**EZregs: Making Sense of Illinois Agricultural and Horticultural Regulations**

Over the years, you’ve occasionally seen the Pesticide Safety Education Program Team publish answers to “frequently asked questions” (FAQs) in the *Illinois Pesticide Review* newsletter. Though we hope these FAQs have been helpful, we certainly recognize at least two inherent problems with this approach: (1) The FAQ lists are often long and are “written for the masses” (few of the outlined situations apply to any one individual); and (2) laws and regulations change from time to time, sometimes causing published FAQs to become inaccurate.

Well, as the saying goes, we think we’ve “built a better mousetrap.” Introducing *EZregs*, a Web site (www.ezregs.uiuc.edu) designed to help identify state and federal environmental regulations that pertain to specific agricultural and horticultural operations and practices in Illinois.

*EZregs* provides detailed information about how regulations apply to livestock, food-crop, and ornamental horticulture production operations, as well as landscape-maintenance operations. It contains a variety of regulations related to environmental protection; safe and legal use of pesticides; and livestock-facility construction, management, and siting. The following regulations are presently included in *EZregs*:

- Dead Animal Disposal
- Endangered Species Act
- Federal Certification of Pesticide Applicators (40CFR171)
- Federal Recordkeeping Requirements (7CFR110)
- Federal Worker Protection Standard (40CFR170)
- Historic Resources Preservation Act
- IEPA Livestock Regulations, Parts 501, 506, 560, 570, and 580
- Illinois Construction Site Stormwater Permit
IR-4’s New Pest Products/ Transitional Solution List Now Available

The Interregional Research Project No. 4, commonly known as IR-4, has been assisting growers of minor crops for the past 40 years. The overall goal of the project is to obtain tolerances and registrations for pest-control products. Typically, pest-control options are often limited on minor crops because research money and efforts often focus on major crops. The IR-4 project, which is government and university sponsored, develops data to support registration clearances. To learn more about the IR-4 project, either visit their Web site at http://www.ir4.rutgers.edu/ or check out the May 2002 issue of this newsletter at http://www.pesticidesafety.uiuc.edu/newsletter/html/200205e.html.

Recently, the project published a new Pest Control Products/Transition Solutions List that contains brief descriptions of numerous new pest-control materials that have been introduced over the last several years. It also contains information on some “older” crop-protection chemicals that are believed to have potential for new uses. Many of these pest-control tools offer great promise to fill the pest-management voids left from the cancellation of pesticides/pesticide uses associated with the Food Quality Protection Act. A number of these new products have been classified by the EPA as reduced risk for one or more uses, while others have characteristics that make them more desirable than some existing products. Several of the pest-control materials have been registered by the EPA for certain crops, while others have their initial registration pending. In most cases, the usefulness of these new tools on specialty crops is still unknown.

The list is available online at http://www.ir4.rutgers.edu/ FoodUse/ NewProductsAugust2006.pdf. It is 30 pages long (but don’t let that scare you) and is divided by pesticide type (herbicide, insecticide, etc.). For each pesticide listed, the following information is provided: common name, trade name, manufacturer, chemistry, pest-control spectrum, common traits, and registration status. (Michelle Wiesbrook, adapted from http://www.ir4.rutgers.edu/ FoodUse/ NewProductsAugust2006.pdf)

Cleaning Your Sprayer

Properly cleaning your sprayer this fall can save you time and headaches next spring. Cleaning a sprayer regularly can prevent unnecessary and costly repairs, and cleaning it before winter storage increases its life. While properly cleaning a sprayer for winter storage is important, it is also required throughout the spraying season. Thoroughly cleaning your sprayer can prevent injury to nontarget vegetation that is susceptible to a previously applied pesticide. This is especially critical if you are going to switch the type of herbicide being applied, or switch from making herbicide applications to making insecticide or fungicide applications.

Spray contamination caused by a failure to thoroughly clean a sprayer can cause crop injury up to several months after using the sprayer, and following several subsequent applications. This can occur when herbicide residues that adhered to a surface within the sprayer are brought back into the spray solution via a subsequent herbicide or adjuvant that acts as a solvent on the herbicide residue. Plant-growth-regulator (PGR) herbicides in particular are difficult to clean from a sprayer. Other herbicides, glyphosate being one of them, are effective at dissolving PGR herbicide residues in a sprayer. This can obviously cause severe problems if the sprayer is used to make applications of...
 glyphosate on crops sensitive to the PGR herbicide dissolved in the sprayer. Rinsing with water alone does not remove PGR herbicide residues.

