

Tour of Iowa Agriculture for EPA Office of Pesticide Programs Staff

On July 7-10, EPA Office of Pesticide Programs (OPP) staff members were taken on a WSSA-sponsored tour of Iowa agriculture for an opportunity to meet first hand with farmers, consultants, agribusiness personnel, and farm managers to view and discuss issues such as herbicide-resistant weed management and BT-resistant corn root worm (CRW) management. A special thanks is owed to Mike Owen of Iowa State and Amy Asmus of Asmus Farm Supply for making the arrangements for the tour. Sixteen persons from EPA participated with representatives from the Herbicide Registration Branch (3 persons), the Fungicide-herbicide Registration Branch (3 persons), the Pesticide Re-Evaluation Division (3 persons), the Biopesticides and Pollution Prevention Division (4 persons), the Biological and Economic Analysis Division (2 persons) and the Environmental Fate and Effects Division (1 person). In addition, Jill Schroeder from the USDA Office of Pest Management Policy and Lee Van Wychen, WSSA Director of Science Policy, joined the tour and both provided comments to help with this report. A list of those participating in the tour is included at the end of the report. The participation of 16 EPA staff in the tour represents a significant commitment from the EPA and demonstrates the value it places in these experiences for its staff. Each of the participants was approved by OPP administration before they could go on the tour.

Prior to the tour, the EPA participants suggested some topics about which they would like to learn more. These topics included:

1. How is Enlist Duo being used by farmers and what is their view on its usefulness as a weed resistance management tool?
2. Have you used any biopesticides for pest (weed, insect, plant disease) control? Some examples would be naturally occurring substances that control pests (biochemical pesticides) or microorganisms that control pests (microbial pesticides).
3. Corn rootworm (CRW) resistance is becoming an issue. What are your thoughts on CRW insect resistance management?
4. Given the competing needs to control pests and manage resistance along with other considerations, how do you decide which field corn product(s) to plant?
5. Colony collapse disorder among bees is an issue with multiple causes. Do you have any thoughts on what farmers could do to help address this issue?
6. Do you have any thoughts on the organic movement?

While persons visited were not asked to address these questions directly, the questions were distributed to many of them ahead of our visits.

The tour was kicked off on the evening of July 7th with presentations by Amy Asmus, Bill Northey, Iowa Secretary of Agriculture, Dr. Wendy Wintersteen, Endowed Dean of Agriculture and Life Sciences at Iowa State University, Mike Barrett, Aaron Putze, Director of Communications & External Relations, Iowa Soybean Association, and Mike Owen. Secretary Northey described the size and diversity of Iowa agriculture which was a theme and a major point of emphasis throughout the tour. In addition, he described the multi-partner nutrient management efforts in the state which is viewed as a local effort

with considerable local buy-in by commercial agriculture. Dean Wintersteen described partnerships between the college, state and others which have led to the creation of task forces to address issues such as pest resistances, led by Dr. Steve Bradbury the former Director of the EPA Office of Pesticide Programs, and monarch butterfly protection. Mr. Putze presented more of the Iowa agricultural statistics but also went on to discuss the culture of Iowa agriculture. It is a family based culture steeped in family history and tradition. Mike Barrett presented a brief history of earlier tours arranged by WSSA and the regional weed science societies had how the goals and activities of those tours differed from what they would see in Iowa. Mike Owen wrapped up the presentations with an introduction to the tour and its goals. A booklet produced by Mike and Amy that went into detail on Iowa agricultural data and background for each of the stops on the tour was presented to the participants and was highlighted by Mike.

