Survey of Herbicide-Resistant Waterhemp in Iowa Corn and Soybean Fields

Prashant Jha  
*Iowa State University*, pjha@iastate.edu

Robert G. Hartzler  
*Iowa State University*, hartzler@iastate.edu

Meaghan J. B. Anderson  
*Iowa State University*, mjanders@iastate.edu

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Abstract
The escalating spread of herbicide-resistant weed populations has become a production challenge in the corn-soybean based cropping system of the Midwest. With the evolution of weed resistance to major herbicide groups used in corn and soybean, we have a limited number of herbicide options left, which is even more disconcerting as no new herbicide site of action has been discovered in the past three decades. A new site of action coming to the marketplace in the next 5-8 years would also be a rare event.

Disciplines
Agricultural Science | Agriculture
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Early detection and rapid response is key to prevent further spread of resistance. The Weed Science program in the Department of Agronomy at the Iowa State University has research facilities to screen herbicide resistance and detect the level of resistance evolved in weed populations. We will also develop DNA-based molecular markers for rapid testing of live plant samples to disseminate results and develop recommendations within the growing season.

As harvest approaches, we will conduct a statewide survey to collect waterhemp seeds produced by plants in corn/soybean fields as well in field edges. We will revisit more than 200 field sites (GPS tracked) that were included in the 2012-2013 survey. These populations will be screened for possible multiple resistance (levels of resistance) to Groups 2, 5, 9, 14, 27, and others. Waterhemp resistance to Group 15 herbicides (acetochlor, S-metolachlor, dimethenamid, and pyroxasulfone) has recently been reported in IL. We will screen Iowa waterhemp populations for variable response to Group 15 herbicides since these are widely used both in corn and soybean as a component of overlapping residual programs. Furthermore, resistance to 2,4-D was recently reported in a 5-way resistant population from IL (2016) and a 6-way resistant population from MO (2018). With the increase in use of dicamba and 2,4-D to manage glyphosate-resistant
waterhemp in Xtend and Enlist soybean respectively, the response of Iowa waterhemp populations to 2,4-D and dicamba needs to be evaluated.

Results from this survey will help in developing proactive/reactive herbicide resistance management strategies in Iowa corn and soybean production. Based on specific cases, we will develop research-based information on short- and long-term best management practices using a multi-tactic approach (cover crops, overlapping soil residuals (multiple effective sites of action herbicides), harvest weed seed control technologies, site-specific resistance management) at a cropping systems level.

Our program is also encouraging growers, extension field agronomists, industry, and commodity groups to be a part of this survey work and send seed samples of suspected-resistant weed populations. To have the samples tested, collect a large portion of seed-bearing heads, put those in paper bags, label with details of the field site (GPS coordinates, address, and crop/herbicide use history), and ship to our lab at ISU, Address: Weeds Lab, 3212 Agronomy Hall, 716 Farm House Lane, Ames, IA 50011. Since waterhemp is a dioecious species, male and female plant are separate; hence, make sure to collect only seed-bearing female plants. If you have any questions regarding seed collection or any suspected new cases of resistance, please feel free to reach out to us (Phone: 515-294-7028; Email: pjha@iastate.edu).

Category: Weeds  Herbicide Resistance

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Crops:
Corn  Soybean

Tags: herbicide resistance  Survey  Common waterhemp  Integrated resistance management

Authors:
Prashant Jha Associate Professor

Prashant Jha is an Associate Professor and Extension Weed Specialist with the Department of Agronomy at ISU. His research program is focused on improved understanding of weed biology and ecology to develop effective, integrated weed management strategies in corn and soybean production systems of...

Bob Hartzler Professor of Agronomy

Dr. Bob Hartzler is a professor of agronomy and an extension weed specialist. He conducts research on weed biology and how it impacts the efficacy of weed management programs in corn and soybean. Dr. Hartzler also teaches undergraduate classes in weed science and weed identification...

Meaghan Anderson Field Agronomist in Central Iowa

Meaghan Anderson is a field agronomist in central Iowa and an extension field specialist at Iowa State University Extension and Outreach. Educational programming is available for farmers, agribusinesses, pesticide applicators, certified crop advisors, and other individuals interested in...