The pesticide label for the product you have been applying and your sprayer manual are two important sources of information on how to properly clean the sprayer. It is especially important always to check the label for special cleaning instructions and warnings related to sensitive crops that would be affected by tank contamination. When cleaning a sprayer, remember to wear the same personal protective equipment as required when making an application with the pesticide being cleaned out of the sprayer.

Leaving the spray solution in the sprayer for longer periods of time increases the risk of contamination due to the increase in difficulty of removing dried pesticides, compared to pesticides that are still in solution. For this reason, it is recommended not to allow herbicide mixtures to dry in the sprayer. Some pesticides can cause the equipment to deteriorate if they remain in the sprayer for an extended period. Clean a sprayer as soon as possible after use. If possible, plan on always ending the day with an empty spray tank. Even if you plan to spray the same pesticide the next day, flush the tank with clean water after spraying. Some pesticide solutions may create a pastelike substance in the tank, and rinsing out the sprayer at the end of each day or even after every load can help prevent an accumulation.

Many sprayers have built-in rinse tanks that hold sufficient water to allow rinsing the main solution tank three times immediately following an application. Sprayers with rinse tanks generally also have tank-rinse nozzles designed to provide complete spray coverage of the inside of the tank. Rinse tanks and nozzles make rinsing out a spray tank after an application easier, quicker, and safer. If possible, apply the rinse on the treated application site in a manner consistent with the label. Repeatedly rinsing a sprayer with small quantities of water is more effective than a single rinsing with a large quantity of water, provided all sprayer parts can be reached with the smaller quantity of water.

In general, plastic and polyethylene tanks require a more thorough cleaning than stainless steel tanks. Inadequate agitation can allow dry-flowable and wettable-powder formulations to build up accumulations in the bottom of spray tanks. The upper surfaces of the tank and surfaces around the tank baffles can be difficult to clean well. However, do not focus only on the tank when cleaning. Pesticide residues on hoses, sumps, strainers, pump surfaces, and other sprayer components can also cause contamination if not removed during cleaning. Cracks in hoses often accumulate pesticide residues and are difficult to clean. Worn hoses should be replaced to reduce the risk of this occurring.

Check and clean strainers daily. They can be a source of contamination, and partially plugged strainers create a pressure drop and reduce the nozzle flow rate. Most sprayers have up to three different strainers: one on the suction hose to protect the pump; another in the line between the pump and the boom; and a third, which has the smallest openings, in the nozzle body.

Cleaning agents can work to dilute or deactivate pesticide residues, but many cleaning agents work by increasing the solubility of the pesticide. These cleaning agents dissolve the pesticide residue in the rinse solution, which can then be flushed from the sprayer, removing the residue. As an example, ammonia is the recommended cleaning agent for removing sulfonylurea herbicides from sprayers. An ammonia solution increases the pH, which increases the solubility of sulfonylurea herbicides. The ammonia, however, does not decompose or deactivate the herbicides. Although a chlorine bleach solution decomposes sulfonylurea and other types of herbicides, it is not as effective as ammonia at dissolving sulfonylurea herbicides, and therefore does not work as well for removing these herbicide residues from sprayers. Never mix chlorine bleach with ammonia or liquid fertilizers that contain ammonia. The chlorine and ammonia react and form chlorine gas, which is toxic and can cause eye, nose, throat, and lung irritation.

When cleaning the sprayer, use only water that appears clean enough to drink. Water from ditches, ponds, or lakes can contain small particles that can clog nozzles and strainers. The type of cleaning agent you use to clean your sprayer depends on the type of pesticide formulation used. Residues from some formulations are more difficult to remove from the tank than others. To remove residues of oil-based herbicides, such as esters of 2,4-D and similar materials, fill the tank one-quarter to one-half full with a water–ammonia solution (1 quart of household ammonia to 25 gallons of water) or a water–trisodium phosphate (TSP) solution (1 cup of TSP to 25 gallons of water). Circulate the solution through the system for several minutes, allowing a small amount to pass through the nozzles. Let the remainder of the solution stand at least 6 hours, and then pump it through the nozzles and drain the tank. Remove the nozzles and strainers, and flush the entire spray system twice with clean water, making sure to remove all pesticide-contaminated rinsate from the spray system. Oil-based solvents, such as fuel oil, are also effective at removing oil soluble pesticides. After cleaning with an oil-based solvent, rinse the sprayer with a detergent solution to remove oil residues, followed by two clean water rinses.

