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Phytophthora race 25 and soybean 1k gene

Abstract
Phytophthora has many races and the Rps-1k gene confers resistance to many of them. The 1k gene has been widely bred into soybeans to manage Phytophthora root rot. It has been very effective in management of Phytophthora; however, this summer we have received many reports of Phytophthora root rot on soybean varieties with the 1k gene. Recently, we have observed an increased prevalence of a new race in Iowa that can overcome the 1k gene called race 25. Growers are wondering why the 1k gene is not working, and if they can test to determine whether their fields contain race 25.

Keywords
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Although there are no solid research data on the level of prevalence in Iowa of race 25 or other races that can defeat the 1k gene, there are an increasing number of reports that the 1k gene is no longer effective in some soybean fields. The first reported case of Phytophthora defeating the 1k gene in Iowa was from an old public variety Williams 82 in 1995. An Iowa State University survey (1992-1994) showed that less than 5 percent of Phytophthora isolates in Iowa were race 25. Today, diseased 1k-gene soybeans submitted to the ISU Plant Disease Clinic are from almost every major seed company. This is not surprising because the wide use of 1k gene increases selection pressure for races that can overcome the 1k gene.

Some Phytophthora symptoms look like stem cancer.

If you find Phytophthora in 1k-gene soybeans, there is no need to test for race 25. The infestation itself says that the 1k gene is no longer effective in your fields because of the buildup of race 25 or other races. The greater losses of this disease occur at the seedling stage, causing severe damping-off and necessitating replanting. The occurrence of Phytophthora-infested plants is a warning sign of damping-off in future soybean crops. In the past few years, we have received reports of replanting varieties with the 1k gene due to Phytophthora.

During scouting, Phytophthora can be misidentified as stem canker, a mistake made by many, including ourselves. Some Phytophthora-infested plants have stem rot but no root rot and sharply defined lesions at the nodes of plants, which are typical symptoms of stem canker. In this case, check for more diseased plants with typical Phytophthora root rot.
symptoms. Check for bare spots around diseased plants. These spots are likely the result of damping-off, an indication of *Phytophthora* occurrence at earlier growth stages. The ISU Plant Disease Clinic also has test kits to help you identify *Phytophthora*.

If *Phytophthora* occurs in your 1k-gene soybeans, take note. Check with your seed dealer and ask for varieties with the Rps-6 gene. This gene is a new *Phytophthora* resistance gene effective against race 25. Consider a seed treatment with Apron if the Rps-6 gene is not available. Plowing and avoiding no-till also can reduce *Phytophthora* damage.

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