



Pesticide Review

- News

- About

- Pesticides & Regulations

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In This Issue

Aerial Applications Going Full Speed Ahead This Season 1

Field Study in Corn Reveals Need to Maintain Correct Height Above Canopy 3

Illinois Laws Regulating Noxious, Exotic Weeds 4

TPSA Treated Seed Taskforce Offers Disposal Guidance 5

Aerial Applications Going Full Speed Ahead This Season



Air Tractor AT-802A pattern testing, Matt Gill, University of Illinois.

Have you noticed an increase in airplanes applying pesticides to agricultural fields? While they are entertaining to watch, aerial applicators provide a vital service to agricultural producers. The weather this growing season has presented numerous challenges to our region’s farmers. Some areas have been wet, others were extremely dry. Nearly all of Illinois has experienced hot and humid conditions conducive to many fungal pathogens and some insect pests. With that being said, the need to protect the yield is essential. Farmers have the option to apply fungicides or insecticides using ground equipment. However, aerial applicators can often apply these products in a more timely and efficient manner, with far less mechanical injury to the crop.

Many aerial applicators across the state participate in the Operation S.A.F.E. program stands for Self-regulating Application and Flight Efficiency. The program has oversight by the NAAA



College of Agricultural, Consumer and Environmental Sciences
 University of Illinois, U.S. Department of Agriculture Local Extension Councils Cooperating
 University of Illinois Extension provides equal opportunities in programs and employment.

(National Agricultural Aviation Association) and NAAREF (National Agricultural Aviation Research and Education Foundation). At an Operation S.A.F.E. Fly-In event, spray pattern deposition is collected and measured. A certified analyst then processes the data and provides the applicator with printouts of spray deposition across the swath, effective swath width, and droplet spectrum information. If corrections are needed, the applicator may adjust the aircraft setup and immediately run another test series to verify that the adjustments have improved the spray pattern or droplet size. Some of the basic adjustments to be made include nozzle orifice size, deflection angle, boom pressure, and spray height. In many cases, an aerial applicator may run multiple series, checking different setups for various spray application rates used across a spraying season. Each year the Illinois Agricultural Aviation Association (IAAA) holds an Operation S.A.F.E. Fly-In at the start of the spraying season.

The University of Illinois Extension conducted four Operation S.A.F.E. Fly-Ins across the state of Illinois this year, offering aerial applicators the opportunity to ensure their equipment was primed for the application season. In all, 30 aircraft were tested, requiring 168 passes over the flight-line. Remember, the “S” in the S.A.F.E. acronym stands for “Self-regulating.” No entity requires pilots to bring their aircraft to a Fly-In—it is completely voluntary. Attending is not inexpensive either: it can cost several thousand dollars for the fuel alone to travel to and participate in a fly-in. That is not to mention the time required, which was in particularly short supply this season. It is a credit to the professionalism of Illinois’ aerial applicators that they prioritize safety and application accuracy so highly.

In addition to the Fly-Ins in Illinois, Extension was also invited to conduct Fly-Ins in Wisconsin and North Carolina. Outside of Illinois, a combined 16 aircraft were tested,

requiring 155 passes over the flight-line.

This year showed increased interest among aerial applicators to test the effects of changes in application height. It is a common misconception that aerial applications are best made from the lowest possible application height. Applicators are often requested to spray with “wheels [or skids] in the tassels.” The reality is that every aircraft has an optimal spray height, typically somewhere between 10-15 feet above the canopy. Flying too low inhibits the spray pattern from developing to its full width and can result in non-uniform deposition in the field.

The wind conditions at Fly-Ins this year also presented a natural experiment. Optimum wind speeds were elusive, but calm and windy conditions (as is so often the case) were both easy to come by. Several aircraft were tested in both calm and windy conditions with no changes made to the spray system. The results were mixed, with some aircraft having no difference in effective swath width between the two conditions and some having as much as 10-foot reductions in calm versus windy conditions. More testing is merited, but this reinforced the need to adapt spray system configurations to the application conditions.

