

## In This Issue

The Hazards of Harriet the Hapless Homeowner .....	1
Pesticide AD-ucation .....	4
Turfgrass Clippings: A Bagful of Lawn & Turf Issues .....	6
Compost Quality: New Threats from Persistent Herbicides .....	9
Structural Pest Management: Out of the Shadows .....	14
Putting the Bite on Mosquitoes in Western Washington .....	16
Insect of the Month .....	19
Tolerance Information .....	20
Federal Register Excerpts .....	22
PNN Update .....	22

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## The Hazards of Harriet Hapless Homeowner Heeds Hunches

**Dr. Catherine Daniels, Pesticide Coordinator, WSU**

On July 11, 2000, I returned to my office at Washington State University's Pesticide Information Center (PIC) after attending an all-day meeting. There I found, waiting for me on my voice mail, a slightly hysterical message from...let's call her "Harriet." And let's say she lived in Franklin County. (As I progress through this story you will understand why I have changed the name and county residence of the caller.)

In a word, Harriet was harried. Her message said that she had used Dursban on her vegetable garden and was now worried that she would be poisoned by the application. She begged me to return her call.

While it is not unusual for PIC to receive calls from concerned citizens, the tone of this call was certainly more disturbed than we normally hear. Not wanting to be responsible for a lost night's sleep, I called Harriet back. Mindful of the recent news coverage of Dursban use cancellations, I gathered all of the EPA press releases and other related information needed to assuage her worries. I assembled this tidy media kit on my desk while dialing her number.

However, the conversation took a turn I did not anticipate. Harriet told me she had bugs...lots of bugs. Harriet had bugs "all over her tomatoes." The diazinon she had previously applied was clearly not working, so she had gone to the local feed and supply store to purchase malathion, which she was sure would kill them. The store clerk told Harriet she really wanted Dursban, not malathion, and handed her a bottle of Lilly/Miller Dursban Insect Control. Thus armed, Harriet returned home and read the directions carefully (more on that in a moment), then sprayed her tomatoes. She was caring for her neighbor's garden while he was away, and as his garden also had bugs, she acted as she thought a good neighbor should, and sprayed his garden as well.

The use directions for lawns told Harriet the lawn should be damp before application. Proceeding with a certain type of logic, she deduced that the vegetables should also be damp and accordingly turned the sprinkler on while she was spraying the garden. Harriet told me she had been very thorough in soaking the plants with

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## Hazards of Harriet, cont.

**Dr. Catherine Daniels, Pesticide Coordinator, WSU**

the Dursban solution. To make sure the garden was good and wet she left the sprinkler on for two hours after the application. When the bugs were not dead the next morning she determined she should spray again. But she was worried that she had misunderstood the use directions for damp lawns so she called the retailer back and asked for clarification on the label directions. They informed her that vegetables were not on the product label. They helpfully provided the Lilly/Miller telephone number, which is no longer in service. (As many of our readers know, the company has been sold.) In desperation, our Harriet called her county extension office, which in turn referred her to me.

While Harriet, in a high state of excitement, waited for me to return her call, she "called Oregon." At this point in the conversation Harriet was verging on hyperventilation and couldn't identify to whom in Oregon she had spoken. I assume it was either the EXTOXNET\* or NPTN† folks, whom many offices regularly use as referrals. She was told chlorpyrifos (Dursban) was registered on a large number of crops, but that they could not give her the list of all crops to compare with those she had sprayed in the neighbor's garden. The garden included tomatoes, cucumbers, cantaloupe, squash, coriander and other herbs, fresh corn, bell peppers, onions, and broccoli. The tomatoes, cucumbers, peppers, and cantaloupe plants had fruit present.

I pulled a copy of the label from our files to review. The Dursban product she had purchased (a 6.7% emulsifiable concentrate, or EC) listed turf, ornamentals, lawn, non-bearing peach, non-bearing nectarine, and home outdoors (patio, foundation, etc.) on the label. At the very bottom of the label was the following statement: "Do not spray vegetable gardens or other plants used for food purposes, except as specifically directed." Harriet read this statement to me and in a very aggrieved tone told me that since the label didn't give any direction on how to use the product on vegetables, she had used the rate for control of

spittlebugs on ornamentals, which was 4 teaspoons per gallon. As she had bugs around her house she used the leftover spray as a foundation application around the house and patio. She was now concerned that her litter of kittens, who played in this area, might be poisoned as well. I might note here that the label directs the user to make a solution of one cup of product per gallon for patio applications.

