

## 1 **First report of *Fusarium acuminatum* on pigeonpea in India**

2 M. Sharma\*, R. Ghosh, R. Telangre, G. Senthilraja and S. Pande

3 International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru,  
4 Greater Hyderabad, India

5 \*Corresponding author: Mamta Sharma, Email: [mamta.sharma@cgiar.org](mailto:mamta.sharma@cgiar.org)

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7 Pigeonpea (*Cajanus cajan* (L.) Millsp.) is the most important protein rich grain legume crop  
8 being cultivated worldwide. During surveys (2010-2012) conducted in major pigeonpea  
9 growing states in southern and central India (Andhra Pradesh, Karnataka and Maharashtra),  
10 rapid mortality of pigeonpea plants was observed. This occurred in all of the surveyed areas  
11 with disease incidence of 20-60% irrespective of cultivars and crop growth stage. Symptoms  
12 included chlorosis, drooping and rolling of the leaves followed by rapid mortality of whole  
13 plant. Pinkish growth on infected stems and branches was observed and inner layer of the  
14 infected stem had brown discoloration. Xylem vessels of the infected plants were healthy and  
15 did not show any blackening.

16 Isolations from infected stem tissues consistently yielded cultures of *Fusarium* sp. on potato  
17 dextrose agar (PDA) medium. Monoconidial isolation from three separate isolates was used  
18 to establish pure cultures. The morphological characters of the fungus were consistent with  
19 descriptions in *Fusarium* keys (1) for *Fusarium acuminatum* (Ellis & Everhart). The mean  
20 colony growth was 86 mm after 7 days; with white aerial mycelium, developing brownish  
21 pigmentation in the center on PDA. The dorsal side of the colony had rose to burgundy  
22 pigmentation. Macroconidia were broadly falcate with 3-5 septa, and 3 to 8 × 39 to 64 μm.  
23 Microconidia were absent and chlamydospores formed in chains, 20 to 50 μm. Koch's  
24 postulates were established on seedlings of pigeonpea (cv. ICP 7119) using root dip  
25 inoculation of 10-day old seedlings. The roots were immersed in a conidial suspension

26 ( $6 \times 10^6$  conidia/ml) for 2-3 minutes; the control plants roots immersed in sterilized distilled  
27 water in beaker. Inoculated seedlings were transplanted into pre-irrigated pots (12 cm)  
28 containing sterilized vertisol and sand (3:1). Five seedlings were used for each of 3  
29 replications. Inoculated plants were kept in the greenhouse at  $28 \pm 2^\circ\text{C}$  and irrigated with  
30 sterilized water. Inoculated plants developed symptoms identical to those observed in the  
31 field and disease incidence reached 100% within 96 hours after inoculation. Experiment was  
32 conducted twice with two independent sets of plants. No symptoms were observed in water-  
33 inoculated control plants. The rDNA internal transcribed spacer (ITS sequence) was  
34 amplified with ITS1 and ITS4 primers (2). The amplicons of both forward and reverse (438  
35 bp) were sequenced and submitted to GenBank (Accession no. JX177431). A BLASTn  
36 search revealed 100% sequence similarity to the nucleotide sequence of *Fusarium*  
37 *acuminatum* (Ellis & Everhart) (GenBank Accession no. HQ 443205). To our knowledge,  
38 this is the first report with confirmed molecular identification of *F. acuminatum* on  
39 pigeonpea. Occurrence of *F. acuminatum* on various plant species have been reported by  
40 Summerell *et al.* (3). Presence of *F. acuminatum* from soils of pigeonpea fields have been  
41 reported, however, no information on location, symptoms, plant mortality and identification  
42 of pathogen has been provided (4).

#### 43 **References**

- 44 (1) J. F. Leslie and B. A. Summerell. Pages 122-123 in: The Fusarium Laboratory Manual.  
45 Blackwell Publishing Professional, Hoboken, NJ, 2006.
- 46 (2) T. J., White *et al.* Pages 315-322 in: PCR protocols: Guide to Methods and Applications,  
47 San Diego, Academic Press, 1990.
- 48 (3) B. A. Summerell *et al.* Fungal Diversity 46: 1-27, 2011.
- 49 (4) A. P. Singh and S. N. Bhargava. Phytopath. Z. 100: 300-311, 1981.

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