

Preventing yield losses in wheat from a stripe rust epidemic

The Situation

In the fall of 2010, we noted stripe rust infected wheat on the Aberdeen R & E station in the Cereals Extension variety trials.

Approximately 27% of the hard winter wheat and 41% of the soft winter wheat plots were infected. This was the first fall infection of stripe rust that Juliet Marshall, the Cereal Crops Management Specialist, had documented during her tenure at the University of Idaho. In most years in the Bingham and Power County areas, cold temperatures would kill exposed wheat tissue and terminate stripe rust disease progression. Due to an insulating blanket of snow, the stripe rust infections overwintered on live green wheat plants. In March 2011, the presence of viable lesions and spores directly after snow melt was confirmed in those same plots. The presence of viable inoculum was followed by extremely conducive weather conditions in the spring that permitted rapid expansion of the disease throughout the affected areas. Weather records showed the coldest April, May, and first two weeks of June on record. Yield losses of up to 80% have been documented in susceptible varieties, and many of the varieties grown in the area are susceptible. Fungicide applications and planting resistant varieties are the standard recommendations for reducing losses, but with no substantial impacts from this disease since 2005, stripe rust resistance is not among standard variety selection criteria of many area grain producers.

Both irrigated and dryland producers needed to be aware of the potential threat. The rapid spread of the disease in widely planted susceptible varieties followed by extraordinarily conducive weather conditions that favored the fungus made this a time-critical situation.



Stripe Rust spores on wheat.

Our Response

Due to the existence of a greenbridge in wheat and the potential for diseases and insects to survive the winter, we began discussing the possible carryover of stripe rust, Russian wheat aphid, wheat streak mosaic virus, and other diseases during the winter meeting season. Starting in November of 2010, growers were warned of the potential carryover, the need for scouting, and the possibility for the need to apply fungicides. After viable stripe rust was discovered on March 31, 2011 in the field at Aberdeen, the crop management specialist immediately began notifying county educators, technical representatives from fungicide companies, crop consultants, other researchers, and growers with regular "Stripe Rust Alerts" sent via email. In order to test the resistance and degree of susceptibility of the varieties regularly grown in the area, the specialist applied fungicide to two replications of the winter variety trials while leaving two reps untreated. One application of Quilt fungicide

was applied at herbicide application, and a second of Quilt Excel at heading, both at the full labeled rate. The same protocol was followed with the spring wheat variety trials. Within eleven days of the first detection in the spring, the soft winter wheat trials went from 3 plots with detectable stripe rust, to 77% of the plots having visible infection. The hard winter wheat plots went from none detected on April 1 to 64% of the plots showing signs on April 12, 2011.

Many field visits and crop tours were made by the county educator and the extension specialist throughout the affected areas. Pictures of the disease were taken by both and posted on the Cereals Agronomy website. Disease alerts were also posted in local news papers. Variety reactions and verified reports of spread into new areas were updated regularly on the cereals extension website. Fact sheets were handed out at field days detailing scouting, control options, potential losses and variety reactions. At harvest, yield results and documented losses under severe stripe rust infection were posted in a Stripe Rust Alert and posted on the website. Additionally, due to the summer conditions being similar to the previous year, a Strip Rust Alert for Fall 2011 was posted for management recommendations to reduce the potential for another fall infection.

Hundreds of thousands of acres of winter and spring wheat were infected and sprayed with fungicides throughout all wheat production areas in Idaho. Especially impacted was the very susceptible soft white winter wheat "Brundage" and the hard red winter wheat "Moreland," showing up to 80% yield loss in untreated plots. Growers in the De3clo area were reporting >50% yield loss, harvesting 60bu/A of untreated Brundage as opposed to up to 118 bu/A in fields sprayed three times. Typical yields of Brundage for that area in past years have been 140-160 bu/A. Yields of resistant varieties were also reduced by about 9-10 bu/A, due to the extremely heavy spore load and constant bombardment throughout the season with billions of stripe rust spores.

Program Outcomes

- Early warning of disease potential at winter grower meetings (such as the Cereal Schools), lead to the early purchase of fungicides by some growers in preparation for disease carryover.
- Fungicide costs increased 10-20% from the previous year, saving early purchasers costs associated with last minute purchases of fungicides.
- Training of growers, field-men and company representatives resulted in increased scouting and early identification of the disease as it spread West, East, and North.

- Spray programs limited losses, especially in spring wheat growing regions where fungicides were routinely incorporated with the herbicides to reduce early infections.
- Yield losses were reduced from a potential 80% loss to an average of 10-20% loss.

FOR MORE INFORMATION

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