Confronted with such a plateful of problems, I literally didn't know where to begin to correct her behavior, nor did I have any confidence that in her hysterical condition she would remember much of what I said. My discussion of label legalities fell on deaf ears. She simply wanted to know, person to person, if there were

**TABLE 1**

Crop	Tolerances in ppm
Broccoli	1.0 (chlorpyrifos)
Snap bean	0.05 (chlorpyrifos and metabolite)
Cucumber	0.05 (chlorpyrifos)
Radish	2.0 (chlorpyrifos)
Fresh corn	0.1 (chlorpyrifos and metabolite)
Dry bulb onion	0.5 (chlorpyrifos and metabolite)
Peppers	1.0 (chlorpyrifos and metabolite)
Tomatoes	0.5 (chlorpyrifos and metabolite)

**Tolerances for Crops Commonly Grown in Home Gardens**

any way she and her neighbor could consume food from their respective gardens. Faced with this question, I simply explained to her that the vegetables could not be eaten under any circumstances, that she MUST tell her neighbor what had happened, and that in the future she should avail herself of the Master Gardener program in her county before ever spraying again.

Thus finished with Harriet's immediate crises, I remained interested in determining, even roughly, what Harriet's application equated to in terms of possible residues. I asked Dr. Allan Felsot, as an academic exercise, to do a back-of-the-envelope calculation of the potential maximum residue left after Harriet's application. Some broad assumptions were made:

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\*Extension Toxicology Network

†National Pesticide Telecommunications Network

# Hazards of Harriet, cont.


## Dr. Catherine Daniels, Pesticide Coordinator, WSU

- ◆ 100% uptake of the EC product (we know that wasn't likely given the sprinkler situation, but this IS just an academic exercise);
- ◆ approximately 10 ml. of spray per tomato fruit (she did say she soaked them);
- ◆ a specific gravity of 1.0 for the chlorpyrifos solution (the label didn't list it); and
- ◆ an average helping size of one 100 g. tomato.

Using these assumptions and the application rates related by Harriet, theoretically she could have deposited as much as 34.9 ppm of chlorpyrifos on every 100-gram helping of tomato, squash, bell pepper, onion, and whatnot she harvested. That seemed unreal, even for an academic exercise. So we backed off to a more realistic estimate of 1 ml of solution. The theoretical residue would then be 3.49 ppm. Federal tolerances are listed in Table 1. Squash, cantaloupe, and herbs have no listed tolerances.

In an epilogue to this saga, on July 18<sup>th</sup>, Norman, the neighbor whose garden had been sprayed, called me. He said Harriet had relayed all of the information to him, but he needed to hear it himself. I explained the situation to him as I had explained it to Harriet. Hoping to help avert a neighborhood war, I then told him if it was any consolation Harriet had been hysterically upset over the outcome. Norman the Neighbor agreed that was the case and said he would take his garden out, then wailed "But why me? I just don't understand! I was only gone two days and look what happened!"

If I had been trying to write a script of a typical homeowner pesticide application scene, I wouldn't have included everything Harriet actually did because it would seem like satire at that point. I'd be accused of "going over the top"—making it a comedy of errors to draw a laugh. But the sad thing is that this is a true story with no embellishments, and in fact, only one of many we have heard at PIC. After sitting in this desk for ten years, I have developed a firm belief there are

millions of Harriets applying their certain brand of logic to pesticide applications around the country. 

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## Just for Fun...

Like the children's exercise of "How many wrong things can you find in this picture?" let's review what Harriet did wrong in this story.

- ❶ She did not identify, or have identified, the insects she saw on her tomatoes. Were they even pests? Would one expect diazinon (her first application) to control them?
- ❷ She self-diagnosed that malathion would solve the problem when diazinon failed.
- ❸ She listened to a retail sales clerk for advice about what chemical to use.
- ❹ She did not follow the directions on the label, despite carefully reading it.
- ❺ She probably put too much of the product on the vegetables by soaking them.
- ❻ She applied the product while the sprinklers were on.
- ❼ She applied the wrong rate for insect control around the house and patio.
- ❽ She did not exclude her animals from the application area during spraying nor keep them out of the area until the sprays were dried.
- ❾ She decided that since the bugs were not dead by the next day she needed to spray again.
- ❿ And finally, she applied it to someone else's property without his knowledge and consent.

# Pesticide AD-ucation

## Homeowners “Learn” from Madison Avenue

Dr. Douglas B. Walsh, Agrichemical & Environmental Education Specialist, WSU

Jane and Joe Homeowner are overwhelmed. Global warming, ozone holes, mass extinction, greenhouse effect, acid rain, and toxic pollution are among the many buzzphrases to which Jane and Joe are exposed every day. They know the planet is under environmental stress. But Jane and Joe have ants in the pantry, mildew on the rosebush, and broadleaf in the turfgrass. What are conscientious Homeowners to do? To whom do they turn to for advice? All too often, the answer is “Madison Avenue.”

