Canadian Agronomist

DIGGING INTO RESEARCH

Controlling stripe rust in winter wheat

CATEGORY disease | *March 18, 2025*

In susceptible varieties, a single foliar fungicide application at flag leaf reduced stripe rust severity and protected yield potential. A single fall foliar application was not effective. A moderately resistant variety did not require a spring foliar application.

Stripe rust of winter wheat, caused by *Puccinia striiformis* f. sp. *tritici* Eriks. (*Pst*) occurs across western Canada in many years. While many of today's western Canadian winter wheat varieties have improved resistance to stripe rust – some moderately resistant (MR) – a foliar fungicide application is another strategy to help control stripe rust.

A research project was conducted at 4 locations in Saskatchewan and Alberta to evaluate the effects of fall and spring foliar fungicide application on stripe rust, leaf spot severity, and impact on yield and quality of winter wheat. Sites were at the University of Saskatchewan East Sutherland farm near Saskatoon and the Agriculture and Agri-Food Canada sites at Indian Head, SK, and AAFC Lacombe and Farming Smarter at Lethbridge, AB. The Lethbridge site was irrigated.

There were 11 site years, with the longest running research at the U of S from the 2013/14 winter wheat season through 2016/17 season. Indian Head had a trial in 2015/16, and Lacombe and Lethbridge ran from 2014/15 through 2016/17 growing seasons.

Four winter wheat cultivars, ‘AC Bellatrix’, ‘Moats’, ‘CDC Osprey’ and ‘Radiant’ were selected to provide a range of resistance ratings against stripe rust and leaf spot diseases. AC Bellatrix and CDC Osprey were rated as susceptible to stripe rust, Moats as MR, and Radiant as either resistant, intermediate or susceptible depending on geographic location.

The foliar fungicide Twinline (metconazole + pyraclostrobin, Group 3 + 11) was used for stripe rust and leaf spot control at the recommended rate of 202 mL/ac (500 mL/ha) in 9 gallons/ac (100 L/ha) of water.

Four fungicide treatments were made to each cultivar including an unsprayed control, a single application in the fall at the seedling stage (growth stage (GS) 15–19), a single application in the spring at the flag leaf stage (GS 39–47), and a dual application in both the fall and spring.

In the fall and spring of each growing season at Saskatoon, field plots were inoculated with urediniospores of three *Pst* isolates. The other sites relied on naturally occurring pathogen infections.

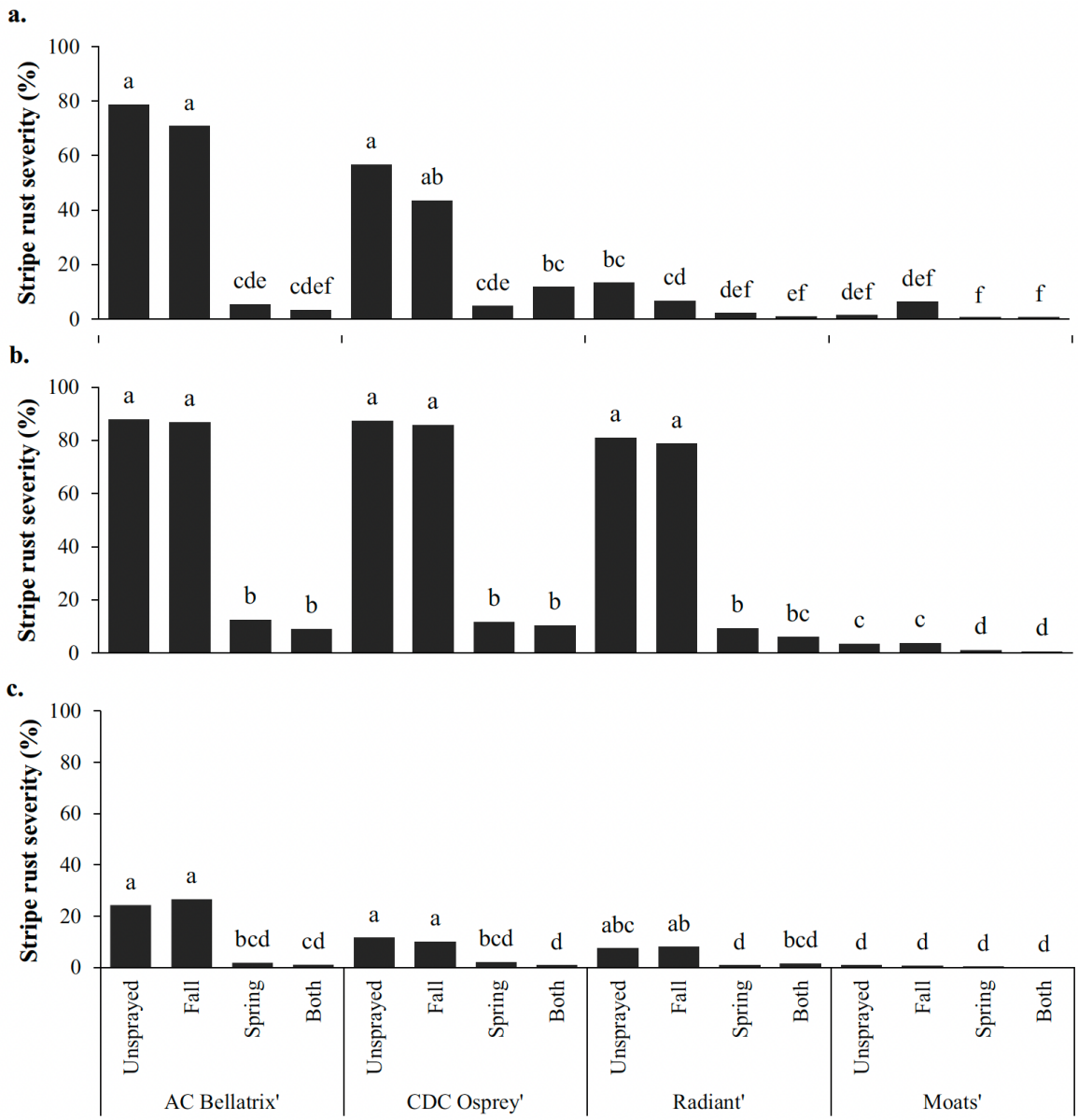
Stripe rust severity varied among site years. At Saskatoon, trace levels of stripe rust were observed in the fall after inoculation in 2014, 2015 and 2016. At Lacombe, low severity levels of less than 10% were observed in the fall in 2015 but not in 2014 or 2016. Stripe rust severity at Indian Head was very low. Lethbridge had consistently high stripe rust severity all 3 years.

