

## PLANT PATHOLOGY LABORATORY: SUMMARY OF 2013-2014 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 2013 and 2014 growing seasons.

In 2013, samples were received from 132 sugarbeet fields and diagnoses are summarized in Figure 1A. *Rhizoctonia solani* was isolated from 62 fields, *Aphanomyces cochlioides* from 41, *Fusarium* from 22, *Verticillium* from 7, and chemical injury was determined in 1 field (= 47, 31, 17, 5, and 1% of fields, respectively). More than one pathogen was isolated from some fields, while in some fields, no pathogens were isolated. The second half of July was the peak time for diagnosing both *R. solani* and *A. cochlioides* (Fig. 1B).

In 2014, samples were received from 128 sugarbeet fields and diagnoses are summarized in Figure 2A. *Rhizoctonia solani* was isolated from 42 sugarbeet fields, *A. cochlioides* from 72, *Fusarium* from 2, and chemical injury was determined in 3 (= 33, 56, 2, and 2% of fields, respectively). In some samples, more than one pathogen was isolated, and in others, no fungal pathogens were isolated. Diagnoses of both *R. solani* and *A. cochlioides* infections peaked in the first half of July (Fig. 2B).

The number of samples received of a particular disease does not always accurately reflect the prevalence of disease. Agricultural staff and consultants may be more comfortable self-diagnosing certain diseases or they may go unnoticed if aboveground symptoms are not observed. However, a few general contrasts between 2013 and 2014 were observed. There was greater prevalence of *A. cochlioides* in 2014 compared to 2013, most likely due to a combination of late planting into warm soils and high rainfall in the month of June (Fig. 3B). While total rainfall from April through September was similar in 2013 and 2014 (Fig. 3A), an abundance of rainfall in June of 2014 resulted in high soil moisture when sugarbeet plants were young and highly susceptible to infection by *A. cochlioides*. The number of samples received with *Rhizoctonia* infections was down in 2014 compared to 2013. Infection of sugarbeet by *R. solani* is also favored by high soil moisture and temperature so this trend cannot be explained by environmental conditions. Perhaps wide use of seed treatments such as Kabina was effective in reducing infections by *R. solani* when soil moisture was very high early in the season. Other control measures such as the use of partially resistant varieties and rotation with non-host crops may also have benefited some fields. A final trend for 2014 was a reduction in the number of *Fusarium* samples received. *Fusarium* infections are also favored by high soil temperatures, so the lack of samples cannot be explained by environmental conditions. The use in 2014 of varieties with higher levels of resistance to *Fusarium* in locations where the disease has been prevalent likely reduced levels of disease (Chris Motteberg, American Crystal Sugar Company Agronomist, personal communication).

### ACKNOWLEDGEMENTS

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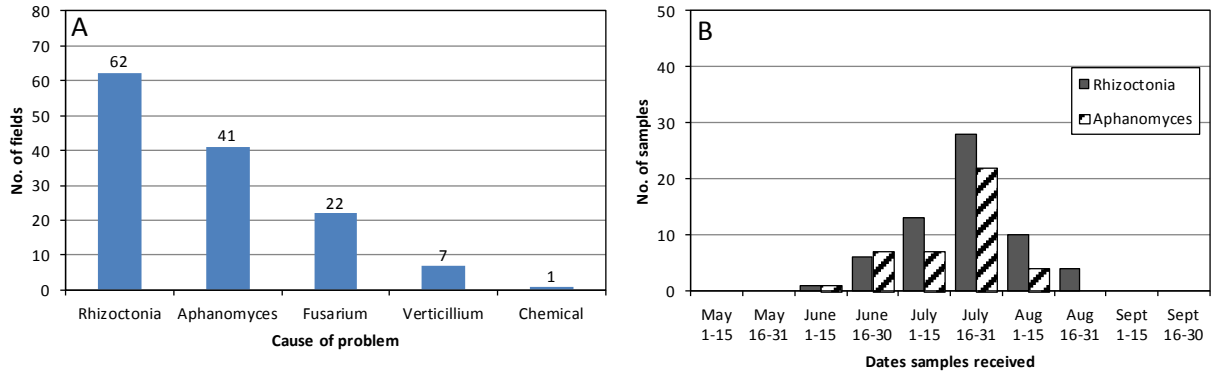