It is immensely encouraging to see aerial applicators continue to push the envelope of technology in pursuit of improving the safety and efficacy of their applications. While attending an Operation S.A.F.E. Fly-In may only happen once per year, effectively calibrating and pattern testing even a single aircraft can positively impact tens of thousands of acres throughout a spraying season.

The Illinois Department of Agriculture has a Question and Answer Page for any concerns about Aerial Pesticide Applications and for those who need more information. <https://www2.illinois.gov/sites/agr/Pesticides/Pages/Aerial-Pesticide-Application-Q-A.aspx> This page includes a list of products that are typically applied aerially as well as some

guidance should there be a concern. Another wonderful resource is the National Pesticide Information Center. They can provide detailed information on products being used and ease some concerns by providing the necessary material safety data information of those products and discussing the real versus perceived risk of toxicity. Trained NPIC toxicologists can be reached at <http://npic.orst.edu/> or by calling from 11-2 p.m. Central time at 1-800-858-7378.

Matt Gill and Maria Turner

Field Study in Corn Reveals Need to Maintain Correct Height Above Canopy

A field study by Alan Corr from Agri-Spray Consulting, Ken Ferrie from Crop-Tech Consulting and Matt Gill from the University of Illinois at Urbana-Champaign examined deposition from aerial applications in a corn canopy. The flying was done by David Baurer with Palmer Flying Service in Manito, Illinois. The project was sponsored by Bayer Crop Science. The purpose of the study was to identify potential causes for some of the streaking seen in corn fungicide applications from the 2021 season.

Several treatments were examined with a single replication, including different nozzle setups and application heights. For each treatment, an AT-802 made two adjacent passes with a 90-foot swath width. Spray coverage was captured on white sampling cards located in the top, ear level and lower parts of the corn canopy. The corn was just entering the VT growth stage. Sampling began at the center of the first pass and went to the center of the second pass to see if canopy penetration and deposition were reduced in the zone of overlap between the two passes.

Data for all the treatments showed high variability across the 90-foot swath, which is to be expected for sampling at a 5-foot interval in a plant canopy where much of the spray is intercepted by plant tissue. The results do show that with flat fan nozzles and the aircraft operated with a boom height of around 12 to 15 feet above the canopy, there was no indication of a reduction in spray coverage and deposition in the zone of spray overlap between the two passes. This was true for all three sampling locations in the canopy: top, ear level and lower parts of the canopy.

Flying much lower, with the wheels almost in the canopy, appears to have caused a roughly 15-foot gap with reduced spray deposition in the zone of overlap between the two passes. This reduction was found at all three sampling heights in the canopy. This reinforces the fact that aerial applicators need to fly at an appropriate height for their aircraft. Flying too low prevents the spray pattern from developing to its full width. It can also greatly reduce uniformity within the pattern itself. If you have had your aircraft pattern-tested at an Operation S.A.F.E. fly-in, do not expect to fly it at a much lower height in the field and use the same swath width.

When switching to straight stream nozzles, there was a gap in deposition between the two passes. This gap is to be expected, however, as the same target swath width of 90 feet was used by the pilot. Based on the results of this study, a 75-foot swath width would have been more appropriate for these nozzles. Straight stream nozzles create a larger droplet size that typically results in an overall narrower spray pattern. This trend has also been seen at numerous Operation S.A.F.E. fly-ins. When switching nozzles from flat fans to straight streams, it is critical to understand that swath width will have to be reevaluated and likely reduced. Have your spray pattern analyzed at an Operation S.A.F.E. fly-in to determine its optimum swath width.

Matt Gill

Illinois Laws Regulating Noxious, Exotic Weeds

The State of Illinois has two “legal” lists of problematic plants that require attention – Noxious Weeds and Exotic Weeds.