Wednesday, July 8



The first stop on the morning of the 8th was Hertz Farm Management. This company began in the Great Depression when banks needed expertise to identify and eventually sell farm land that they had repossessed. Over time, the company moved from real estate management to farm management, helping the owners of the land receive a return on their asset. Owners typically think long term while the operators of the farms often are thinking more short

term. The role that Hertz Farm Management takes in management depends on the form of the lease agreement and can range from little involvement in management decisions to setting up an operating plan for the farms they manage. From a weed management stand point, specifications in these plans have moved from soil-applied to postemergence herbicides and, in the case of cash leases, to include that the operator must use more than one effective herbicide mechanism of action on the weed population. However, additional resistance BMPs are not specified in leases at this time. It was difficult to convince operators to use multiple effective MOAs as this increased their cost. Hertz Farm Management makes these stipulations without consulting the landowner. One interesting comment by the Hertz Farm Management Staff was that farmers receive mixed messages, including many non-scientific “facts”, which can complicate their decision-making.

Given that the average age of farmers in Iowa is 57 and between two-thirds and three-quarters of the farm land is owned by persons older than 65, Hertz Farm Management expects there will be more call for farm management services like theirs in the future as more farmers retire and their families have no desire to directly manage their farms. The impact of Hertz Farm Management on farms goes beyond the land for which they are actually responsible as other farmers often follow their recommendations.

The second stop was the Key Cooperative in Roland, Iowa. This is a member-owned cooperative with 3200 members with 220 employees and serving six Iowa counties with divisions in agronomy, energy, feed, grain, lumber and construction services, NAPA auto care, precision ag, and transportation services. Jim Magnuson, General Manager, and other Key Coop employees hosted the group on a tour of the company's seed distribution and pesticide treatment facilities, the pesticide storage area including bulk tank storage, pesticide mixing equipment, and pesticide application equipment.



The scale of the operation plus the professionalism and environmental stewardship that permeated the activities greatly impressed the tour participants. EPA staff learned that the coop was ordering their bulk pesticides for the 2016 season already and that it is a very capital and inventory intensive business. One point of interest was that sprayers were actually filled in the field not at the base plant. They carry multiple products on the sprayer and the actual treatment is determined on a field-by-field basis with the herbicide injected into the spray stream rather than added to the spray tank. This allows for maximum flexibility for the sprayer, eliminates over-mixing, and greatly simplifies tank clean-out.

Over lunch at the coop, we met with some area farmers. An interesting request from the farmers, when queried about how EPA could help them, was that they wanted to know how they could better communicate with the public about what they do, their care for the land, and their desire to produce wholesome plentiful food. They also asked the EPA staff to help get this message out. The farmers expressed frustration in being portrayed as the “bad” guys. They also expressed interest in use of cover crops and no-till crop production for the environmental benefits they bring but felt they needed more information on how to integrate them successfully into their operations.



After lunch, we traveled to Reinbeck to meet with Ken Vogt who is an owner/operator of a farm that has been growing seed corn since the 1990s. Mr. Vogt's fields have waterhemp populations with evolved resistances to Herbicide Group 2 (ALS inhibitor herbicides), Herbicide Group 9 (glyphosate), and Herbicide Group 27 (HPPD-inhibitor herbicides). The herbicide options that Mr. Vogt has available to him are limited by the seed corn company contracts and the herbicide sensitivity in the inbred seed corn lines. While the production of seed corn offers good economic return, Mr. Vogt held out the possibility of switching to field corn in order to increase his herbicide options in an attempt to reduce the waterhemp populations. However, we also discussed the relatively long soil bank persistence of waterhemp seed and the fecundity of waterhemp. This was discouraging to Mr. Vogt as he realized reversing his problem would be an extremely difficult task. Coincidentally, an international group from an agchemical company was touring Mr. Vogt's farm to view research at this location.

The final stop was at Ag Leader Technology in Ames, IA. This company is a pioneer in precision agriculture and introduced a yield monitor in 2000. Today, Ag Leader Technology has products and applications for GPS displays, auto-steering, planting, pesticide applications, harvest monitoring, water management, and data management. Representatives for Ag Leader Technology gave a series of presentations that described how their products, based on the field computer as the heart, work through a complete crop year cycle. Of particular interest to EPA were the pesticide management aspects of the precision systems that allowed the selection of pesticides by name, chemical attributes and logged data and documented field activity. The systems allowed swath selection using information from the previously treated area, field boundaries, and precise prescription maps. The prescription map function uses geo-referenced rate values to apply the correct amount of pesticide at specific field locations. The system also can give an optimal prescription for speed and droplet size to minimize pesticide drift. Other functions are min/max warnings for spray pressure and flow plus an automatic boom height control. The software provides options for tracing GMO stewardship, such as refuge planting, as well as data management, storage and reporting; Ag Leader Technology personnel stressed that all data is proprietary to the owner.



