

# Weed Management

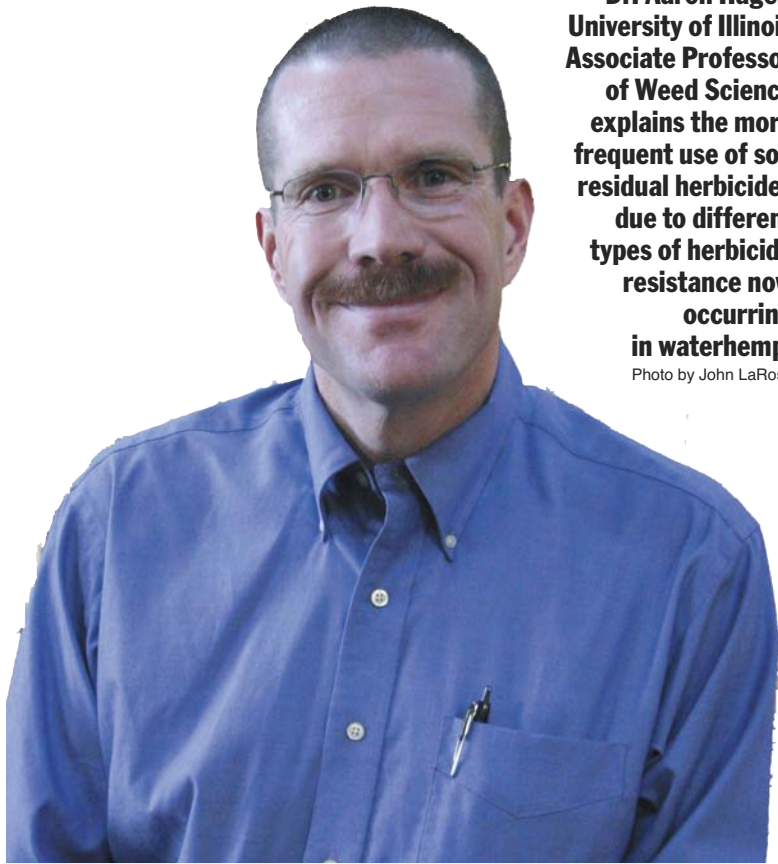
New Resistance Discovery Calls For Integrated Weed Control Approach

**BETTY VALLE GEGG-NAEGER**  
MidAmerica Farmer Grower

**MOUNT VERNON, ILL.**

Soil residual herbicides in a soybean system claimed the attention recently of Dr. Aaron Hager, University of Illinois Associate Professor of weed science. Many farmers in Illinois will be utilizing these products more frequently in upcoming seasons due to the different types of herbicide resistance now occurring in waterhemp.

"The presentation during the University of Illinois Corn & Soybean Classics is broken down into three topical areas," he began. "The first was to share with the audience our updated survey work that we have been doing for the last couple of years to try to understand what types of resistance we have in Illinois and where these populations actually are located. We're doing this now with some non-traditional techniques; they're actually molecular biology techniques. We're sharing how we conduct these assays and the results from those surveys. Secondly, we actually introduced and described a brand new



**Dr. Aaron Hager, University of Illinois Associate Professor of Weed Science explains the more frequent use of soil residual herbicides due to different types of herbicide resistance now occurring in waterhemp.**

Photo by John LaRose

type of herbicide resistance that we found in an Illinois waterhemp population in the fall of 2009."

The discovery involves a population of waterhemp that's been confirmed resistant to the HPPD inhibiting herbicide family, which includes products like Callisto, Laudis and Impact.

"When we announced finding this resistant population in July of 2010, to the best that we are aware of, that was the first report of resistance to this herbicide family anywhere in the world," Hager said. The population was discovered in McLean County, Ill., which is roughly in the center of the state. "Again, it's a new type of resistance, and represents the fifth herbicide family to which Illinois waterhemp populations have evolved resistance.

"This background forms the foundation for the third discussion topic, which is soil residual products," he added. "In many instances on these populations that we deal with, farmers may not always have an effective option to control the waterhemp once it emerges, especially when farmers elect to grow either conventional, non-GMO or glyphosate resistant soybeans. Often there is multiple resistance in either a plant or in a field.

