Evaluation of chemical treatments and cultivars on the incidence of powdery scab and *Potato mop-top virus*

Yuan Zeng, Ana Cristina Fulladolsa, Andrew Cordova, and Amy O. Charkowski

INTRODUCTION

- *Spongospora subterranea* (*Ss*) is a protist that causes root galls and powdery scab (PS) on tubers
- *Ss* transmits *Potato mop-top virus* (PMTV) which causes tuber necrotic symptoms
- These two pathogens are widespread in the US, and lead to monetary and resources losses
- There is no effective control for either pathogen

Root galls | Immature lesions | Mature lesions | Tuber spraing

METHODS

Field Experiment

- Three farms (A, B, and C) identified with *Ss* positive soil in the San Luis Valley, CO
- Split-plot design (Omega, RIDEZ and control) with a RCBD within (6 cultivars) at each farm

Greenhouse Experiment

- Two house-prepared potting mixes (PM1; PM2) with 3 inoculum levels (1, 5, 10 sporosori/g)
- Omega, RIDEZ, and control
- Optimal environment (water saturated soil, 18 ^{o}C)

Disease Assessment

- qPCR to determine *Ss* inoculum change
- Tuber lesion (PS) rating
- ELISA to detect PMTV

A subplot in a field trial

A greenhouse trial

CONCLUSIONS

- Omega and RIDEZ cannot control PS and PMTV
- The environment may play a role in PS disease development
- Russet-skinned cultivars (Canela and RNK8) are more tolerant to PS
- Under optimal conditions, undetermined or low inoculum levels of *Ss* result in severe disease symptoms on susceptible cultivars

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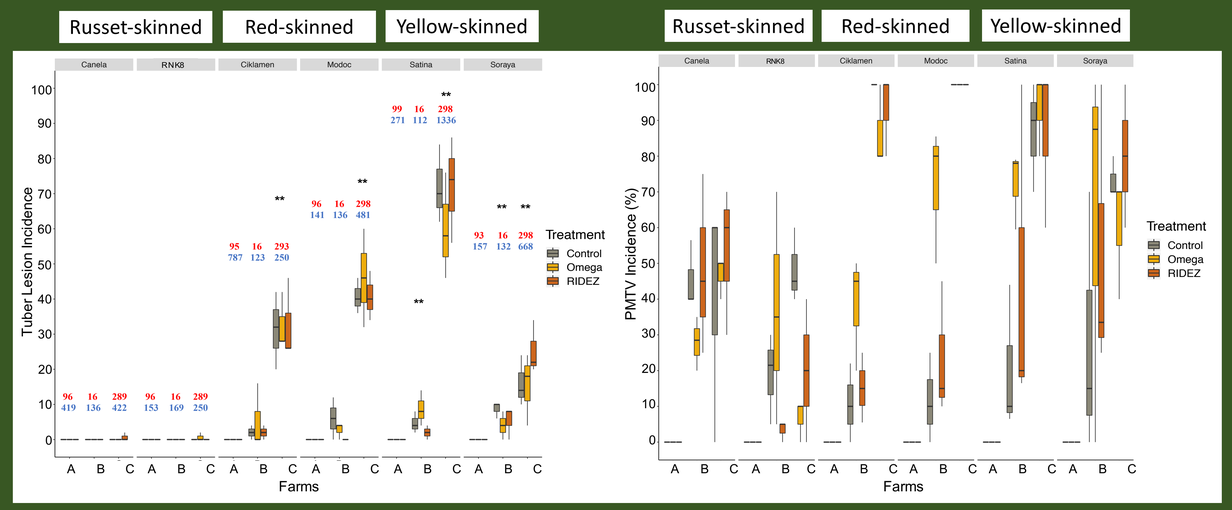
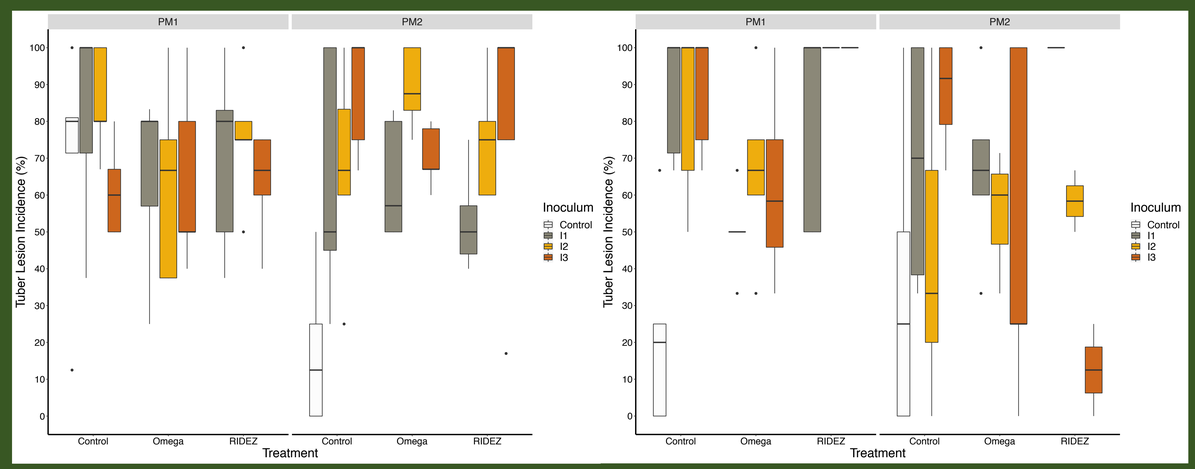
Omega® 500F and FOLI-R-PLUS RIDEZ™ **CANNOT LIMIT** the incidence of powdery scab and *Potato mop-top virus* in potatoes



