

Research Paper :

Morphological and molecular identification of *Fusarium* isolated from cumin wilt



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SUMMARY

Cumin (*Cuminum cyminum*) is one of the oldest and economically most important spices after black pepper. Production of this plant is limited due to several biotic stresses of which wilt disease are the most serious. Cumin wilt disease is caused primarily by *Fusarium oxysporum* but other *Fusarium* species have been implicated. This is the first report of wilt of *C. cyminum* caused by *F. equiseti* in India. Observation was made both at morphological and molecular levels. Isolated pathogen was confirmed by sequence analysis, ITS marker and species-specific PCR assays.

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Key words :

Cumin wilt disease, *Fusarium equiseti*, Sequence analysis, Species-specific PCR assays

Cumin (*Cuminum cyminum*) is one of the spices grown in India. It is commonly used as spice in our daily life. Recent studies have indicated its pharmaceutical and medicinal importance (Aruna and Sivaramakrishnan, 1996). Cumin is produced in the warm regions of the world. There has been increased demand of cumin while its production is limited and decreased (Abu-Nahoul and Ismail, 1995).

Significant losses in cumin yield can be attributed to the adverse effects caused by biotic stresses of which *Fusarium* wilt disease is the most serious one (Omar *et al.*, 1997). Cumin plants are attacked by *Fusarium* species responsible for wilt diseases. Wilt of cumin generally infects the crop during the last week of December when the crop is about a month old. The disease generally appears in patches and is characterised by wilting of affected plants. After the appearance of wilting, the whole plant dries up. A preliminary survey was carried out and the loss from the disease was estimated to vary between 5 to 25 per cent in North Gujarat, and 5 to 60 per cent in Rajasthan, the average in the latter case being 20 per cent. It is very difficult to control

this disease through modern means of chemical based measures.

MATERIALS AND METHODS

Fungal isolates:

In January 2009 and 2010, 324 samples (wilted plants) were collected from different areas of Gujarat (India). Total of 108 cumin fields in 25 locations of 7 districts were sampled during the season (Table 1). The fields were located in the main cumin growing area in Gujarat with different climates. Each field was arbitrarily divided into five circular plots approximately 100 m in diameter and two to four samples were randomly taken from each plot. Samples were pooled in each field and two infected plants from each field were selected and used for *Fusarium* species isolation. A total of 216 *Fusarium* isolates were recovered from 108 samples collected from different geographic regions.

Identification of *Fusarium* isolate:

Infected stem sections were surface-sterilized for 3 min. with a 0.01% sodium hypochlorite solution, rinsed twice in sterile

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