



Fig. Soybean sudden death syndrome: leaf with interveinal necrosis and chlorosis; grey to blue coloured sporodochia on tap root; and premature defoliation (ref. <http://www.fieldcroppathology.msu.edu/>)

Disease: Soybean sudden death syndrome; Causal agents: *Fusarium virguliforme*; *F. tucumaniae*; *F. brasiliense*; *F. crassistipitatum*

Classification: K: Fungi, D: Ascomycota, C: Sordariomycetes, F: Nectriaceae

Sudden death syndrome is a fungal disease of soybean caused by *Fusarium virguliforme* (syn. *Fusarium solani* f. sp. *glycines*) and closely related species *F. tucumaniae*; *F. brasiliense*; *F. crassistipitatum*. The foliar component of disease typically initiates in mid to late soybean reproductive stages. The disease is easily spread to new locations through contaminated soil and water. Significant crop damage is reported in North and South America. Currently, Australia is thought to be free of this disease thus it is a potential biosecurity threat to the Australian soybean industry.

Biology and Ecology: The pathogen is capable of infecting the plant during early seedling stages, causing root rot and vascular discoloration of roots and stems. However, foliar symptoms are typically not expressed until mid to late soybean reproductive stages. The characteristic symptoms include interveinal chlorosis that progresses to necrosis and premature defoliation, where the leaflets fall but the petioles remain attached. The foliar symptoms can be confused with other diseases such as brown stem rot. Under conducive environmental conditions late in the season grey to blue sporodochia (masses of spores) may form on infected taproots. Soybean cyst nematode may exacerbate disease, potentially resulting in earlier onset and more severe symptoms.

The pathogen can survive for a long time in the soil, producing chlamydospores and is a strong saprophyte, able to colonize other crop residue such as corn.

Distribution: The disease has been reported from the USA, Canada, Argentina, and Brazil. It has not been reported from Oceania countries.

Host Range: In addition to soybeans, it has also been demonstrated that the fungus can cause root rot of dry beans, and it may be able to asymptotically infect a wide range of plant species.

Disease Impact: *F. virguliforme* and its closely related sister species are considered to be major pathogens of soybean in North and South America. Losses in the US have been estimated at an average of \$150M US per year, local losses of 50% or greater have been reported in both South and North America. Therefore this exotic disease poses potential economic impacts to soybean, and potentially other crops such as dry beans in Australia.

Disease Management: Cultural practices for disease management are inconsistent. Soil compaction and early planting both tend to promote disease. Recent studies indicate that extended crop rotation may reduce disease severity. Currently available seed treatments do not offer any protection. There are significant differences in resistance among soybean cultivars and plant resistance is a key management strategy.

Further Reading: Aoki *et al.* (2012) *Mycoscience* 167-186; O'Donnell *et al.* (2010) *Mycology* 58-71.

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