

## First Report of Sudden Death Syndrome of Soybean Caused by *Fusarium virguliforme* in Louisiana

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During summer of 2014, soybean [*Glycine max* (L.) Merr.] variety Asgrow 4232 exhibited typical symptoms of sudden death syndrome in East Carroll Parish, LA. Symptoms were interveinal chlorosis and necrosis of leaf tissue on the upper and lower surfaces, stunting, and death of some plants (Fig. 1). White bluish sporodochia were observed on the roots of symptomatic plants (Fig. 2), as was necrosis of cortical tissue with white pith in the lower stem (Fig. 3). No soybean cyst nematodes were observed on sampled plants. Disease incidence in the field was 2% with a yield loss estimated at 1%. Microscopic examination of sporodochia on roots revealed the presence of conidia typical of *Fusarium* sp. (Fig. 4).

A mass of conidia was removed from infected roots using a scalpel and added to 5 ml distilled water in a test tube. Serial dilutions in sterile distilled water were performed from  $10^{-1}$  to  $10^{-7}$ . Two milliliters of the resulting suspensions were spread evenly over potato dextrose agar (PDA) amended with chloramphenicol (75 ppm) and streptomycin sulfate (125 ppm). Plates were incubated at 25°C with a 12-h photoperiod. Colonies that originated from single spores were selected for isolation and subsequent analysis. The internal transcribed spacer region of a single-spore isolate PDC14318 was amplified and sequenced with ITS1 and ITS4 primers (White et al. 1990). BLASTn analysis of 525 bp (GenBank Accession No. KM610156) resulted in 100% homology with a *Fusarium virguliforme* isolate Mon-5 from Michigan (GenBank Accession No. AY826772).

A single-spore isolate PDC14318 of *F. virguliforme* was grown on PDA for 14 days at 28°C to prepare inoculum as previously described but slightly modified (Hartman et al. 2000) as follows. Grain sorghum seeds (100 g each) were soaked overnight in ten 500-ml glass flasks and autoclaved at 121°C for 20 min on two consecutive days. Each flask was inoculated with 15 mycelial plugs (15 mm) obtained from the PDA cultures and incubated for 14 days at room temperature with a 12-h photoperiod.

Pathogenicity tests were performed on four-week-old seedlings grown from seeds of the soybean variety, Pioneer 94Y82. Twenty seedlings were inoculated by placing colonized sorghum seeds beneath the root balls during transplanting (Hartman et al. 2000). Twenty control seedlings were treated with non-colonized,



**FIGURE 1**

Interveinal chlorosis and necrosis of both surfaces caused by *Fusarium virguliforme*.



**FIGURE 2**

Roots of infected plants colonized with bluish-white sporodochia of *Fusarium virguliforme*.

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**FIGURE 3**

Necrotic cortical tissue, with pith remaining white, of symptomatic soybean plant caused by *Fusarium virguliforme*.



**FIGURE 4**

Conidia of *Fusarium virguliforme* at 400x.

autoclaved sorghum seeds. All plants were maintained in a greenhouse at  $28 \pm 2^\circ\text{C}$ . All twenty inoculated plants exhibited interveinal chlorosis and necrosis within five to six weeks after inoculation and control plants remained symptomless. *Fusarium virguliforme* was re-isolated from the infected plants and confirmed with PCR.

Sudden death syndrome of soybean caused by *F. virguliforme* has been previously reported from several major soybean-producing states in the United States. To our knowledge, this is the first report of sudden death syndrome of soybean occurring in Louisiana. During 2014 in Louisiana, soybean were grown over 1.39 million acres for a total gross farm value in excess of \$988 million. Although the initial yield losses in 2014 were minimal, this soil-borne pathogen has the potential to spread, and establishment may lead to negative impacts on soybean production in the state.

#### LITERATURE CITED

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