

**AGRICULTURAL RESEARCH FOUNDATION
INTERIM REPORT
FUNDING CYCLE 2017 – 2019**

TITLE: Evaluating New Fungicides for Stem Rust Management in Perennial Ryegrass Seed Crops

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COOPERATORS: Oregon Grass Seed Industry

EXECUTIVE SUMMARY: Stem rust caused by *Puccinia graminis* subsp. *graminicola* is the most serious and widespread disease in perennial ryegrass grown for seed in western Oregon. Perennial ryegrass seed yield losses up to 98% have been attributed to stem rust damage. Stem rust is also known to decrease thousand seed weight and biomass dry weight (seeds and straw) when moderate to severe infections occur.

Triazole and strobilurin containing fungicides are currently relied upon by grass seed producers to manage stem rust in commercial perennial ryegrass seed production fields. Applications are often repeated two or three times in May and June when the disease is active. There has been growing interest in evaluating newly available succinate dehydrogenase inhibitor (SDHI) fungicides for improved stem rust control and resistance management benefits in grass seed crops.

Preliminary studies conducted in the Willamette Valley indicate that Trivapro (Syngenta) has the potential to improve overall stem rust control and extend the time between fungicide applications. As a result, there is potential for grass seed growers to reduce their total number of fungicide applications to as few as one per season. These new fungicide materials also have the potential to address IPM strategies in regard to resistance management since both Trivapro and Priaxor (BASF) contain an SDHI (Group 7) active ingredient and Prosaro (Bayer CropScience) contains two DMI (Group 3) active ingredients. The Oregon grass seed industry has been quite dependent on QoI (Group 11) fungicides in perennial ryegrass seed crops for some time.

Effects of Trivapro, Priaxor and Prosaro on seed yield, seed weight, biomass and plant health effect measurements, such as improved nitrogen uptake, have not been evaluated on grass seed crops in Oregon. Generally the new fungicides are more expensive than the current industry standards. Therefore, it is important that these treatment effects are known so that crop benefits can be quantified and cost-effectiveness can be evaluated. All company registrants have expressed support in collecting this information to support future registration of each of the fungicides included in this study.

OBJECTIVES:

1. Measure effects of new fungicides on percent stem rust infections, seed yield, thousand seed weight, and percent cleanout.
2. Determine if new fungicides have plant health benefits to improve biomass production and nitrogen uptake.
3. Develop new recommendations for fungicide products, rates and timings in perennial ryegrass seed production based on research results and disseminate this information to seed growers and industry practitioners.

PROCEDURES: Field trials were initiated with the rust susceptible turf-type perennial ryegrass variety 'Accent' at OSU's Hyslop Farm. Routine fertilizer and herbicide sprays have been applied to manage pests as needed. Three new experimental fungicides will be compared to an untreated check and the current industry standard (Quilt Excel) at one and two applications per season. The experimental design for the trial is a randomized complete block with four replications.

Timings:

- A. First incidence of stem rust (less than 5% infection)
- B. Approximately 30 days after first application

Fungicide treatments will include the following treatments, application rates and timings:

1. Untreated control (no fungicide)
2. Quilt Excel 14 oz A
3. Trivapro 18 oz/acre A
4. Priaxor 6 oz/acre A
5. Prosaro 8 oz/acre A
6. Quilt Excel 14 oz/acre A+B
7. Trivapro 18 oz/acre A+B
8. Priaxor 6 oz/acre A+B
9. Prosaro 8 oz/acre A+B

Visual stem rust ratings will be recorded weekly from first fungicide application to swathing. Above-ground biomass samples will be taken from each perennial ryegrass plot at physiological maturity and dry weight of the standing crop will be determined. Total tissue N content will be measured from the above-ground biomass samples.

Seed will be harvested by a small-plot swather and combine, and seed will be cleaned to determine clean seed yield. Seed weight will be determined by counting two, 1000-seed samples with an electronic seed counter and weighing these samples on a laboratory balance. Harvest index, the ratio of seed yield to above-ground biomass, will also be calculated.

SIGNIFICANT ACCOMPLISHMENTS TO DATE: The first year crop was successfully established with carbon banding in October, 2017 (Figure 1). Fertilizer and pesticides have been applied to promote growth and protect the crop from slugs, voles and weeds. Fungicide treatments will be applied in early summer of 2018.



Figure 1. Carbon planting of 'Accent' perennial ryegrass fungicide trial at OSU's Hyslop Research Farm (October, 2017).

ADDITIONAL FUNDING RECEIVED DURING PROJECT TERM: None.

FUTURE FUNDING POSSIBILITIES: Additional monetary funds are not expected but fungicide product will be provided by the manufacturers.