

## PLANT PATHOLOGY LABORATORY: SUMMARY OF 2011-2012 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. This report summarizes results of samples received during the 2011 and 2012 growing seasons.

In 2011, samples were received from 173 sugarbeet fields and diagnoses are summarized in Figure 1A. *Rhizoctonia solani* was isolated from 95 fields, *Aphanomyces cochlioides* from 81, *Fusarium* from 5, and chemical injury from 1 field (= 55, 47, 3, and 1% of fields, respectively). More than one pathogen was isolated from some fields. The first half of July was the peak time for diagnosing both *R. solani* and *A. cochlioides*, although *Aphanomyces* samples continued to be brought in through the end of August and *Rhizoctonia* samples were seen through the end of September (Fig. 1B).

In 2012, samples were received from 103 sugarbeet fields and diagnoses are summarized in Figure 2A. *Rhizoctonia solani* was isolated from 65 sugarbeet fields, *A. cochlioides* from 8, *Fusarium* from 7, and chemical injury from 3 (= 63, 8, 7, and 3% of fields, respectively). In some samples, no fungal pathogens were isolated, but signs of drought stress were evident. Diagnoses of *R. solani* infections peaked in the first half of June while *A. cochlioides* peaked in the first half of July (Fig. 2B). The first *Rhizoctonia* samples of 2012 were received in early May, one month earlier than in 2011. The earlier *Rhizoctonia* infections are attributed to earlier planting dates and warmer soil temperatures in 2012 than in 2011. The *Aphanomyces* sample submitted at the beginning of October, 2012 showed root scarring, suggesting that infection occurred much earlier in the season (and presence of *Aphanomyces* was subsequently verified by baiting the pathogen from field soil).

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 2011, a drastic increase in the number of samples from fields with *A. cochlioides* infections was seen throughout the months of July and August. Rainfall totals for 2011 recorded by the North Dakota Agricultural Weather Network (NDAWN) suggest high soil moisture in the Red River Valley resulted in increased *A. cochlioides* infection (Fig. 3). In contrast, the dry growing conditions of 2012 did not favor *A. cochlioides* infection. Regardless of soil moisture conditions, more samples were received from fields with *R. solani* infections than those with *A. cochlioides* in both 2011 and 2012. In 2012, inoculum density of *Rhizoctonia* in soil was high from the previous season and soil temperatures were warmer, but low soil moistures reduced the abundance of *Rhizoctonia* samples from 2011.

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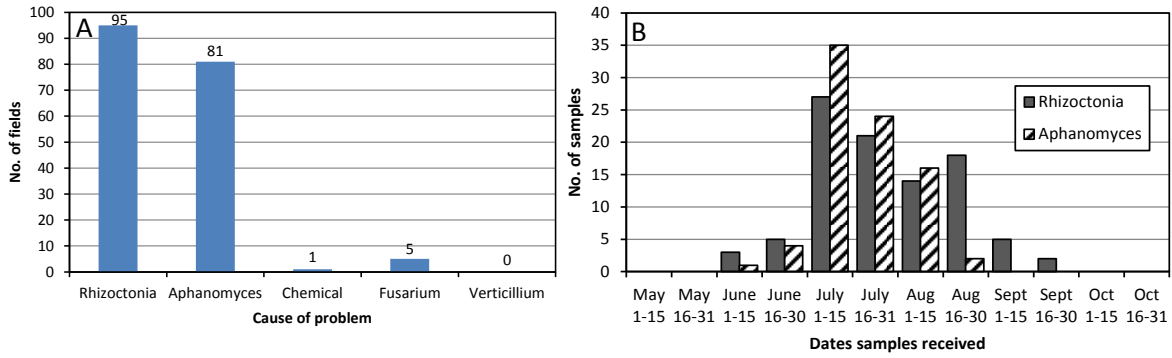


Fig. 1. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2011. Results are reported by A.) diagnoses and B.) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

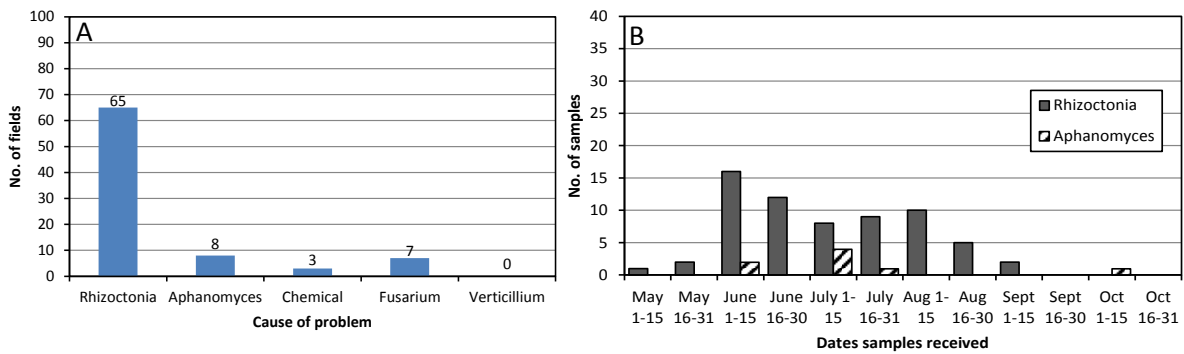


Fig. 2. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2012. Results are reported by A.) diagnoses and B.) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

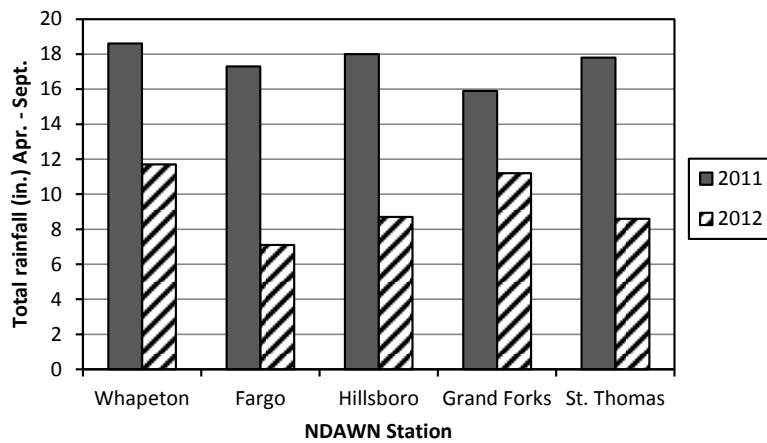


Fig. 3. Total rainfall recorded by the North Dakota Agricultural Weather Network (NDAWN) at five locations in the Red River Valley (Whapeton, Fargo, Hillsboro, Grand Forks, and St. Thomas). Rainfall is reported in inches for the 2011 and 2012 growing season months of April through September.