Equipment in which wettable powders, amine forms, or water-soluble liquids have been used should be thoroughly rinsed with a water–detergent solution (2 pounds of detergent to 30 to 40 gallons of water). Water-soluble materials should be treated as water-soluble liquids. Allow the water–detergent solution to circulate through the system for several minutes. Remove the nozzles and strain-
ers, and flush the entire spray system twice with clean water. Commercial cleaning agents are available, and many of these can be used to remove residues of both water- and oil-soluble pesticides. The commercial cleaning agents tend to work better than household cleaning agents and can serve both to dissolve and to deactivate pesticide residues.

Remove nozzle tips and screens, and clean them using a cleaning solution. Use a brush with plastic bristles to clean the nozzle tips. Rinse the cleaning solution off all parts with clean water. Many nozzle manufacturers have brushes designed specifically for cleaning out nozzles. Never use a metal object for cleaning nozzles. Metal objects destroy the orifice, which can alter nozzle flow rate, spray pattern, and droplet size. When a nozzle becomes clogged, always remove it for cleaning.

Activated carbon can also be used to clean out a sprayer. It works by deactivating, or tying up, certain organic pesticides. A solution of 3 percent activated carbon in water can be circulated through all of the sprayer components. Afterward, rinse the sprayer thoroughly with water to remove all the activated carbon, as any remaining traces of activated carbon will deactivate a portion of the next pesticide applied with the sprayer. It is important to note, however, that activated carbon is quite abrasive and can potentially damage certain spray equipment, particularly roller-type pumps. To avoid damage, be sure to read and follow all label directions.

When it is time to store your sprayer, add 1 to 5 gallons of lightweight oil, depending on the size of your tank, before the final flushing. As water is pumped from the sprayer, the oil leaves a protective coating inside the tank, pump, and plumbing. To prevent corrosion, remove the nozzle tips and strainers, dry them, and store those that are corrosion prone in a can of light oil, such as diesel fuel or kerosene. (Scott Bretthauer)

### References


### When Does a Preharvest Interval End?

Someone recently asked me, “When does the preharvest interval end?” What the person really wanted to know was when it would be safe and legal to harvest the crop that was recently sprayed with a pesticide. I responded by telling the caller to check the product label for the preharvest interval (PHI) for his particular crop and situation. He told me the label stated, “Do not harvest within 5 days of treatment.” He said that he finished spraying at 8 p.m. on the seventh and wanted to know if he could start harvesting first thing in the morning on the twelfth. I said that he can’t legally harvest the crop until 120 hours (5 days x 24 hours) after the application. In other words, he can’t start harvest until 8 p.m. on the twelfth. We soon realized that the crux of the question was “when does a person start counting the time?” This person incorrectly believed that the day of application counted as a full day of waiting, regardless of what time of day the application took place.

Many labels indicate the PHI in terms of hours rather than days, which simplifies the issue of when to start the clock. However, when a label indicates the PHI in terms of days, it is better and more accurate to think about it in terms of hours. Although waiting a few extra hours for the PHI to elapse may be inconvenient and may even seem insignificant, there are some important questions to ask yourself:

- Do I want to jeopardize my reputation and that of my industry?
- Do I want to see additional regulations?
- Do I want to lose the use or practicality of this pesticide?
- Do I want to break federal law and set a bad example?
- Would an attorney perceive a few hours as “insignificant?”

Before a pesticide may be used on a food crop, the U.S. Environmental Protection Agency requires extensive research, including studies to determine how much pesticide residue may legally remain in or on each labeled crop when it is harvested. This amount is called a tolerance level. Food products (both domestic and foreign-produced) are periodically and randomly tested by the U.S. Food and Drug Administration and U.S. Department of Agriculture to determine what pesticides are present and in what quantity. If residues of an unlabeled pesticide are found or if the level of a labeled pesticide exceeds the tolerance, the product can be seized and the grower penalized.

Pesticide labels give restrictions on rates and timing of applications that allow
enough time for the pesticide residues to break down, below the tolerance level, before a treated food or feed crop is harvested. Label PHI statements are science-based and must be strictly followed to ensure that the pesticide tolerance level is not exceeded. (Bruce Paulsrud)

**Bed Bug Resistance to Pyrethroid Insecticides**

Entomologists at the University of Kentucky report that some bed bug populations across the United States are resistant to pyrethroid insecticides. Alvaro Romero, a doctoral student, and his co-investigators, Kenneth Haynes (project leader), Michael Potter, and Daniel Potter, found that adult bed bugs from four infestations collected from separate locations in Kentucky and Ohio were several 1,000-fold resistant to deltamethrin and lambda-cyhalothrin, compared to a susceptible laboratory strain. This high level of resistance may compromise the efficacy of insecticidal products with pyrethroids as an active ingredient.