"We have populations now for which there are no effective post herbicide options in either conventional or glyphosate-resistant soybean varieties. So in order to chemically control that population farmers would need to utilize soil residual herbicides."

Some of the survey work Hager has done with audience participation questions the last couple of years suggests that more farmers are considering using soil residual products. There are several factors that impact how well these types of products actually perform.

"In many cases, we're many years removed from using residuals in soybean systems here in Illinois and there are some things that are generally related to soils and environment that really can influence how well these products perform," he said.

Hager mentioned some instances that interfere with their performance.

"If we make an application to soils that are fairly dry and there's no precipitation for two to three weeks after that, we can't expect them to perform as well as they would have if there had been better moisture conditions in the soil," he said.

Hager couldn't say how quickly the new resistance might spread.

"Good question," he said. "We have a population here in Illinois and not very long after we

announced that, Pioneer and DuPont announced they had a similar population in Iowa. So independent selection obviously has occurred now at two separate locations. We have no evidence that this couldn't happen in other locations. We certainly expect it to, which again demonstrates how selection intensity influences how rapidly these resistance traits evolve."

Hager said he believes the Iowa and Illinois incidents are separate independent selections. Though there's much researchers don't know about resistance, they know resistance spreads by different mechanisms, two of which are by seed and pollen.

"If it's a trait that can move in pollen, generally those traits move faster from a given resistant population simply because pollen moves readily in wind," he added. "However, of course, there is always that possibility of having independent selection occur somewhere else."

The resistance recently discovered in Illinois was in one farmer's field used for seed corn production for at least seven years in a row. The farmer had used HPPD inhibitors for post emergence control of waterhemp each year.

"Unfortunately we think we will see more of it," Hager said. "What we're most concerned about with waterhemp is not just resistance to a particular family of herbicides. Obviously that presents some very significant challenges by itself; but what we fear is going to become even more commonplace is stacked or multiple resistance. This could occur either in an individual plant, or multiple types of resistance could occur within a given field where satisfactory levels of control are going to be increasingly difficult to achieve."

Already a lot of populations in the state are resistant to at least three different herbicide families. One population is confirmed resistant to four different herbicide families.

"That's four different types of resistance within one plant, and now that we have this fifth type of resistance one could say it's theoretically possible to find a population that could be resistant to five different families," Hager said.

Unfortunately, there are no new chemistries coming down the pipeline. It's very unlikely that using a similar target site would be sufficient to control the problem. One of the better chemical options from the industry would be a herbicide that targets a novel plant system or enzyme.

"We haven't seen that, and we really don't have much indication from many of the primary manufacturers that there's anything like that coming in the foreseeable future," he added.

Hager was hoping that his presentation would stimulate some productive follow up conversation during the question and answer period.

"It's not that we're trying to scare folks; we just want to make them aware that this has happened and it's going to continue to happen. One of the very common responses that we have heard through the years and still do to some extent is that 'I'm not going to change anything that I'm doing until I have to deal with it on my own farm.'"

That attitude could be disastrous, because Hager reports that the most expensive year for a farmer to deal with herbicide resistance is the first season a resistant weed population is discovered, not two or three years after it's discovered.

"Many times the most expensive year is the first year that they have it and they really don't know what they have," he said. "So they continue to do the same practice that they always have because it's worked in the past; then all of a sudden it doesn't work."

The farmer now has an investment in the herbicide and the application that more or less was ineffective. He has to treat the field again, and most often he will come back with the same product.

"If it's glyphosate, now you have the second application that's probably not going to work again," he explained. "So you're going to look for possibly a third trip with an alternative herbicide which, of course, adds costs and is unlikely to provide 100 percent control. There has been weed interference occurring up to that point and more than likely will continue for the remainder of the season. The worst case scenario that we've been able to document with waterhemp was a 42 percent yield loss from season-long interference. You can do the math on whatever your targeted yield would be, subtract 40 percent, and multiply that by number of bushels lost, by whatever market value is. The numbers add up pretty quick."  $\Delta$

*BETTY VALLE GEGG-NAEGER: Senior Staff Writer, MidAmerica Farmer Grower*

Cache River Valley Seed, LLC  
888-CRV-SEED

Link Directly To: **CASH RIVER**

syngenta

Link Directly To: **SYNGENTA**