Hydrothermal Model Predicts Russian Thistle Seedling Emergence

Seed biology findings from a newly published Weed Science Society of America research article could improve integrated weed management

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WESTMINSTER, Colorado – 20 February 2024 – Recently published research in the journal *Weed Science* highlights the first predictive model to use hydrothermal time (HTT) unit data to predict Russian thistle (*Salsola tragus*) seedling emergence in the Pacific Northwest (PNW). The predictive model will be especially helpful in timing efforts to control Russian thistle populations in fallow and spring-wheat no-till systems that are vulnerable to becoming herbicide resistant.

"Russian thistle is among the most troublesome weeds in cropland and ruderal semiarid areas of the Pacific Northwest," says Fernando Oreja, Ph.D., Research Associate, Oregon State University, the article's lead author. "This summer-annual-weed can cause between 20% to 50% yield reduction on spring wheat, but the effects of this species do not end at harvest. After wheat harvest in mid-summer, this weed continues growing and consumes water for the next crop."

During the study, Dr. Oreja and collaborating researchers were able to develop and validate an HTT unit model to successfully predict Russian thistle seedling emergence patterns under PNW field conditions. This new model is important because emergence timing plays a critical role in scheduling effective weed management measures.

"Postemergence herbicides are most effective when applied at an early seedling stage before the plant becomes tolerant," he says. "Our model describes the emergence of *S. tragus* with an accuracy of 81-96% and this can serve as the basis for the development of decision support systems, helping farmers to make the best decisions to control this troublesome weed in the future."

In addition, the model can help farmers and agronomists control Russian thistle seedling populations with fewer herbicide applications than the current, three to four standard application practice used in wheat-fallow rotations. Decreasing herbicide applications will help reduce herbicide resistance pressure and the risk from new herbicide-resistant populations, as well as lower costs and reduce environmental pollution.

More information is available in the article, "A hydrothermal model to predict Russian thistle (*Salsola tragus*) seedling emergence in the dryland of the Pacific Northwest (USA)."

The research is featured in Volume 72, Issue 1 of *Weed Science*, a Weed Science Society of America journal, published online by Cambridge University Press.

About Weed Science

Weed Science is a journal of the Weed Science Society of America, a nonprofit scientific society focused on weeds and their impact on the environment. The publication presents peer-reviewed original research related to all aspects of weed science, including the biology, ecology, physiology, management and control of weeds. To learn more, visit www.wssa.net.

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