Fig. 1. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2013. Results are reported by A.) diagnoses and B.) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

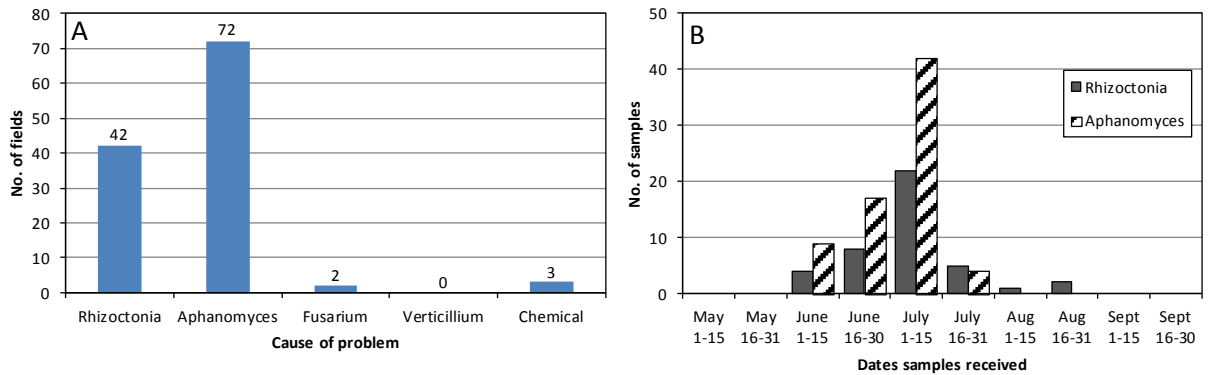


Fig. 2. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2014. Results are reported by A.) diagnoses and B.) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

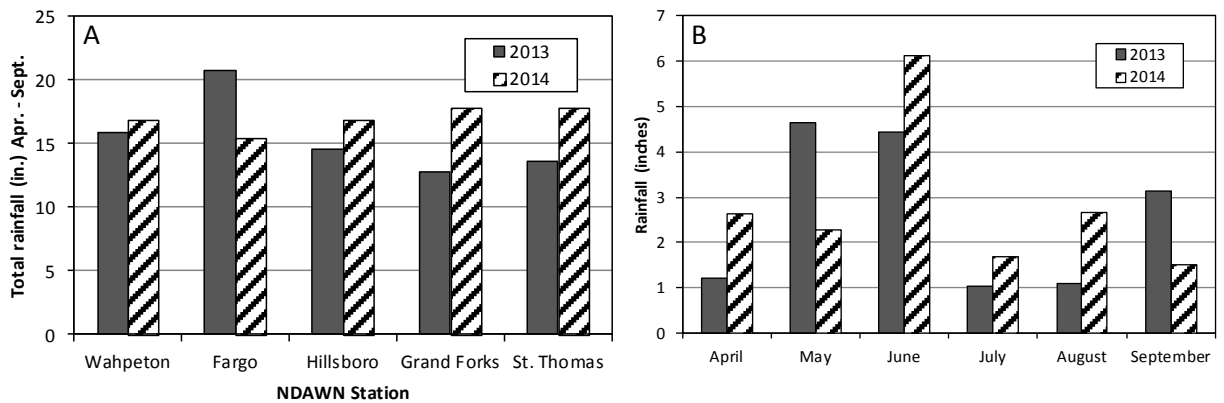


Fig. 3. Total rainfall recorded by the North Dakota Agricultural Weather Network (NDAWN) at five locations in the Red River Valley (Wahpeton, Fargo, Hillsboro, Grand Forks, and St. Thomas). Rainfall is reported in inches for the 2013 and 2014 growing season months of April through September. Rainfall is reported by A.) location and B.) month (averaged for all 5 locations).