Pest e-alerts

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New Soybean Diseases

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Phytophthora Rot

Phytophthora rot, caused by *Phytophthora sojae*, was observed in two fields of soybeans in the early reproductive stages of plant development grown under irrigation in southwestern OK. Only a low percentage of plants were affected (<10%) although there were isolated areas where over 50% of the plants were wilting. Symptoms included wilting of plants (Fig. 1) along with the presence of brown, elongated, stem cankers that extend several nodes up the plant from the soil line (Fig. 2). The disease is most severe in heavy, poorly drained soils that are readily flooded. However, Phytophthora rot can also occur in lighter soils that become saturated when plants are young. The fungus produces oospores, products of sexual recombination, which persist in the soil indefinitely. Therefore, the presence of Phytophthora rot is a concern for future crops in infested fields. The disease is managed with seed treatment fungicides that contain

Fig 1. Wilting and death of soybean plant at early reproductive stages caused by Phytophthora rot.

metalaxyl or mefenoxam, and with resistant varieties. Seed treatments only control the seedling damping off phase of the diseases, which can reduce stands and necessitate replanting where severe. In the two problem fields, seedling disease was not observed early in the season and the recent wilting of older plants was the first symptom observed. Treated seed was used in both fields

Fig 2. Phytophthora rot stem lesion.

Genetic resistance is the primary strategy for controlling Phytophthora rot. There are two types of resistance to Phytophthora rot in soybeans and both are clearly detailed in variety descriptions. Major gene resistance is most effective, however, there are many races of the fungus and major gene resistance can be overcome by changes in the genetics of the pathogen. The variety planted in the two problem fields had resistance gene *Rps1c* which is a common major resistance gene in soybean varieties. Apparently this gene is losing effectiveness in these fields. Resistance gene *Rps1k* is recommended where *Rps1c* fails. However, this gene is not widely available in maturity group 4 or 5 varieties. Soybean varieties are also scored for field tolerance and the variety in question had an intermediate field resistance score (5 on a 1-9 score where 1 is best). Field resistance permits an adequate yield where disease symptoms occur. Only a few varieties have a better field resistance score.

Management of Phytophthora rot should focus on selecting resistant varieties, particularly those with Rps1k or stacked resistances when they become available. Also select the best field resistance score. Seed treatment with fungicides containing metalaxyl or mefenoxam is recommended for infested fields. Finally limiting irrigation amounts and frequencies where Phytophthora rot is a problem may be beneficial, particularly early in the season when most infections are thought to occur.

Sudden Death Syndrome

Sudden death syndrome (SDS) was observed last year for the first time in eastern Oklahoma and has now been identified in a field in southwestern OK. The disease is a soilborne root rot caused by the fungus *Fusarium solani* f. sp *glycines*. Symptoms appear at mid to late season with distinct foliar symptoms that consist of chlorotic (yellow) and then brown spots in between the leave veins (Fig. 3). Often patches of affected plants appear in clumps (Fig. 4). As the disease advances, affected leaves fall off the plant but the petioles remain attached to the plant. The root system of affected plants is reduced in size and disease plants are easily pulled from the ground. The internal lower stem and taproot appear grey to light brown in color when sectioned. Yield loss results when plants are killed prior to pod fill. Yield impacts of SDS are reduced when the disease appears late in plant development. SDS is favored by wet poorly drained soils where drainage is restricted by soil compaction. As a result, SDS is most severe in wet years of high rainfall. The disease is also favored by high soil fertility and high yielding environments.

Fig 3. Foliar symptom of soybean sudden death syndrome.

The fungus produces long-lived spores that survive in the soil for extended periods. As a result, the disease is likely to reappear in future years. The primary management strategy for SDS is planting resistant varieties. Variety descriptions generally include SDS ratings. In fields where the disease occurs, varieties with the best resistance ratings should be planted. In the field where SDS was observed, different varieties were planted in strips for promotional purposes. The disease was apparent in a variety with a mid SDS resistance score, but not in adjacent varieties with better resistance scores. Soil management strategies that promote drainage and reduce soil compaction should also reduce the severity of SDS.

Fig 4. Localized 'hot spot' of soybean plants with sudden death syndrome.

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