

## First Forecast of Stripe Rust for the Pacific Northwest in 2013

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Based on the 2012 December temperatures, stripe rust yield loss on highly susceptible winter wheat cultivars is predicted to be 41%, which is lower than 47% predicted for 2012 based on the 2011 December temperatures, but similar to  $35\pm 5\%$  predicted based on the weather conditions during the entire 2011-2012 winter season. The predicted 41% yield loss is calculated using the formula  $Y$  (yield loss) =  $84.3 - 0.323X$ , where  $X$  is the absolute value of the accumulated value of negative degree days based on daily maximum temperatures. The negative degree day value for a day equals the maximum temperature ( $^{\circ}\text{C}$ ) subtracted by  $7$  ( $^{\circ}\text{C}$ ). This model is the first of a series of models we use to predict stripe rust damage on susceptible cultivars for the major wheat growing region in the Pacific Northwest. For more information about this formula and other formulas, you may refer to our publication (Sharma-Poudyal, D., and Chen, X. M. 2011. Models for predicting potential yield loss of wheat caused by stripe rust in the US Pacific Northwest. *Phytopathology* 101:544-554).

If we classify stripe rust yield losses into four categories, low (equal to or less than 20%), moderate (more than 20% but equal to or less than 40%), severe (more than 40% but equal to or less than 60%), and extremely severe (more than 60%), the predicted level of 41% for 2013 indicates a severe level, higher than normal (35%). For comparison, the extremely stripe rust epidemics caused more than 60 and 90% yield losses in 2010 and 2011, respectively, and the 2012 severe epidemic caused 57% yield losses on highly susceptible winter cultivars.

We surveyed wheat fields in Horse Heaven Hills and along Highway 26 in Washington on November 21, 2012, and did not find any rust, indicating that stripe rust infection before the winter should be relatively low. The low stripe rust infection in the fall was due to the drought conditions in September. However, the winter wheat crops had good emergence throughout the surveyed areas.

Please keep in mind that this prediction is based on the winter weather so far. If the weather conditions from now to June are close to normal, the prediction will be very close to the real disease situation. The other models using the weather data from the entire period of November to February usually give better predictions. Our next forecast will be in early March.