both inoculation rates with 100 per cent disease incidence and In the Dhangadhra isolate in 50g inoculation rate PDI was 100 per cent. Among the two inoculation rate 50g/kg soil was gave the highest Percent Disease Intensity of 100 per cent.

Key words: *Fusarium oxysporum* f.sp. *cumini*, cumin, pathogenic variability

Cumin (*Cuminum cyminum* L.) is an annual herb of the family Apiaceae (Umbelliferae) and an important spice crop. India is the leading producer (70% of world production), exporter and consumer of cumin in the world. Gujarat state share 59% of Indian production and Surendranagar is the leading district (Anon., 2012). Because of its low water requirements, farmers are interested in cultivation of cumin in drought affected areas, where most of the other crop plants cannot be grown economically. However, production of cumin is limited due to several biotic stresses, of which wilt disease is the most serious (Valizadeh *et al.* 2007; Agrawal, 1996). The fungus *Fusarium oxysporum* f. sp. *cumini* Prasad and Patel was first reported by Patel *et al.* (1957) as a wilt causing pathogen in cumin. Since the pathogen is soil borne and difficult to eradicate, as fungal chlamydospores survive in soil up to 6 years even in the absence of the host plant (Haware *et al.*, 1996). This disease has been reported as a limiting factor in cumin production worldwide including Argentina (Gaetan and Madia, 1993), Egypt (Arafa, 1985), Greece (Pappas and Elena, 1997) and India (Champawat and Pathak, 1990; Jadeja and Nandoliya, 2008). The present study was carried out for variability in pathogenicity with different inoculation rate.

During the year 2011-12, fifteen isolates were screened for their pathogenicity on cumin cultivar GC-4 under pot trial with two rates of inoculation i.e. 30 g/pot and 50 g/pot. For each isolate two sets of pots (15 cm width x 15 cm depth) were prepared comprising four pots in each one. One set of pot constituting two sterilized pots were filled with sterilized soil @ 3 kg/pot. These pots were considered as control. Similarly second set of two sterilized pots were filled with sterilized soil @ 3 kg/pot followed by inoculating 50 g of the culture of *Fusarium oxysporum* f. sp. *cumini* prepared in sand maize meal medium mixed in upper 5 cm soil layer. Twenty seeds were sown. Cumin cultivar GC 4 was used in the pot experiment. This was repeated for each isolates. Watering was done as and when required. The plants were observed regularly for the appearance and development of disease symptoms. As the symptoms of disease appeared, the fungus was re-isolated from the roots of diseased plant and the re-isolated fungus was brought to pure culture, which later compared with the original one. The per cent wilt incidence to be calculated by following formula.

Per cent disease incidence = Total number of wilted plants in two pots/ Total number of plants in two pots x100

Pathogenicity of fifteen isolates *F. oxysporum* f.sp.

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Table 1: Variation in wilt incidence among different isolates of *Fusarium oxysporum* under two inoculum load (2011-12)

Isolate	Location (District)	Inoculum (g) /pot	Per cent Disease Incidence*
Vadod-1	Vadod (Surendranagar)	30	20
		50	30
Vadod-2	Vadod (Surendranagar)	30	40
		50	60
Surendranagar-2	Surendranagar (Surendranagar)	30	60
		50	90
Surendranagar-1	Surendranagar (Surendranagar)	30	0
		50	0
Dhangadhra-1	Dhangadhra (Surendranagar)	30	20
		50	60
Dhangadhra-2	Dhangadhra (Surendranagar)	30	80
		50	100
Sedla-1	Sedla (Surendranagar)	30	0
Devla	Devla (Rajkot)	30	70
		50	90
Limdi	Limdi (Surendranagar)	30	0
		50	0
Hadala	Hadala (Surendranagar)	30	0
		50	0
Surajgadh	Surajgadh (Surendranagar)	30	70
		50	80
Keshod-1	Keshod (Junagadh)	30	30
		50	50
Keshod-2	Keshod (Junagadh)	30	10
		50	50
Junagadh	Junagadh (Junagadh)	30	100
		50	100
Kotda sangani-1	Kotdasangani (Rajkot)	30	20
		50	50

*Mean of two replications (pots)

cumini were tested on cumin cv GC-4 by Soil inoculation method. Pathogenicity test indicated that these isolates varied in the percentage of infection.

Under controlled condition the pathogenic isolates rear under artificially inoculated condition showed all typical wilt symptoms and re-isolation from the diseased plant produced identical characters of pathogen on PDA as well as under pot trial.

In the year 2011-12 fifteen isolates with two inoculation rates i.e. 30 g/pot and 50 g/pot were screened against cumin variety GC-4 (Table 1). Among the all isolates highest disease incidence was recorded in Junagadh isolate in both inoculation rates with 100 per cent disease incidence, In the Dhangadhra isolate @ 50 g and 30 g inoculation rate PDI were 100 per cent and 80 per cent followed by Devla isolate (90 and 70 PDI) and Surendranagar-2 isolate (90 and 60 PDI) The PDI in Surajgadh isolate PDI was 80 per cent and 70 per cent respectively. While, Surendranagar-1, Sedla, Limdi and Hadala isolates were found non-

pathogenic.

These results indicates that the isolates isolated from the infected roots may or may not be pathogenic. These finding match with the results of Arafa (1985) and Larkin and Fravel (1988) as their isolates from cumin wilt samples collected from different fields showed pathogenic and non-pathogenic trends with variation among pathogenic culture in PDI.

Present findings are also supported by the observations of Baradia and Rai (2008). They reported pathogenic variability among isolates from cumin. In support to these results the observation of Sharma *et al.* (2009) on chickpea wilt isolates also varied in pathogenicity. They collected forty-eight isolates of *Fusarium oxysporum* f. sp. *ciceris* from different chickpea growing regions in India and check the pathogenic nature of the fungus. They reported that 41 isolates were pathogenic. It is concluded from pathogenicity test that these isolates varied in the percentage of infection and among the two inoculation rate of 30 g/kg soil and 50 g/ kg soil, Inoculation rate of culture 50 g/kg soil gave highest per cent disease incidence and it is used for conducting pathogenicity trial.

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