Using a discriminating dose test with bed bug nymphs, the researchers further found that seven of the eight field populations submitted by pest-management firms across the country were well over 100-fold resistant to deltamethrin. These tests included bed bugs originating from California, Florida, Kentucky, Ohio, and Virginia. Details of the study will be reported at the National Pest Management Association Annual Convention in Grapevine, Texas, in October 2006.

While the results suggest that resistance to pyrethroids is becoming more widespread, the investigators emphasize that it is not yet universal and many firms are still reporting good control with these active ingredients. Nonetheless, the study findings are significant, given that cancellation of most carbamate and organophosphate insecticides has left the industry with few effective alternatives.

Bed bug resistance to insecticides is not a new phenomenon. Resistance to DDT was first reported in the late 1940s and was so widespread a decade later that other products were already being recommended as alternatives. Extension entomologist Michael Potter cautions that there are a number of reasons other than insecticide resistance why pest-control professionals may have difficulty eliminating bed bugs.

Resistance, nevertheless, represents a major challenge to the management of bed bugs and may accelerate the need for alternative tactics. Pyrethroid resistance is likely a factor in the resurgence of this international problem. (Phil Nixon, adapted from a news release from Pest Control Technology Magazine)

**EPA May Reevaluate Human Pesticide Research Proposals**

The U.S. Environmental Protection Agency (EPA) may ask its science advisers to reevaluate a series of potentially precedent-setting human pesticide research proposals developed by industry after its Human Studies Review Board (HSRB) rejected the proposals because of scientific concerns.

Industry officials say they are waiting for EPA’s final decision but hope that if the agency does choose that option, it will allow the protocols to win future approval from HSRB. EPA is considering a variety of options, including SAP review. If EPA moves on that option, the review would likely address key scientific questions raised by HSRB.

HSRB, which is charged with reviewing scientific and ethical components of human pesticide research, at its June meeting rejected five study protocols meant to examine farm worker pesticide exposure. In addition to some minor ethical concerns, HSRB found the studies unclear and scientifically flawed. For example, the board questioned the scientific value of the proposals because they included a small pool of participants, which board members argued would give the studies weak statistical power.

The study protocols are part of a package developed by an industry consortium known as the Agricultural Handlers Exposure Task Force. The group designed
Chemical Safety for Kids

I was invited to speak recently at a University of Illinois Extension-sponsored Youth Safety Day in Butler. My topic was chemical safety, and about 350 fourth-graders attended. Being a pesticide safety education specialist, I’m used to training large groups, but not groups who raise their hands all at once to speak! For the day, I enlisted the assistance of my lovely display model, Pat. Now Pat is a stuffed dummy dressed in personal protective equipment (PPE) in order to safely handle chemicals. Although Pat doesn’t talk much, he had the audience’s full attention, more so than I did, I think.

I played a little game with the kids to determine if they could spot the chemical when presented with two look-alike substances. There were six sets of look-alikes, and some were easier than others. I learned that most of the kids had a deep love for Mountain Dew. But when presented in an unmarked, sealed container next to similarly packaged antifreeze, most kids failed the test. Several kids even asked if they could drink my yellow-green “Mountain Dew” sample, which was really antifreeze. Another tricky one was window cleaner and blue Gatorade. I now think very few 9-year-olds wash windows, after witnessing how poorly they did on identifying the cleaner. Again, there were requests to drink my “Gatorade.” Another pair was used motor oil and sorghum. It turns out that kids these days don’t have a clue what sorghum is, and there were no volunteers to sample that test vial. I guess I’m getting old.

My demonstration drove home the point that kids can easily be confused when a chemical is improperly stored in a something other than its original container. Chemicals, including pesticides, should never be stored in food or feed containers. They should also be stored out of reach of children. Not all kids can read the “Keep out of reach of children” statement on the package. One student told me that my Roundup verses canola oil test was easy because he had sprayed that herbicide for his dad. That was a shocker. We often lose sight of the fact that although many chemicals can be purchased easily by anyone, they are still potentially hazardous if used or stored improperly.

The kids and I discussed some of the benefits and dangers of chemicals, what to do if someone is accidentally poisoned by a chemical and what symptoms they might exhibit. Everyone should have the Poison Center’s number (1-800-222-1222) near the phone.

An excellent resource for teaching kids about household chemicals is EPA’s site at http://www.epa.gov/kidshometour/. Understanding pesticides, reading labels, and what to do in an accident are discussed in detail. Particularly good is the section on 10+ questions. There are several games that make the topics fun to learn. Youth Safety Day was a fun event and I think we all learned a lot that day. I know I did. (Michelle Wiesbrook)

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