



SUDDEN DEATH SYNDROME OF SOYBEAN

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Sudden death syndrome (SDS) is a relatively new disease of soybean in South Africa. In South Africa it has been found in the Mpumalanga and KwaZulu-Natal provinces and in KwaZulu-Natal it is present in the Bergville/Winterton area. The causal organism of SDS is, *Fusarium virguliforme* (or *Fusarium solani* f.sp. *glycines*). It is a soil-borne pathogen and once present in a field, is easily spread with soil movement. Initial infection occurs on the root and crowns of young soybean plants at the seedling stage. SDS produces toxins that cause foliar symptoms, including leaf drop, which reduces the ability of the plant to provide nutrients to promote pod fill. In the United States of America losses of up to 80% in individual fields were shown. In Brazil yield losses in individual fields of 30-40% have been reported.

Symptoms and Signs

Symptoms of SDS occur after flowering around mid pod-fill. The first leaf symptoms are circular to irregularly shaped, scattered, interveinal, pale green to chlorotic spots that produce a mottled appearance (Figure 1). The spots may enlarge and become necrotic or they may coalesce and form elongated regions of interveinal chlorosis (Figure 2). Eventually, part or all of the chlorotic tissue becomes necrotic and green tissue remains only near the major leaf veins. Leaf symptoms are the most dramatic and happen quickly after infection.

The crowns of SDS infected plants are usually discoloured and roots are discoloured and decayed.

Occasionally, the blue-green spores of the fungus can be seen on the tap root (Figure 3).



FIGURE 1: Leaves showing a mottled appearance in soybeans (Robertson and Mueller, 2010)



FIGURE 2: Leaves showing typical symptoms of interveinal chlorosis (Chilvers et al., 2011 and Yang, 2007)



FIGURE 3: Blue-green spores visible on the tap root (Yang, 2000)

Disease Development of Sudden Death Syndrome on Soybeans

Sudden death syndrome is not known to be seed transmitted. Since the primary inoculum occurs in the soil, movement of soil or infected plant debris can transfer the fungus as well. The exact time of infection for SDS is not known, although research has shown that the causal fungus can be isolated from plant roots as early as 40 days after planting, even though symptoms do not appear until much later. SDS appears to develop in cool, wet weather and soil compaction with temperatures below 15°C being ideal for infection.

Management of Sudden Death Syndrome on Soybeans

SDS is a difficult disease to manage. At present, there are no resistant varieties and fungicides that will reduce SDS levels in a field. No single management practice has been shown to control SDS.

Follow these guidelines to lessen the impact of SDS:

1. Learn to identify SDS in the field. Symptoms may appear much as those of other, more common diseases. Brown stem rot, stem canker, charcoal rot and chemical burn can all produce foliar symptoms similar to SDS.

2. Select varieties of soybean that will mature at different times.
3. Extend planting time so that all beans are not at the same growth stage at the same time. However, do not plant after optimal planting time for your area.
4. Where feasible, improve drainage in the field and reduce soil compaction. Reduction of soil compaction will help drainage and also improve root growth and development.
5. Crop rotation is of limited value to manage SDS. It has occurred in continuous soybeans, soybeans following one or two seasons of maize and in fields that had been out of beans for many years. However, continuous cropping of soybeans is not recommended as it results in increased inoculum build-up.

References

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