Program:

GENE DRIVES TO COMBAT OUR WORST WEEDS

June 10, 2019
PROGRAM

Welcome and Introduction
DR. LEE VAN WYCHEN
NCFAR REPRESENTATIVE

Distinguished Speaker

DR. PATRICK PANEL
DEPARTMENT OF CROP SCIENCES
UNIVERSITY OF ILLINOIS

Open Forum

Closing
DR. LEE VAN WYCHEN

NCFAR is a nonprofit, nonpartisan, consensus-based and customer-led coalition that brings food, agriculture, nutrition, conservation and natural resource stakeholders together with the food and agriculture research and extension community, serving as a forum and a unified voice in support of sustaining and increasing public investment at the national level in food and agricultural research, extension, and education.
ABSTRACT

Weeds are an ongoing threat to modern crop production. This threat has escalated in recent years due to continued evolution of herbicide resistance in weeds and the lack of newly commercialized herbicide options for farmers. Non-chemical weed control strategies, including cultural and mechanical techniques, contribute to weed control, but have limitations and disadvantages as well. New tools to combat weeds are urgently needed. Genetic control strategies, modeled after the very successful sterile insect technique used in, e.g., screwworm control, are now being considered for weed control. The advent of gene editing tools, such as CRISPR-Cas9, makes such genetic strategies more feasible. Two of the worst weeds in the U.S. are Palmer amaranth and waterhemp, and they might also be among the most amenable weeds to a genetic control strategy. Unlike most weeds, these two species are dioecious, meaning plants are either male or female. Consequently, a gene drive could be used to shift a population towards all males, resulting in fewer seeds being produced each year. Gene drives might also be used in other weed management approaches, e.g., to reduce seed dormancy or reverse herbicide resistance in weeds. For genetic control of weeds to become a reality, however, significant basic research is needed to increase our understanding of weeds at the molecular and genomic levels. There is also a need to increase efforts in training future scientists in the cross-disciplinary interface of weed science and genomics.

SPEAKER BIOGRAPHY

Patrick Tranel, Ph.D., has been a weed scientist at the University of Illinois in Urbana-Champaign since 1997. In addition to teaching weed science classes, he conducts research to understand how weeds evolve in response to humans’ attempts to manage them, with a long-term goal of developing more sustainable weed management systems. He has been at the forefront of using molecular and genomic tools to study weeds, and his research findings have informed how weeds evolve resistance to herbicides and strategies that can be used to mitigate that process. Dr. Tranel has received numerous awards for his research and teaching. He currently holds the Ainsworth Professorship, and is the Associate Head, in the Department of Crop Sciences at the University of Illinois. He is a Fellow of the North Central Weed Science Society and serves on the editorial boards of four journals.
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