As we prepared to leave following the presentations, the EPA discovered the Ag Leader Technology equipment-testing bay. They had to be pried away from the grain combine and other equipment located there; not unlike farmers, large equipment fascinated them.

A well-deserved dinner was had at the end of the day at the “iconic” Hickory Park Restaurant Company in Ames.

Thursday, July 9

Bright and early, we were on the bus and headed for the farm of Mike Coleman in Humboldt. There the group met with Mr. Coleman and his family as well as several other area farmers and consultants. As with the other farmer interactions, there was a lively discussion with the EPA staff posing a number of questions to the farmer group. Mr. Coleman related how waterhemp became a problem in his area after the failure of Herbicide Group 2 products. Before that, cocklebur and velvetleaf were much more important weed problems. Mr. Coleman commented on how weed populations vary with yearly spring weather patterns. Waterhemp, milkweed, and thistles are dominant in wetter years while velvetleaf, cocklebur and giant ragweed are more common in drier years. Unfortunately, glyphosate has not controlled his waterhemp population for the past 2 or 3 years. In response, he has put his kids back to hoeing and knows other local farmers who are purchasing row cultivators. However, row cultivators could not be used in 2015 because it was too wet. He does not feel that the waterhemp is affecting his yields yet but the knowledge of what has happened in Missouri and Arkansas has prompted him to



switch herbicide programs. He is “relearning” how to use preemergence herbicides but he has herbicide carryover concerns. The consultants in the group said they were relearning weed management too. Part of this relearning is that cost has increased from \$11/acre to \$30+/acre to achieve

similar levels of weed control. Another thing that has been “relearned” is how to use residual herbicides in fields that differ in soil type and pH.

When asked about corn rootworm problems, they said they were significant in 2012 for both northern and western species. The growers are planting less corn after corn but are also observing rootworm biotypes with extended diapause which are able to survive in corn/soybean rotations. Fortunately, there have not had any crop failures due to rootworm in their county. They are observing differences in corn rootworm management between Bt traits. The growers intend to scout more for corn rootworm, have a management plan, and intend to use insecticides as needed.

One thing obviously evident was that the Coleman farm is a family farm and the area growers and consultants have a community with mutual support. The young farmers that participated in the discussion clearly have a keen sense of stewardship and preservation of resources for their children. Neighbor to neighbor communication and cooperation was stated to be generally good; the biggest problem is from new people coming into the area who do not have the same sense of “community”.

Leaving the Coleman farm, we traveled to Hagie Manufacturing Company in Clarion. Hagie Manufacturing Company started manufacturing equipment for corn detasseling during World War II in response to the shortage of men to do that operation. They began manufacturing sprayers after the war when they recognized the potential of the newly available 2,4-D and other herbicides for crop production. Interestingly, Iowa State University faculty helped design both pieces of equipment for Hagie Manufacturing Company, which remains a privately owned company.

At the Hagie Manufacturing Company, the group was broken into smaller units and each was taken on a complete tour of the manufacturing plant where almost all components of their sprayers are fabricated. While somewhat removed from agriculture *per se*, the plant was impressive for its efficiency, especially the integration of operations and the focus on safety and employee well-being. The group was able to



see finished sprayers and available options such a nitrogen applicator. Hagie Manufacturing Company offers training on their sprayers to buyers and installs either Ag Learn or Raven technologies in their systems.

A demonstration model was available for persons to climb up into the operators cab and examine the controls. After the tour, a Hagie Manufacturing Company employee gave a presentation on "Spraying 101" which was followed by a

spraying demonstration. The demonstration focused on how different nozzle types can affect spray drift and was of particular interest to EPA participants on the tour.



