

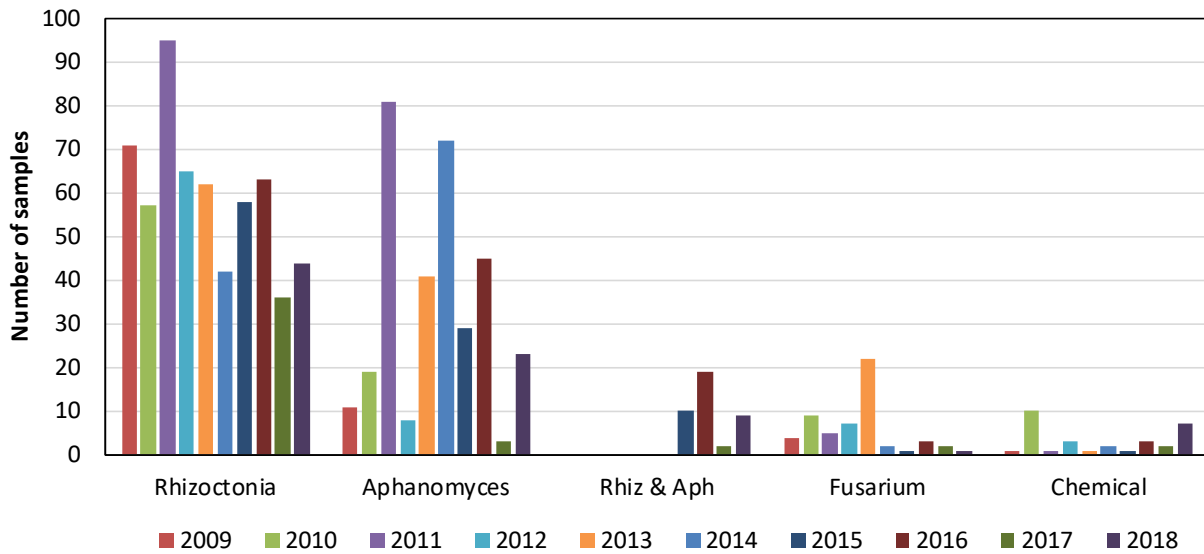
BRANTNER, JASON R.\* and ASHOK K. CHANDA, Department of Plant Pathology, University of Minnesota, Northwest Research and Outreach Center, Crookston, MN 56716. **Accurate diagnosis of sugarbeet root diseases is critical for driving disease management decisions.**

**ABSTRACT**

Accurate diagnosis of soilborne sugarbeet root diseases is not only critical for implementing effective disease management strategies but also useful in documenting prevailing diseases in a given year. Treatment applications in the current growing season and selection of variety, seed treatment, and fungicide applications for the next time the field is planted to sugarbeet all depend on knowing what pathogen(s) are present in the field. The objective of our field sample diagnosis is to identify root pathogens and provide information to growers.

In the last ten years (2009-2018) the sugarbeet pathology lab at the University of Minnesota, Northwest Research and Outreach Center has diagnosed samples from 1088 fields from across the sugarbeet growing areas of Minnesota and North Dakota. Diagnosis is performed by gathering and assessing pertinent information from sample submitters followed by isolation of pathogens from infected tissues where appropriate and microscopic observation.

The most common diseases were damping-off and/or adult root rots caused by *Rhizoctonia solani* (593 samples = 55%) and *Aphanomyces cochlioides* (332 samples = 31%). Diseases caused by *Fusarium oxysporum* or *F. secorum* have been found in 56 samples (5%) during this period. Other pathogens appearing infrequently are *Pythium spp.*, and *Verticillium dahliae*. Chemical issues, mostly herbicide carryover or drift, have been suggested in 31 samples (3%). In the last four years, both *R. solani* and *A. cochlioides* have been isolated from 40 of 355 samples (11%) corroborating an increasingly common observation of co-existence of both diseases in many fields. During the 10-year period, samples with *Rhizoctonia* diseases have been consistently the most common, while those with *Aphanomyces* have fluctuated from year to year (Fig. 1), depending on the soil moisture. Samples with *Fusarium* diseases peaked in 2013, but have remained low since then (Fig. 1) due to grower awareness and selection of tolerant varieties.



**Fig. 1.** Pathogens and problems diagnosed from 2009 to 2018 at the sugarbeet plant pathology lab at the University of Minnesota, Northwest Research and Outreach Center.

There is much anecdotal evidence of misidentification of root diseases leading to inappropriate variety and treatment selection. Proper identification of root diseases in the field involves more than simple above-ground observation and should include digging up several intact roots with varying levels of symptoms around an infection focus or problem area, removing soil to better observe symptoms, and for some pathogens, cutting the roots to observe vascular tissue for presence of discoloration. At times, symptoms caused by *R. solani* and *A. cochliformis* can be difficult to discern and isolation of the pathogen or its DNA by a qualified lab is necessary. Proper samples for this procedure should include 4-8 roots with clear symptoms of active infection alongside healthy tissue. Completely rotten roots are usually not helpful as secondary organisms have taken over by that time. Accurate identification of pathogens in sugarbeet fields through proper sampling and diagnosis will give growers valuable information to make better disease management decisions including taking measures to prevent spread of soilborne pathogens from infested fields to clean fields.