WASHINGTON STATE UNIVERSITY

WSU PLANT PATHOLOGY SEMINAR
September 29, 2025, 4:10 PM

Development and application of infection period models for wheat stripe rust

Dr. Erick De Wolf
Professor
Kansas State University

Attend in Person
9/29/25 @ 4:10 pm (Pacific)
Clark 149, Pullman, WA

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ABOUT THE PRESENTER

Erick De Wolf is a native of Kalamazoo, Michigan, USA. Erick completed his undergraduate work in Biology at Hope College in 1994. He received a Ph.D. in Plant Pathology from North Dakota State University in 2000 and was a post-doctoral researcher at The Ohio State University. Erick began his faculty career at Pennsylvania State University where he was an extension plant pathologist covering all field and forage crops. He joined Kansas State University in 2007 and served as the Extension Specialist for small grains and forages until 2019 when he transitioned to a new role that focuses more on the research and teaching missions of the university. Erick's research interests include pathogen biology and disease management. He is particularly interested in the relationship of weather with disease epidemics and the development of disease forecasting systems.

ABSTRACT

The biological processes of plant pathogens are closely linked to their environment. The influence of environment is commonly studied in controlled environments with experiments designed to isolate the potential influence of one or two factors. While research in controlled environments provides essential information about many pathosystems, the path toward application of these results is often obscured by the uncertainty of measuring key weather variables in field environments that are in a continuous state of flux. The objectives of this research were to identify weather conditions influencing the infection of wheat by *Puccinia striiformis* f.sp. *tritici* in wheat field environments, to develop models estimating the probability of infection based on environment, and to use these models to estimate the risk of severe disease in research plots and commercial wheat fields. The influence of environment on infection was studied using a bioassay approach that involved exposing inoculated, susceptible wheat seedlings within a wheat field environment. The bioassay was conducted 116 times over three wheat growing seasons and logistic regression used to model the probability of infection based on weather during the time that plants were exposed in the field environment. These models correctly classified days as favorable or unfavorable for infection with more than 80% accuracy. The infection models were coupled with simulations of wheat growth and used to estimate the probability of severe stripe rust based on the accumulation of predicted infection events throughout the wheat growing season. This analysis identified that accumulation of infection events occurring between flag leaf emergence and flowering were particularly influential to the development of severe disease. These models correctly classified 79% of disease observations from research plots and commercial fields collected over 17 years. The timing of these predictions relative to crop growth and disease development could facilitate the application of these models as part of an operational disease forecasting system in the future.