Dry weather seedling blight and root rot

Prior to the much-needed rain in the state this week, I recently saw some seedling blight in soybeans planted in May (Figure 1). The lower stems and hypocotyl below the soil line was healthy but there was root rot in the middle depths of the rot system. Culturing the rotted roots produced mostly the fungus *Macrophomina phaeosiolina*, the cause of charcoal root rot of soybeans and charcoal rot of other crops such as grain sorghum. Also known as dry weather wilt, this disease typically infects plants when they are small, but symptoms usually remain latent until drought stress occurs during reproductive stages later in the season. The disease has been reported on young plants, but it is uncommon. The fungus *Fusarium* was also isolated from the diseased roots. Some Fusarium diseases also tend to be more active under dry conditions. For example, *Fusarium* crown and root rot of wheat is also known as dryland foot rot. In contrast, *Fusarium virguliforme*, a specific species that causes sudden death syndrome of soybeans, requires saturated soil for infection. Currently, the distribution of sudden death syndrome is limited in Oklahoma.
Fungicide seed treatments are typically used to control of damping-off and seedling blight in soybeans. However, current seed treatment fungicides are most effective against Rhizoctonia, Pythium, and Phytophthora damping-off and seedling blight diseases. There are no seed treatments registered for control of Macrophomina. In-furrow application of the fungicide flutriafol (Topguard) is registered for charcoal rot and sudden death syndrome in soybeans, but is not likely to be cost effective because the application rate is high. Aside from thiophanate methyl and flutriafol, I’m unaware of much fungicide activity against this pathogen. *Fusarium* spp. are also not readily controlled with fungicides, although seed treatments that include the active ingredients of prothioconazole, thiophanate-methyl, and thiabendazole are likely to be most effective against Fusarium damping off and seedling blight. Consult the OSU Extension Agents Handbook of Insect, Plant Disease, and Weed Control (OSU Extension Circular E-832) for a listing of seed treatments registered for use on soybeans and their active ingredients.

Replanting cotton with soybeans

High winds and low soil moisture a couple of weeks ago have left some cotton farmers with replant decisions. I recently was asked about planting soybeans into cotton fields with a history of cotton root rot (*Phymatotricopsis omnivorum*). My initial thought was soybeans must be one of the susceptible but could not find definitive reports. After all, in 1953 a book chapter on cotton root rot (also known as Phymatotrichum root rot and Texas root rot) was titled “the rot that attacks 2000 species“. Sure enough, I asked my colleague (Tom Isakeit) at Texas A&M and he responded with recent pictures of the disease on soybeans (Fig. 2). His thought was that typically soybeans are not grown in the alkaline, calcareous soils areas that pathogen inhabits. The disease produces expanding areas of wilted plants, attacking broadleaf annual crops such as cotton, alfalfa, and peanuts; and perennial crops such as pecans and grapes. The disease kills roots and colonizes the root system with characteristic cross-shaped (acicular) fungal strands (hyphae) (Fig. 3). Of the annual crops, grass crops such as corn and grain sorghum do not show symptoms. However, the fungus grows on corn roots which may limit the value of crop rotation in fighting this disease. Grain sorghum is the best rotational crop for cotton where root rot is a problem. The disease has a wide distribution in southern Oklahoma and the southwestern U.S., but generally does not appear to readily spread from field to field. Fields infested with the fungus generally remain infested indefinitely, but crop rotation with sorghum reduces the size and number of affected areas in the field. The fungicide flutriafol is registered as Topguard Terra for control of Phymatotrichum root rot on cotton and alfalfa.

Figure 2: Phymatotrichum root rot on soybeans (photo courtesy of T. Isakiet, Texas A&M Univ.)
Figure 3: Acicular hyphae from soybean roots with Phymatotrichum root rot (photo courtesy of T. Isakiet, Texas A&M Univ.)

Figure 4: Distribution of cotton root rot in North America (source: cals.ncsu.edu)
Co-Editors: Eric Rebek and Justin Talley; Oklahoma Cooperative Extension Service

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