Science Societies

An interactive winter survival model for cereals

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A strong photoperiod requirement allows a low-temperature-tolerant spring wheat to survive western Canadian winters. Photo courtesy of Brian Fowler.

Where they can be successfully over-wintered, farmers choose autumn-planted cereals as their main crop in temperate climates. Successful over-wintering depends on plant low-temperature (LT) tolerance and the programming of critical growth stages regulated by complex interactions among genotype, environment, and management that are not clearly understood.

In an article recently published in *Crop Science*, researchers utilized more than 50 years of data and experience to construct an interactive web-based winter survival simulation tool (**https://norstar.usask.ca/survivalmodel**) for use by farmers, extension workers, plant breeders, and researchers. This tool allows users to make in-depth analyses of complex LT responses and their interactions. The model is based on a series of equations describing plant development, acclimation, de-hardening, and damage due to LT stress. A high level of versatility allows interested users to systematically investigate genetic, environmental, and management interactions, production risks, cause-and-effect processes, genetic theories, strategies designed to cope with critical periods of over-winter stress, and adjustments needed to mitigate the effects of climate change.

The model is open access as a means for additional testing and validation that will lead to increased prediction accuracy over a wider range of environmental conditions and a better understanding of the dynamic interactions involved in over-winter survival of cereal crops.

Dig deeper

Byrns, B.M., Greer, K.J., & Fowler, D.B. (2020). Modeling winter survival in cereals: An interactive tool. *Crop Science*, 60. **https://doi.org/10.1002/csc2.20246**

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