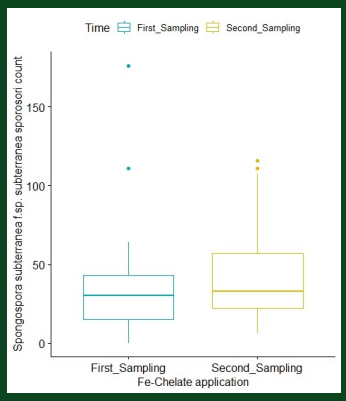
SLVRC Plant Pathology Newsletter

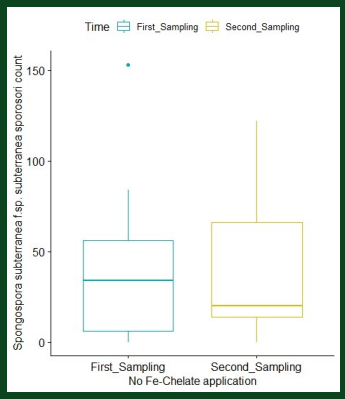
August and September 2019

Figure 1. Box and whisker plots of powdery scab pathogen (*Spongospora subterranea* f. sp. *subterranea*) sporeball (sporosori) counts from soil samples obtained from:

A) Fe-EDTA treated plots



B) Untreated plots



Disease Management Updates

Powdery scab— iron chelate study:

- Objective: To test the efficacy of chelated Iron (Fe-EDTA) for managing potato powdery scab .
- Background: Earlier greenhouse studies indicated Fe-EDTA to stimulate premature release of zoospores from sporeballs (sporosori), which survive less than a day in the absence of host thereby reducing pathogen inoculum levels (Balendres et al. 2018. *Plant Pathology* 67:902-908).
- A field trial was conducted to assess the application of iron chelate before planting to powdery scab infested fields and test if this approach will reduce inoculum levels of the powdery scab pathogen.
- Experimental plots (42 plots; 30 ft by 11.33 ft) were laid out in a grower field with a history of powdery scab. Half of the plots were treated with Fe-EDTA (10 pounds/acre) and the remaining half were untreated.
- Two soil samples were obtained from each plot: a) First: before applying Fe-EDTA (4/8/2019) and b) Second: before planting (5/3/2019). Soil sample processing, DNA extraction and quantitative real-time PCR were performed following established protocols.
- Preliminary results suggest that there is no significant difference between mean sporeball counts of the pathogen in soil samples obtained at two time points from Fe-EDTA treated plots (Fig. 1A). A similar trend was observed in untreated plots (Fig. 1B).
- Another set of soil samples will be collected before harvest and the pathogen inoculum levels will be estimated. I will keep you updated on this project in the next couple of months.
- Funding source: Colorado Department of Agriculture and the Colorado Potato Administrative Committee (CPAC).

- The plant pathology lab has been receiving several diseased potato plants showing wilt and foliar diseases. Thanks to consultants and growers for providing the samples. Pathogen isolation is in progress (Fig. 2) and some of these isolates will be used for fungicide sensitivity studies—a project that was funded by the CPAC this year.
- Instructions for submitting a plant disease sample to the San Luis Valley Research Center are available here:

http://potatoes.colostate.edu/programs/potato-pathology/resource-center/

Figure 2: Fungal cultures obtained from diseased potato samples

***Tobacco Rattle Virus* (TRV) Management**:

- I have been getting some questions regarding TRV (Fig. 3) management practices that can be implemented in addition to the use of pesticides.

Figure 3: Tuber necrosis caused by TRV

- Avoid planting host crops as well as destroy weed hosts. Some susceptible hosts of TRV are: barley, beans, peas, brassicas, spinach, bulb-producing ornamentals such as daffodils, gladiolus, tulip, and hyacinth. Nightshade is a good host for both the nematode (stubby-root nematode) and the virus.
- Consider growing TRV resistant cultivars such as Castile, Merrimack, Millennium Russet, Red Pearl, Symfonia, and St. Johns. Field trials were conducted in North Dakota and Washington (2015 and 2016) to investigate the sensitivity of several cultivars for the incidence of TRV-induced tuber necrosis and severity. Cultivars were categorized into sensitive (over all incidence >15%), moderately sensitive (overall incidence >10 to 15%), moderately insensitive (overall incidence >5 to 10%), and insensitive (overall incidence <5%) groups. Also note, differential responses of the cultivars based on the location tested (Table 1). For further reading about this research, refer to the journal article: Authors: Yellareddygari SKR, Brown CR, Whitworth JL, Quick RA, Hamlin LL, Gudmestad NC. Publication year: 2018. Title: Assessing potato cultivar sensitivity to tuber necrosis caused by *Tobacco Rattle Virus*. Journal information: Plant Disease 102:1376-1385.
- Additional information on potato tuber necrotic viruses (PVY, TRV, and PMTV) and their management strategies can be accessed from the following blog: **https://blogs.cornell.edu/potatovirus/**

Table 1: A representative list of potato cultivar sensitivity to TRV-induced tuber necrosis. For a complete list of cultivars tested, refer to *Plant Disease* journal article (102:1376-1385). * = Sensitivity ranking was calculated using data from one year.

Cultivar	North Dakota trial	Washington trial
Centennial Russet	Insensitive	Sensitive
Classic Russet	Sensitive	Sensitive
Teton Russet	Moderately sensitive	Sensitive
Russet Norkotah	Sensitive	Sensitive
Russet Norkotah 278	Sensitive	Sensitive
Russet Norkotah 296	Sensitive	Sensitive
Russet Norkotah CO3	Sensitive	Sensitive
Russet Norkotah CO8	Sensitive	Sensitive
Chieftain	Sensitive	Sensitive
Ciklamen	Insensitive	Moderately Insensitive
Dark Red Norland	Sensitive	Sensitive
Modoc	Moderately sensitive	Sensitive
Red Thumb	Sensitive	Sensitive
Chipeta	Moderately sensitive	Sensitive
Kennebec	Sensitive	Sensitive
Lamoka	Sensitive	Sensitive
Austrian crescent	Moderately insensitive	Moderately sensitive
Desiree	Sensitive	Sensitive
French Fingerling	Sensitive	Sensitive
Bintje	Insensitive	Moderately Insensitive
Yukon Gold	Sensitive	Sensitive*

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Additional Resources: http://potatoes.colostate.edu