

**Introduction**

**Fusarium crown rot**
- Disease of the crown and stem of winter and spring wheat that can be caused by a combination of *Fusarium culmorum* and *Fusarium pseudograminearum*.
- Associated with wheat production in semi-arid areas worldwide, specifically drought areas which exacerbate disease symptoms.
- Management relies on cultural practices providing incomplete control.
- Prevalent in the Pacific Northwest region of Washington, Idaho, and Oregon, and suppresses wheat yield by up to 9.5% annually.

**Objective**
- Identify extreme performers that are significantly different than susceptible checks.
- Evaluate the screening method for repeatability and power.

**Hypotheses**
- A broad range of differential responses will be observed.
- Experiment repeatability and power will be low due to the high variability of fusarium trials.

**Discussion of Results**
- Data exhibited a narrow range of differential responses trending towards resistance.
- Treatment effect for 3 of the 5 trials was not significant. Block effect was significant for all 5 trials, suggesting that disease is highly influenced by environment.
- Significant differences occurred between the very best and worst performers.
- Treatments UC1742, WB-1035CL+, LWW10-1026, LNR10-0551, and SY_OVATION performed significantly better than the susceptible checks of respective nurseries.
- Repeatability for Soft Winter Variety Trial and Hard Spring Variety Trial were both over 30%, but less than 10% for all other trials suggesting high variability exist within the experiment.

**Conclusions**

Recommendations for future experiments:
- Increase experimental repeatability
  - Water stress plants during greenhouse screening to exacerbate disease pressure and achieve a broader response range.
  - Perform greenhouse screening in a more controlled environment, such as growth chamber.
- Increase experimental power with a high sample size.
- Cross resistant sources to result in better responding germplasm.

**Materials and Methods**

**A. Germplasm**
A total of five trials were evaluated from the winter and spring wheat genotypes of the 2013 WSU Extension Cereal Variety Trials and Western Regional Comparative Trials.

**B. Greenhouse Screening**
Germlasm planted
Germlasm inoculated*
Germlasm rated
40 days post inoculation

*One gram of a blend of five *F. culmorum* isolates on colonized seed.

**C. Rating**
Rating 0
Rating 4
Rating 6
Rating 10

**D. Statistical Analyses**
- All statistical analyses were performed using SAS Software*
- Distribution of data was obtained using Proc Univariate
- Proc Mixed used to determine experimental significance
- Power analysis performed using Proc GLMPower with single degree of freedom contrasts
- Experimental variability and repeatability calculated

**Results**

**Hard Spring Western Regional**

**Soft Spring Variety Trial**

**Winter Western Regional**

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**References**
- The data analysis for this paper was generated using SAS software. Copyright © 2016SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA. Other names are trademarks of their respective companies.
- Identification of resistance trial trait (RTT) for resistance to fusarium crown rot (*Fusarium pseudograminearum*) in multiple growing environments in the Pacific Northwest US. These Agr 5 Genet 19(5): 50-