After lunch, there was a discussion between Hagie Manufacturing Company employees and the EPA staff. We were also joined by John Holmes, an agronomist with North Central Cooperative, who brought several of his farmer clients with him. The growers ranged in age from 27 (operating 8,500 acres) to 75+ (operating <1000 acres).

Hagie Manufacturing Company representatives had several questions and comments that they asked EPA to help them address. Among these were:

What does it take in sprayer cab design to eliminate the need for personal protective equipment?

What agitation is actually needed for individual pesticide formulations and should this be included in the pesticide label?

What is the compatibility of various (each) formulations with different hose materials and should this information be included in the pesticide label?

What are the clean out guidelines for individual pesticide products and how should this be addressed in the pesticide label?

During the open discussion with the North Central Cooperative growers, problems such as herbicide-resistant weeds and Bt-resistant western corn rootworm were addressed. The discussion also addressed opportunities and concerns about new pest management technologies. Interestingly, they expressed similar sentiments/issues as other producers about new traits, increased input costs to manage pest resistances, and corn rootworms. Some growers suggested that cultivation was being brought back as necessary to deal with herbicide-resistant weeds. Farmer participants expressed frustration about the differences between ag companies suggesting that some were easier to work with than others. When asked if they respond to insect resistance management surveys (telephone surveys mandated to registrants of Bt crops by EPA), they said they were not aware of them and generally hung up on phone surveys due to lack of time and being asked to take too many surveys.

They also expressed similar concerns about the vitriol they read about farmers in the press. They feel they are good stewards of the land.

The last meeting of the day was at the farm of Doug Dolittle, owner/operator, in Randall. Mr. Dolittle, a long-time collaborator with Mike Owen and Iowa State University, has problems with Herbicide Group 2 (ALS Inhibitors) and Herbicide Group 9 (glyphosate) resistances in waterhemp and has used Enlist Duo in soybean. He also contracts to produce soybean seed crops. Mr. Dolittle related his journey with herbicide resistance and his plans for the future management of this problem with the group.

Discussions about the day and tour as a whole continued on through dinner and afterwards.

Friday, July 10

Prior to departure to Des Moines to catch flights, the group met to discuss what they had learned and observed. Each person was asked to make brief comments about their personal experiences on the tour. Here are some of the comments provided but not credited to any one person:

- Farmers told us (EPA) that language on pesticide labels often lacked clarity.
- I learned about the biology of waterhemp and how it can spread from field to field on equipment.
- The scale of Iowa agriculture impressed me, as did the technology that is available to farmers.
- The tour had great diversity. It included land management, waterhemp, and manufacturing.
- Growers really care and are in tune.
- The technology that is being used and how farmers embrace it.
- Growers need to communicate with the ag industry what their needs are.