The **Illinois Noxious Weed Law**, set into Illinois Administrative Code, lists 9 weed species that must be controlled on property owned or managed. These weeds have detrimental effects on public health, agricultural crop production, or animal production. They must be controlled so they don’t produce seeds or any other means for propagating, or totally eradicated using legal means. This law is under the direction of the Director of the Illinois Department of Agriculture. Most counties in Illinois have a designated Weed Control Superintendent (Weed Commissioner) for local control authority. Enforcement can result in a fine. The reality is however, that this law tends to be complaint driven and sadly is often poorly enforced due to a lack of funding and personnel. Some counties are stricter than others. This list has primarily remained the same since its creation in the 1970’s with only one addition of Kudzu in 2002.

Weeds on this [list](#) include:

- Common ragweed (*Ambrosia artemisiifolia*)
- Giant ragweed (*Ambrosia trifida*)
- Marijuana (*Cannabis sativa*) (outdoor grown)
- Musk thistle (*Carduus nutans*)
- Canada thistle (*Cirsium arvense*)
- Kudzu (*Pueraria montana* var. *lobata*)
- Perennial sowthistle (*Sonchus arvensis*)
- Johnsongrass (*Sorghum halepense*)
- Sorghum alnum (*Sorghum alnum*)

Please note that the two ragweed species need only to be controlled within the corporate limits of cities, towns and municipalities. All other weeds on the list must be controlled anywhere in Illinois. The local weed commissioner can also declare certain weeds as noxious in the county under his or her jurisdiction. More information on the Illinois Noxious Weed Law can be found [here](#).



A patch of Canada thistle (*Cirsium arvense*) growing along a road, Michelle Wiesbrook, University of Illinois.

The **Illinois Exotic Weed Act**, also set into Illinois Administrative Code, is managed by the Illinois Department of Natural Resources (IDNR). These non-native plants, when planted, will spread by seeds or vegetative propagules (rhizomes, bulbs, tubers, corms, etc.) and naturalize, degrading natural communities, reducing the value of fish or wildlife habitat, and threatening Illinois endangered or threatened species. For most of these plants, it’s the seeds that have caused these plants to spread, particularly in forested and wooded areas.

This law doesn’t require the owner or manager of the property to control these plants like the Illinois Noxious Weed Law does. Rather, the intent is to prevent the spread. The Act does state you cannot sell or plant these without a permit from IDNR. Please do what you can to prevent these species from spreading, including removing flowers before

they set seed. For example, timely mowing can help prevent the spread of Teasel and [Poison Hemlock](#) along roadsides. Keep in mind that controlling these species is the ultimate form of preventing the spread of these invasive species. Again, this law does not require control.

The following species are on the list. Additionally, and this is crucial, ALL their cultivars are included, no matter who or what says the cultivars are sterile. Any cultivar of these plants CANNOT be legally sold or planted in Illinois without a permit from IDNR. This includes all the so-called sterile purple loosestrife cultivars as well as the Fine-Line® buckthorns.

Included plants are:

Biennial

Giant hogweed (*Heracleum mantegazzianum*)*

Poison hemlock (*Conium maculatum*)*

Teasel (*Dipsacus spp.*)*

Perennial

Exotic buckthorns

- Chinese buckthorn (*Rhamnus utilis*)
- Common buckthorn (*Rhamnus cathartica*)
- Dahurian buckthorn (*Rhamnus davurica*)
- Glossy buckthorn (*Rhamnus frangula*)
- Japanese buckthorn (*Rhamnus japonica*)
- Saw-toothed buckthorn (*Rhamnus arguta*)

Exotic olives

- Autumn-olive (*Elaeagnus umbellata*)*
- Russian-olive (*Elaeagnus angustifolia*)*
- Thorny-olive (*Elaeagnus pungens*)*

Invasive/exotic bush honeysuckles

- Amur honeysuckle (*Lonicera maackii*)*
- Morrow's honeysuckle (*Lonicera morrowii*)*
- Sweet breath of spring (*Lonicera fragrantissima*)*
- Tartarian honeysuckle (*Lonicera tatarica*)*

Invasive knotweeds

- Bohemian knotweed (*Fallopia x bohemica*)*
- Giant knotweed (*Fallopia sachalinensis*)*
- Japanese knotweed (*Fallopia japonica*, syn. *Polygonum cuspidatum*)*

Others

- Japanese honeysuckle (*Lonicera japonica*)
- Kudzu (*Pueraria montana* var. *lobata*)
- Lesser celandine (*Ficaria verna*)*
- Multiflora rose (*Rosa multiflora*)
- Oriental bittersweet (*Celastrus orbiculatus*)*
- Purple loosestrife (*Lythrum salicaria*)
- Salt cedar (*Tamarix* spp.)

