PLANT PATHOLOGY LABORATORY: SUMMARY OF 2015-2016 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 mostly 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 2015 and 2016 growing seasons.

In 2015, samples were received from 118 sugarbeet fields and diagnoses are summarized in Figure 1A. *Rhizoctonia solani* was isolated from 58 fields, *Aphanomyces cochlioides* from 29, *Fusarium* from 1, and chemical injury was determined in 1 field (= 49, 25, 1, and 1% of fields, respectively). Both *R. solani* and *A. cochlioides* were isolated from 10 fields (8%), while in some fields, no pathogens were isolated. Samples infected by *A. cochlioides* were received evenly from early June through early August, while samples infected by *R. solani* were mostly received from July through the end of the growing season (Fig. 1B).

In 2016, samples were received from 106 sugarbeet fields and diagnoses are summarized in Figure 2A. *Rhizoctonia solani* was isolated from 63 sugarbeet fields, *A. cochlioides* from 45, *Fusarium* from 3, and chemical injury was determined in 2 (= 59, 43, 3, and 2% of fields, respectively). Both *R. solani* and *A. cochlioides* were isolated from 19 fields (18%), and in some fields, no fungal pathogens were isolated. Samples infected by *A. cochlioides* were received in two peaks, one in the month of June, and the other in late July into August (Fig. 2B). Samples infected by *R. solani* followed a similar pattern but there was also a large peak at the end of the growing season (Fig. 2B). This peak in Rhizoctonia samples at the end of the growing season does not indicate a peak in pathogen activity, but is more likely the result of end-of-the-season sampling by agricultural staff.

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, similarities and differences between 2015 and 2016 were observed. The two most common pathogens in both years were *R. solani* and *A. cochlioides*, but prevalence of samples infected with *A. cochlioides* alone and with both pathogens together was higher in 2016 compared to 2015, most likely due to high rainfall, especially in the northern Red River Valley (Fig. 3A). This trend also suggests an increase in the number of fields where both *R. solani* and *A. cochlioides* are present. The duration of time that samples were received was greater than typical in both 2015 and 2016, due to high rainfall in both years throughout the growing season (Fig. 3B). A good trend continuing in 2015 and 2016 was low numbers of *Fusarium* samples received. In 2013, samples infected with *Fusarium* were received from 22 fields, but *Fusarium*-infected samples were received from only 2, 1, and 3 fields in 2014, 2015, and 2016, respectively. In 2014, varieties with higher levels of resistance to *Fusarium* were being used in locations where the disease had previously been prevalent (Chris Motteberg, American Crystal Sugar Company Agronomist, personal communication), and this has likely continued. As fields and areas with *Fusarium* are documented and more people are aware of this pathogen, varieties with higher levels of resistance should continue to be used to reduce losses, inoculum production, and spread of the pathogen.

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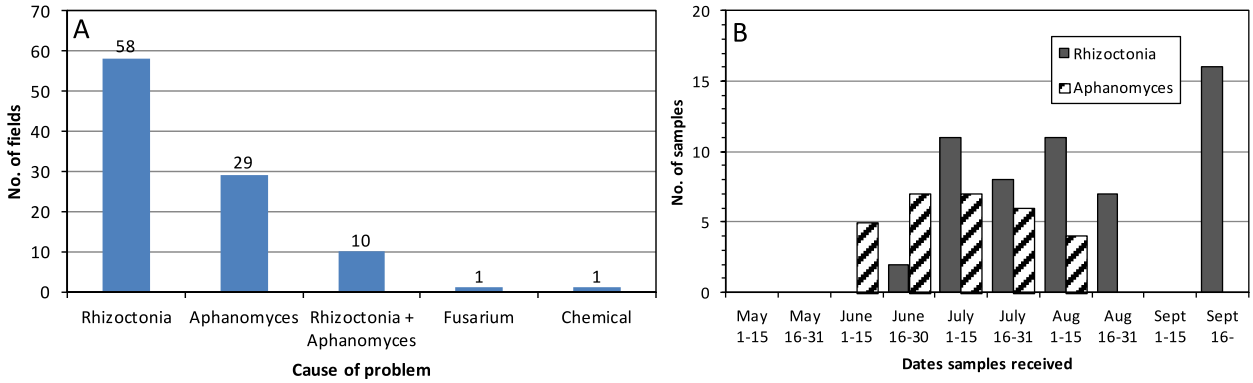