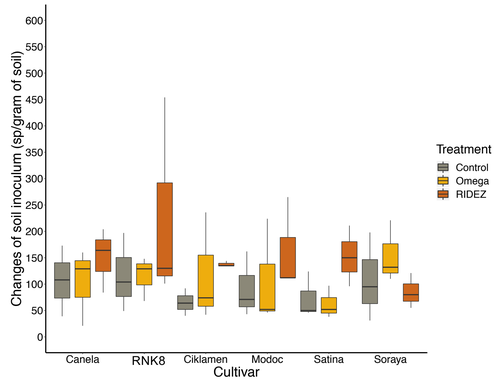
Mean **PS** (left) and **PMTV** (right) incidence across three farms (A, B, and C). The numbers in red are pre-planting inoculum and the numbers in blue are pre-harvest inoculum.



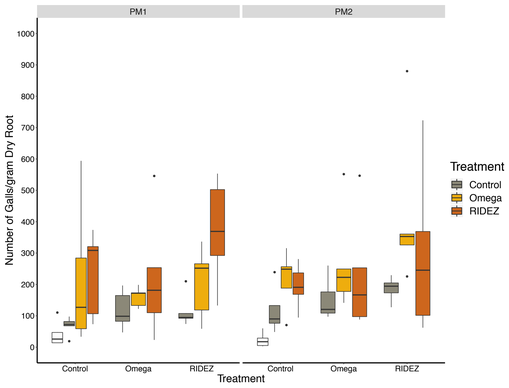
Mean PS incidence in the **Satina** (left) and **Diplomat** (right) greenhouse trials. I1, I2 and I3 represent 1 sporosorus/g, 5 sporosori/g and 10 sporosori/g of potting mix, respectively.

Yuan Zeng, PhD
yuan.zeng@colostate.edu

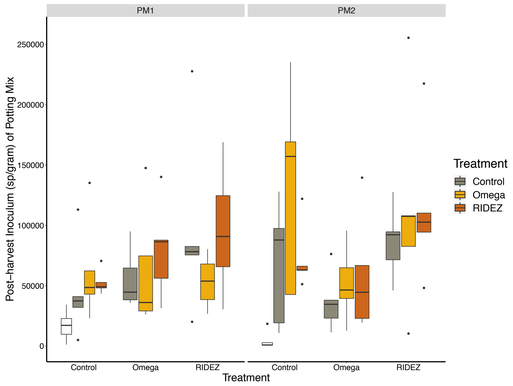
- **Soil inoculum change (sporosori/g) at Farm B**



- **Number of galls/g dry root in the Satina greenhouse trial**



- **Post-harvest inoculum (sporosori/g) in the Satina greenhouse trial**



- **PMTV incidence (%) identified in the greenhouse trials**

Cultivar	Potting mix	Inoculum	Chemical treatment	PMTV incidence (%)
Satina	PM1	Control	Control	80
		Inoculated	Omega	100
			RIDEZ	86.7
			Control	100
	PM2	Control	Control	100
		Inoculated	Omega	93.3
			RIDEZ	86.7
			Control	93.3
Diplomat	PM1	Control	Control	60
		Inoculated	Omega	73.3
			RIDEZ	86.7
			Control	100
	PM2	Control	Control	60
		Inoculated	Omega	93.3
			RIDEZ	100
			Control	86.7