In the spring, overwintering *Pst* was not detected on winter wheat in this study.

Resistant varieties and foliar fungicides controlled stripe rust

As would be expected, stripe rust severity measured in the spring at the soft dough stage (GS85) followed variety resistance ratings, with AC Bellatrix and CDC Osprey having the highest stripe rust severity followed by Radiant with intermediate ratings at some site-years, and Moats having very low severity ratings.

Stripe rust severity of grouped site-years affected by the interaction between cultivar and fungicide application timing.



Data groups:
(a) high stripe rust severity (Saskatoon in 2013/2014 and Lacombe in 2014/2015 and 2015/2016),
(b) high stripe rust severity (Lethbridge in 2014/2015, 2015/2016 and 2016/2017),
(c) intermediate stripe rust severity (Lacombe in 2016/2017 and Saskatoon in 2015/2016).
Source: Nabetani et al. 2025

Fall application of a foliar fungicide on the susceptible varieties did not reduce stripe rust severity when measured at the soft dough stage. For the susceptible varieties, stripe rust severity was reduced by a single spring, or a dual fall and spring application when disease severity was high.

For the MR variety Moats, stripe rust severity was very low in the untreated plots. A foliar fungicide application did not significantly reduce severity any further. Further, the untreated Moats check has stripe rust severity statistically similar when compared to spring or dual foliar applications for the susceptible varieties. This highlights the value of using resistant varieties to manage stripe rust infestations without the need for foliar fungicides.

For more susceptible varieties, foliar fungicides provide a yield benefit when stripe rust infections were intermediate to high. For example, a single spring or dual fungicide application maintained yield potential for the susceptible variety AC Bellatrix by 16.9 to 229.5% compared to the unsprayed treatment.

Overall, a single spring application was beneficial on susceptible varieties in reducing stripe rust severity and protecting yield potential. The dual fall plus spring foliar treatment did not bring additional benefits in reducing stripe rust severity or protecting yield compared to a single spring application at the flag leaf stage. A foliar application was not necessary on the MR variety.

The results will help encourage growers to use resistant varieties as the foundation of stripe resistant control in winter wheat. But also provide growers with guidelines for foliar fungicide application if growing less resistant varieties or if shifts in the strains of *Pst* occur.

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Keiko Nabetani, Juan Lobo, Ken Coles, Brian Beres, Reem Aboukhaddour, Thomas K. Turkington, William May & Hadley R. Kutcher (2025) Stripe rust of winter wheat in western Canada mitigated with spring- but not fall-applied foliar fungicide, Canadian Journal of Plant Pathology, DOI: 10.1080/07060661.2024.2433529

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