- We need to find a way to limit the movement of resistant weeds.
- The nitrogen use management impressed me.
- The tour was a good opportunity for me to interact with my OPP colleagues.
- The WSSA tour, compared some other tours I have been on, showed what was actually going on and that all the Midwest is not the same.
- The amount of value that family has.
- Hagie has it together.
- Circumstances may change between growers but the problems are the same.
- How can OPP allow within their regulations for the creation of local approaches to problems?
- OPP should not ask registrants to do something they can't do – there is a need to at least incentivize consultants.
- The scale of the agriculture observed. How can one convey the diversity of agriculture across the US?
- The tour was an opportunity to break down silos within EPA and elsewhere.
- Talking to farmers was the best part – I really enjoyed the one on one talks.
- Things have progressed since the last tour (WSSA-NCWSS-SWSS MO-IL-AK tour of herbicide resistance issues). Growers have figured out they need to work smarter.
- Growers are learning from others mistakes.
- Herbicide resistant waterhemp is not affecting yield yet, we need to take care of it before it does.
- I better understand the corn-soybean production system.
- How farmers talk to their neighbors and take notice of what they do.
- How can we better educate the public about GMOs? (not the first or last time this will be asked)
- The Enlist Duo discussions were useful for me. The fact that growers thought it would be a good tool but may have a short life. The barriers to its use because of trade issues with China. The farmers worry about sprayer contamination and the potential for spraying the wrong field. Growers seemed OK with buffers and their equipment allowed for that.
- I was surprised the farmers did not respond to surveys and that Bt resistance was sporadic, that it could change from year to year.
- The spray drift demonstration at Hagie made an impression on me.
- How there can be a difference between what a landowner and a tenant can want.
- The tour will help me in thinking about new herbicide/tolerance traits under consideration.
- That I talked to farmers who were my age, younger than 40, and their kids.
- The scale of agriculture and I did not know about coops before.
- I was happy individual farmers are being proactive if Bt resistance is an issue in their area but it would be helpful, if more information was put out in a structured form. I was unhappy to hear individual growers may not be getting as much help from industry as we have been led to believe.
- I learned that, if OPP puts restrictions on pesticide use or approves registrations and China does not approve what we do, then, growers could be in a squeeze.
- Weeds are being managed because of peer pressure more than economics.

- Growers are still learning about mechanisms of herbicide action – they say they are no longer using glyphosate yet it is in the pre-mixes they are using.
- I was surprised that Hertz did not include resistance management BMPs in their contracts and that those companies only manage a small percentage of Iowa farm land.
- The capital intensity of Iowa agriculture was impressive.
- Income is an annual concern. You can't average over years. Corn prices are low now but the farmers made great income a few years ago.
- The land stewardship practiced by farmers – the rationale behind the need for regulatory changes should be made apparent to them and we need to communicate the “whys” of any changes.
- One-sided buffers may be a problem because farmers may not come back to treat them later.
- The growers were very candid with us and there is a higher sensitivity among them about resistance.
- The growers reminded me that management needs to be local but we need better conduits to understand their local needs.
- I was just impressed at seeing the agriculture in Iowa and the network of organizations that are all working to support farmers in Iowa.



Tour Participants

Mike Owen	WSSA / Iowa State University
Amy Asmus	Independent Crop Consultants Association / WSSA / Asmus Farm Supply, Inc.
Michael Barrett	WSSA / University of Kentucky
Jill Schroeder	WSSA / USDA-Office of Pest Management Policy
Lee Van Wychen	WSSA
Rachel Holloman	EPA/ Registration Division
William Chism	EPA/ Biological and Economic Analysis Division
Jonathan Becker	EPA/Biological and Economic Analysis Division
Marquea King	EPA/Pesticide Re-Evaluation Division
Brittany Pruitt	EPA/Pesticide Re-Evaluation Division
Khue Nguyen	EPA/ Pesticide Re-Evaluation Division
Meghan Radtke	EPA/EFED Environmental Fate and Effects Division
Kenneth Haymes	EPA/Biopesticides and Pollution Prevention Division
Ann Sibold	EPA/ Biopesticides and Pollution Prevention Division
Kimberly Nesci	EPA/Biopesticides and Pollution Prevention Division
Menyon Adams	EPA/Biopesticides and Pollution Prevention Division
Grant Rowland	EPA/Registration Division
Shaja Joyner	EPA/Registration Division
Sarah Meadows	EPA/Registration Division
Driss Benmhend	EPA/Registration Division
Dan Kenny	EPA/Registration Division

Some thoughts for future tours:

Mike and Amy did a fabulous job of organizing the tour and there are few suggestions for improvement. The minor additions to help the EPA staff understand some of the discussions would be cheat sheets for acronyms used and, especially, one that translates trade names into active ingredients. Many at EPA only work with active ingredient names. Additional reference material such as the "Take Action" poster of herbicide products with MOA groups would be helpful too. EPA staff indicated that the discussion the first night of the tour on what we hoped they would see and learn and the discussion on the last day really helped provide a framework for the tour. Both those discussions really helped define the tour for all of us.