Cool Bean Advisor

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Early Season Assessments for Soybean "Stress"

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In 2008, we spent a great deal of time during the latter portion of the growing season visiting soybean fields that were under extreme stress. Specifically, we fielded many questions if the *Rps1k* gene conferring Phytophthora resistance was breaking down and also numerous questions regarding what we need to do to improve soybean yield in Wisconsin. From our sampling effort in 2008, we identified multiple pathogens including those that cause stem canker and charcoal rot as well as multiple species of *Fusarium*. This information was summarized over the winter in multiple sources and we recommend consulting those for a reminder and summary of our observations (see references). What we learned from last year, and a key point we emphasized during the winter meeting season was that many of these stresses may have started much earlier in the growing season, or were induced when plants were stressed by other abiotic or biotic factors. This hypothesis was further backed up with statements by growers and consultants that went, "Well, the plant looked stressed around V3 or V4, but I thought it would grow out of it."

With soybean now moving into the early vegetative growth states, we want to emphasize that scouting fields earlier in 2009, when soybean is from the second trifoliate (V2) to the fourth trifoliate (V4), can help to determine if plants are under stress due to biotic organisms (some discussed below) or other factors, including environmental. While conditions this spring have been different from we saw in 2008, taking the time to sample now is very critical to determine what may be one of the causes of soybean stress that could affect yield at the end of the growing season.

What pathogens might we be looking for? During this period of vegetative growth, it is important to assess fields for the effects of diseases caused by Phytophthora, Pythium, Fusarium, and Rhizoctonia. These organisms have overlapping characteristics but can be differentiated based on symptomology (see Integrated Crop Management News from Iowa State University. All can cause a lesion on the stem as well as a root rot; however, Pythium normally occurs in the cool, wet soils, while the other three organisms are more common in warmer, wet soils. Phytophthora, Pythium, and Rhizoctonia can all cause a seed rot (Figures 1-3), but that is less common for Fusarium.

For any samples that appear suspect, these can be submitted to the Plant Disease and Diagnostic Clinic for confirmation.

Figure 1. Field photo (left) showing plants that are under stress due to biotic factors (here, Rhizoctonia) and general evidence for a root rot of soybean (right).

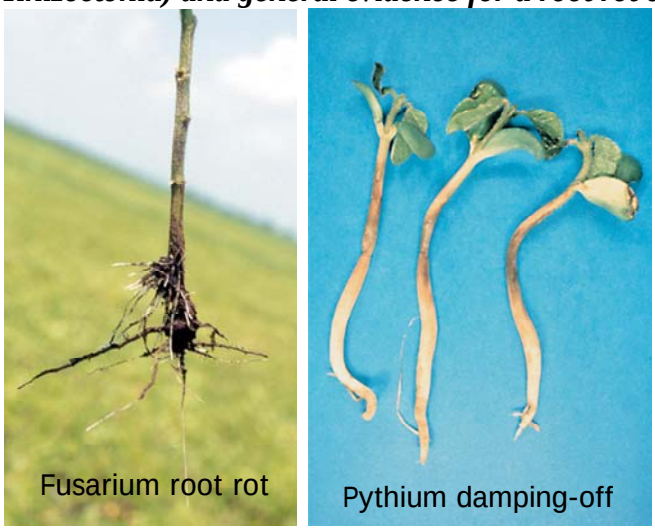

Figure 2. Images of Fusarium root rot and Pythium dampling-off.

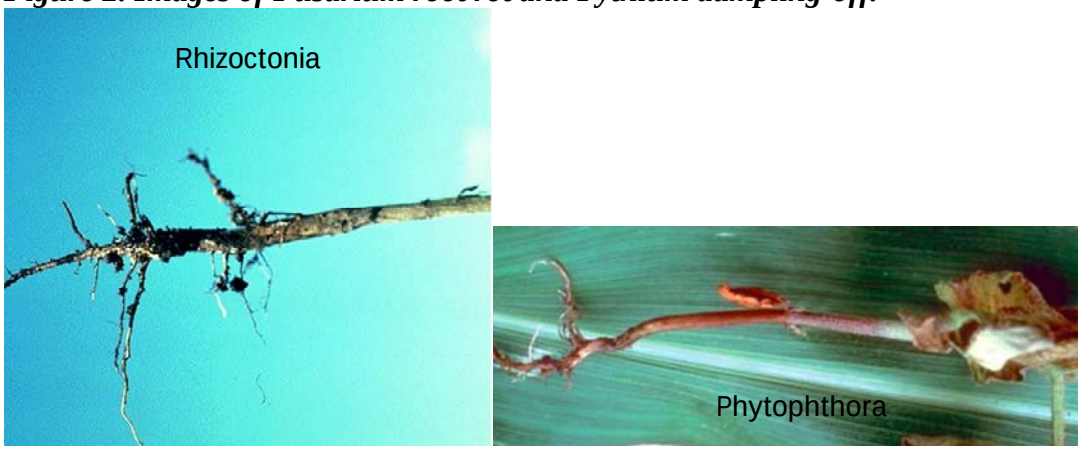

Figure 3. Images of Rhizoctonia and Phytophthora.

References:

1. Hughes, T., P. Esker, and S. Conley. 2009. Taking advantage of a stressful situation: stem canker and charcoal rot in soybeans. Wisconsin Crop Manager, Vol. 16, Number 2, Pages 9-11.
2. Hughes, T., P. Esker, and S. Conley. 2009. Did the *Rps* 1k gene fail in Wisconsin in 2008? Wisconsin Soy Sentinel, Spring 2009, Vol. 6, Issue 1, Pages 12-13.
3. Esker, P., S. Conley, J. Gaska, and T. Hughes. Charcoal rot – a disease of drought stressed environments. Wisconsin Soy Sentinel, Winter 2008, Vol. 5, Issue 4, Page 16.

Image Sources: P. Esker (UW-Madison); C. Grau (UW-Madison); American Phytopathological Society Image Galley; Iowa State University; University of Nebraska