This species list was last added to in January 2016. Kudzu is the only plant also on the Noxious Weed list.

More information can be found [here](#).

Michelle Wiesbrook, adapted from an article written by David Robson, University of Illinois

TPSA Treated Seed Taskforce Offers Disposal Guidance



Improper disposal of unwanted treated seed, Travis Cleveland, University of Illinois.

Proper disposal of treated seed can be challenging. These issues can be helped just by knowing the right person to call. TPSA has taken steps to assist this process.

The Treated Seed Taskforce was created by the TPSA Board of Directors to establish TPSA as an objective resource and consolidation forum for regulatory, compliance, and stewardship information related to the disposal of treated seed. The taskforce's purpose is:

- to offer a forum for constructive discussion,
- to serve as an information resource on current regulations and best practices, and
- to provide information regarding disposal options for treated seed.

In doing this, TPSA can address a critical and time sensitive issue that is important to its members and the greater agricultural community.

How the Taskforce began

In February 2021, the Nebraska Department of Environment and Energy ordered the closure of an ethanol plant due to environmental violations. The plant had been receiving treated seed for the purpose of producing ethanol, thereby providing a disposal option for unused treated seeds.

This closure received widespread attention. Stakeholders from across the agricultural community became keenly aware of the need to more easily determine how to properly manage and dispose of pesticide treated seeds. It became apparent that TPSA was the ideal forum to begin this discussion.

To form the Taskforce, TPSA reached out to its membership and other agriculture associations that foster best management practices and stewardship, as well as provide reliable information that benefits and supports the agriculture industry. Taskforce membership is comprised of representatives from departments of agriculture, universities, state regulatory agencies, seed trade associations, seed and chemical manufacturers, and agriculture retail associations.

The following entities participate on the TPSA Taskforce: Nebraska Department of Agriculture, University of Nebraska, Minnesota Department of Agriculture, Iowa State University Extension Program, North Carolina Department of Agriculture, Bayer Crop Science, Corteva, Syngenta Crop Protection, Tri-Rinse, Clean Earth Environmental Solutions, Heritage Environmental Services, Washington State Department of Agriculture, Agricultural Retailers Association, American Seed Trade Association and Crop Life America.

The makeup of the Taskforce brings a diverse spectrum of knowledge and professionalism to the discussion of proper treated seed management.

The initial goal of the Taskforce was to gather reliable contact information in each of the top 10 U.S. corn producing states. By knowing the appropriate starting point, a producer, a seed manufacturer, an agricultural association, a distributor, or anyone can then obtain needed information about regulations and disposal options in his or her respective state. The Taskforce is proud to announce that this goal was completed and has resulted in the development of a Treated Seed Life-Cycle Management Guidance Map, which can be found on the TPSA website at <https://tpsalliance.org/resources/treated-seed-disposal-map/>

A simple click on a state provides contact information regarding disposal options in that state. The TPSA Treated Seed Guidance map compliments the American Seed Treatment Association's, "Guide to Seed Treatment Stewardship", by providing state specific resource information.

What's next?

The TPSA Board of Directors and the Treated Seed Taskforce members realize the issue of proper treated seed management isn't limited to corn seed or the top corn producing states. The next goal of the Taskforce is to gather and input the resource information for each of the remaining 40 states.

If you're interested and want to assist the TPSA Treated Seed Taskforce with their efforts, please contact Jack Ranney (jranney@harsco.com) or Clinton Shocklee (cshocklee@tririnse.com).

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The *Illinois Pesticide Review* is published six times a year. For more information about pesticide safety or for more issues of this newsletter, please visit us at www.pesticidesafety.illinois.edu. You can also reach us at 800-644-2123.

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