

## PLANT PATHOLOGY LABORATORY: SUMMARY OF 2009-2010 FIELD SAMPLES

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The plant pathology laboratory at the University of Minnesota, Northwest Research and Outreach Center in Crookston receives sugarbeet samples for diagnosis every growing season. These samples have problems caused by plant pathogens, insects, or abiotic causes such as chemical injury (usually herbicide) or nutrient deficiencies. Samples submitted may show recent to advanced stages of problems. This report summarizes results of samples received during the 2009 and 2010 growing seasons.

In 2009, samples were received from 83 sugarbeet fields and diagnoses are summarized in Figure 1A. *Rhizoctonia solani* (= *R. solani*) was isolated from 71 fields, *Aphanomyces cochlioides* (= *A. cochlioides*) from 11, *Fusarium* from 4, and chemical injury from 1 (= 86, 13, 5, and 1% of fields, respectively). More than one pathogen sometimes was identified in the same field. Samples with *Rhizoctonia* diseases (damping-off, root rot, crown and root rot) were received from early June through late September and peaked in the second half of June (Fig. 1B). Samples infected with *A. cochlioides* (damping-off and root rot) were submitted from early June through late August and rose to a peak in the second half of June (Fig. 1B).

In 2010, samples were received from 114 sugarbeet fields and diagnoses are summarized in Figure 2A. As in 2009, *R. solani* was the prominent pathogen and was isolated from 57 fields, *A. cochlioides* from 19, chemical injury from 10, *Fusarium* from 9, and *Verticillium* from 2 (= 50, 17, 9, 8, and 2%, respectively). Samples with *R. solani* were submitted from mid May through mid September and were high from mid June through mid July and again, in early to mid August (Fig. 2B). Samples with *A. cochlioides* were submitted from mid May through mid August and peaked in early to mid July (Fig. 1B).

Chemical problems were a bigger issue in 2010 than in 2009 and most samples were received in May. Seedlings displayed very similar, narrow constrictions in the hypocotyl and all samples were from fields planted to edible beans in 2009. Fungal pathogens were not isolated from these samples and the cause was chemical carryover of the herbicide Valor used on beans the previous growing season.

Appearance of symptoms caused by *A. cochlioides* is linked with periods of warm soil and especially, high soil moisture, which is required for production of motile zoospores that infect sugarbeet roots. As a result, the number of problems caused by *A. cochlioides* and time of occurrence varies from year-to-year. While *Rhizoctonia* crown and root rot (RCRR) is favored by high soil moisture, *R. solani* does not require the high moisture levels needed by *A. cochlioides*. Consequently, occurrence of RCRR is related more to inoculum density in soil, soil temperatures, and cultural practices (e.g., cultivating or rotary hoeing that may favor disease by throwing infested soil into crowns). In both 2009 and 2010, frequency of field samples with RCRR that were submitted to the laboratory for diagnosis/confirmation peaked in the second half of June compared to 2007 and 2008, when most samples were received in early to mid August (Fig. 3). This suggests that in the last 2 years, inoculum densities in fields have increased, soil moisture and temperature has favored earlier infections, and/or growers, agriculturists, and crop consultants are more aware and observant of the disease. Consequently, early fungicide applications may be warranted in fields with a history of RCRR, especially since infections occur at least a couple of weeks before the disease is observed.

### ACKNOWLEDGEMENTS

We thank the Sugarbeet Research and Education Board of Minnesota and North Dakota for funding of this service and agricultural staff of American Crystal Sugar Company, Minn-Dak Farmers Cooperative, Southern Minnesota Beet Sugar Cooperative, and crop consultants for submitting samples.

