

South Dakota Wheat Commission Final Report

Project data

Project title: Determining the importance of insecticide seed treatments for managing aphids and Barley yellow dwarf virus in winter wheat

Sponsoring commodity organization: South Dakota Wheat Commission

Reporting period: July 1, 2017 through September 30, 2018

Total project period: July 1, 2016-September 30, 2018

Report type: Final report

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Research Summary:

The first objective of this study was to evaluate the impact of planting dates, insecticide seed treatments and foliar insecticides on fall aphid populations in winter wheat. We ultimately sought to determine if these treatments provide yield improvement or if they are an unnecessary input cost. The second objective of this study was to rear a field collected aphid colony and test the impact of insecticide seed treatments on Barley yellow dwarf virus transmission and determine if the transmission was hindered by insecticides.

The results of our study were inconclusive due to an absence of fall aphid populations from fall 2016-fall 2017. Of the 20,000 plants that were scouted per year, we observed less than 20 total aphids across all of the research plots. Due to the low field aphid populations and absence of Barley yellow dwarf virus infected plants, we were unable to set up and conduct the greenhouse portion of the experiment. Our findings suggest that the routine use of insecticide seed treatments in wheat for aphid management is not likely profitable due to the sporadic nature of the aphid pests. During our project, there were no yield differences between the untreated plots and the plots treated with insecticide seed treatments. In addition, the effective use of insecticide seed treatments would require a reliable fall aphid population forecast, which currently does not exist.

Introduction:

In South Dakota, there are three species of aphids that are known to colonize winter wheat and have negative direct effects on yield through feeding. In addition, these aphids are also vectors of the plant disease *Barley yellow dwarf virus*. During aphid outbreaks, large populations of the aphids may be observed within a field and during the following spring Barley yellow dwarf virus outbreaks may also be observed. The relationship between these two yield reducing components suggests that reductions in the aphid populations should also result in a decrease in the occurrence of *Barley yellow dwarf virus* within a field. One approach that may reduce aphid populations in winter wheat is the use of insecticide seed treatments. These products are active for

approximately 30-40 days, which during most falls would provide adequate protection of the developing plant. Alternatively, foliar insecticide applications can also be used to immediately reduce aphid populations. However, foliar insecticides often reduce aphid populations after *Barley dwarf virus* has already been transmitted by the aphids to the developing plants. We were interested in determining if insecticide seed treatments reduced aphid populations and the spread of *Barley yellow dwarf virus* within winter wheat fields.

Description of Accomplishments:

During the falls of 2016 and 2017, we observed very few aphids in our winter wheat study. Plots were planted the last week of September and the middle of October. Foliar insecticides were not applied due to aphid populations not reaching thresholds. Plots were scouted from emergence until the first hard frost each year. Plots were then scouted during the spring for the occurrence of Barley yellow dwarf virus. We did not observe Barley yellow dwarf virus in our winter wheat plots. We believe this was due to the low populations of aphids. Yield was collected in late July each year. We observed no yield differences among treatments.

We planned to obtain *Barley yellow dwarf* infected plants from the field and also aphids to start a colony. However, due to the absence of the disease and the low aphid populations we were unable to obtain enough aphids to start a colony in the greenhouse. We will continue monitoring winter wheat and spring wheat to try to obtain aphids and rear a colony to accomplish this objective in the future.

Publications/Data:

Rozeboom, P., B. Hauswedell, C. Dierks, and **A. Varenhorst**. 2018. Evaluating the efficacy of seed treatments and planting dates against aphid pests in South Dakota winter wheat. 73rd Annual Meeting of the North Central Branch of the Entomological Society of America. 20 March 2018. Madison, WI.

Varenhorst, A., R. Beck, C. Strunk, P. Wagner, and A. Bachmann. 2017. An identification guide to major wheat insects and mite pests of South Dakota. iGrow, South Dakota State University Extension. Publication: 03-2011-2017.

Rozeboom, P. and **A. Varenhorst**. 2017. Evaluating the efficacy of seed treatments in South Dakota winter wheat. 65th Annual Meeting of the Entomological Society of America. 7 November 2017. Denver, CO.

Varenhorst, A., P. Wagner, and A. Bachmann. 2016. Scouting winter wheat for aphid pests. iGrow, South Dakota State University Extension. 9/15/2016.

Byamukama, E., **A. Varenhorst**, S. Ali, and M. Langham. 2016. Winter wheat planting: Plan ahead to effectively manage wheat diseases. iGrow, South Dakota State University Extension. 8/25/2016.

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