Fig. 1. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2015. Results are reported by **A.**) diagnoses and **B.**) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

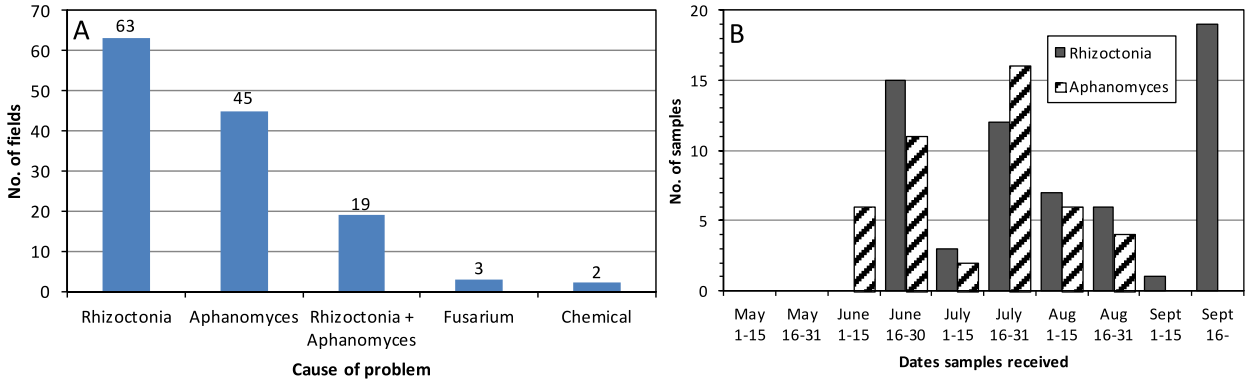

Fig. 2. Summary of field samples received by the plant pathology laboratory, University of Minnesota, Northwest Research and Outreach Center, Crookston in 2016. Results are reported by **A.**) diagnoses and **B.**) dates samples were received for *Rhizoctonia* and *Aphanomyces*, the two most common root pathogens.

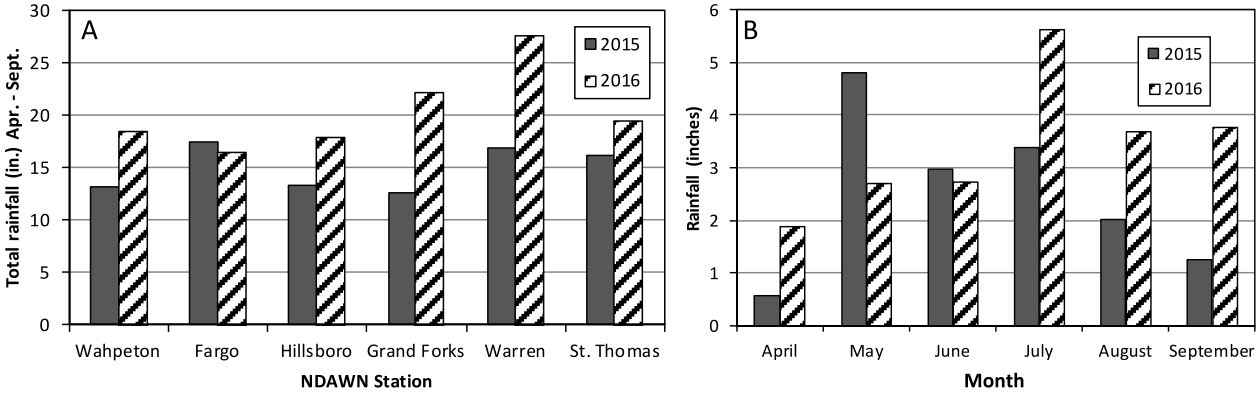

Fig. 3. Total rainfall recorded by the North Dakota Agricultural Weather Network (NDAWN) at six locations in the Red River Valley (Wahpeton, Fargo, Hillsboro, Grand Forks, Warren, MN and St. Thomas). Rainfall is reported in inches for the 2015 and 2016 growing season months of April through September. Rainfall is reported by **A.**) location and **B.**) month (averaged for all 6 locations).