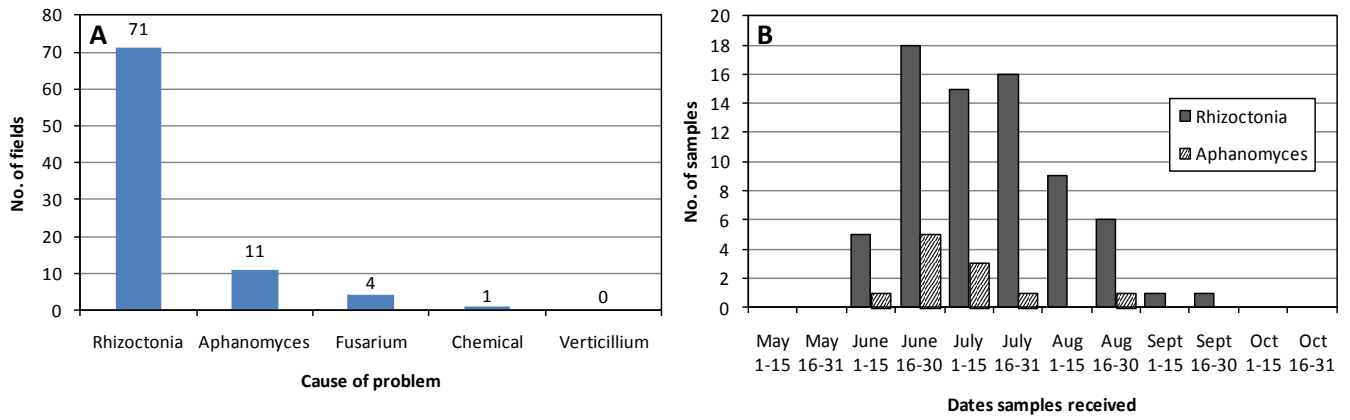


Fig. 1. Summary of samples received at the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2009 by A.) cause of problem and B.) date sample was submitted for *Aphanomyces* and *Rhizoctonia*, the two most common root pathogens.

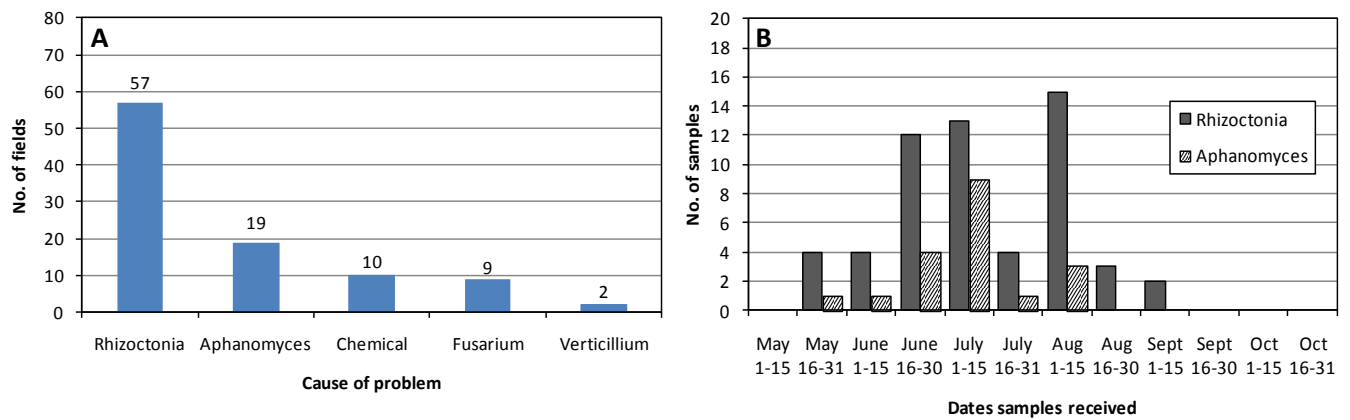


Fig. 2. Summary of samples received at the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2010 by A.) cause of problem and B.) date sample was submitted for *Aphanomyces* and *Rhizoctonia*, the two most common root pathogens.

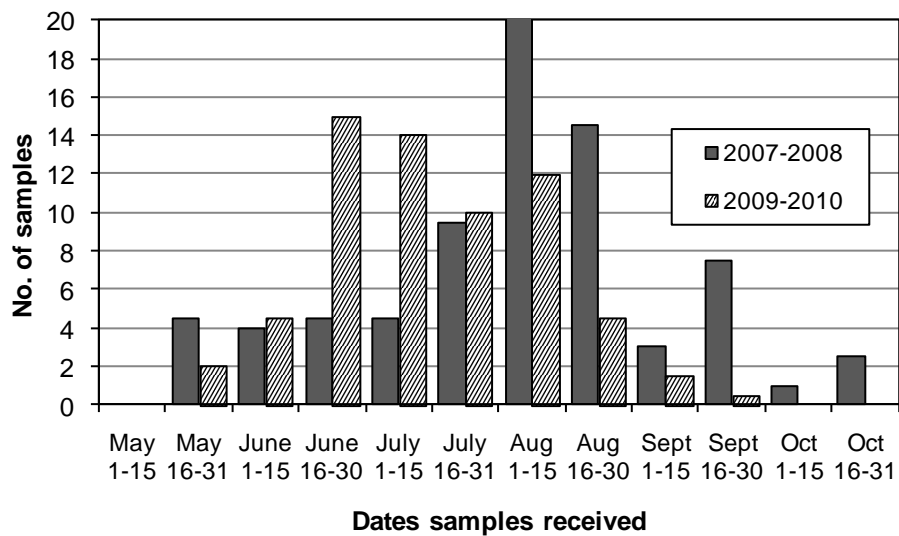


Fig. 3. Average number of fields with *Rhizoctonia* diseases received at the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston throughout 2007-2008 and 2009-2010.