### **A Good Example of a Bad Ad**

This past summer I saw a television commercial for Ortho's Bug-B-Gon product. The commercial portrays a middle-aged Caucasian male (possibly Joe Homeowner?) surveying the pesticide shelf of a do-it-yourself, big-box retail outlet looking for an insecticide. Frustrated in his attempts to find the correct insecticide, he cries out in exasperation, “Can't I just get something that kills everything?” The punch line is that, of course, Bug-B-Gon can do just that. Ain't it great? A boon for the homeowner—it kills everything it touches! Ads like this go against everything we stand for at the Food and Environmental Quality Laboratory.

Unfortunately, the scenario portrayed in the Ortho ad is often true. Many of Jane's and Joe's pest management decisions are made in the aisle of a home improvement warehouse or garden-and-more superstore. There, shelves of brightly colored boxes with catchy product names present Mr. and Mrs. Homeowner with “solutions” to their pest problems. Names like Weed-B-Gon, Spectracide, and Funginex imply a product's efficacy, conjuring an image of successful pest eradication. These trade names have become familiar to the consumer from television, radio, magazine, and newspaper advertisements.

How can a university extension program compete with or, better yet, work with Madison Avenue? Web pages, stodgy manuals, fact sheets? Madison Avenue has trouble keeping the public's attention for more than thirty seconds. Sure, the fine print of many pesticide labels may say “consult your local cooperative extension office for advice and local recommen-

dations on the use of this product,” but we know how much attention the average person pays to fine print.

### **Call In the Experts**

Cooperative extension is a worthy concept. Along with many other universities, Washington State University staffs its Cooperative Extension program with high quality advisors, agents, and Master Gardeners who provide sound advice to homeowners and other domestic pesticide users. Unfortunately, there is great public confusion about Cooperative Extension. Many urbanites get Cooperative Extension confused with University Extension—think it's about night school or continuing education classes. “Master Gardeners” are equated to the public television personality who promotes spraying your plants and yards with tobacco juice and human urine (see “Is It Snake Oil?” *AENews* No. 163, Nov. 1999).

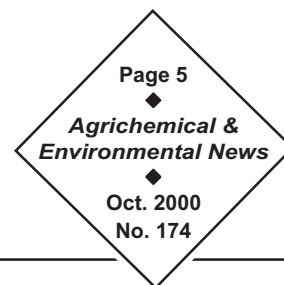
With so much confusion about Cooperative Extension, it's no wonder Jane and Joe don't know where to turn. Unfortunately, when the Homeowners have exhausted their “knowledge” from advertisements and package design, they often turn to the next “expert” they can find—the people staffing retail garden departments. Needless to say, these individuals have no training in these matters. That's unlikely to change, as there is little incentive for retailers to provide such training to their employees. It is costly to have employees doing anything but working on the retail floor and employee turnover can be substantial in retail operations. And let's not forget the lawyers. Undoubtedly, providing recommendations for pesticides implies liability and will render a retailer open to litigation if a pesticide is misused as a result of faulty advice. (Never mind that retail employees provide advice every day *without* training.)

### **A Matter of Attitude**

It can be argued that most of the environmental problems our society faces are attitude problems. Pesticides are designed to kill living things—that's why people buy them. Pesticides, if used incorrectly, can kill “things” they are not intended to kill. We call these “non-target organisms.”

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## AD-ucation, cont.




Dr. Douglas B. Walsh, Agrichemical & Environmental Education Specialist, WSU

Philosophically, I support the right of a human being to protect his or her property from damage. Jane and Joe should be allowed to spray as long as it is done correctly, in adherence to law and regulation. But I don't think that each individual homeowner who plans to apply pesticides should be required to get pesticide applicator training. I am a firm believer in common sense. Jane and Joe should know to not eat, drink, smoke, chew gum, or go barefoot when handling pesticides. The Homeowners should use a little common sense and realize they are handling a chemical designed to kill something. They should take the time to read and follow the label directions.

In the interest of supporting common sense, I think that manufacturers and retailers should hold themselves to high standards when promoting pesticide products. And I think that some effort needs to be made at the retail level to educate employees on

pesticide products. This could be accomplished, in part, by providing retailers and their respective employees with science-based, university-approved educational materials on the proper use of pesticides with correct pesticide recommendations for homeowners.

Let's face it—if consumers are going to bow down to the “knowledge” dispersed by Madison Avenue and big-box retailers, we need to do everything we can to make sure those sources are credible. 

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## 5th Annual Pesticide Issues Conference

Washington State University's Pesticide Education Program presents the fifth annual Pesticide Issues Conference. This year's conference will focus on urban issues including the problems with home and garden pesticide use and the educational and regulatory efforts underway to mitigate risks for the home pesticide user. (8 pesticide recertification credits.)

**October 19, 2000**  
**Pacific Lutheran University, Tacoma, WA**  
**University Center, Chris Knutzen Hall**  
**7:50 a.m. to 4:00 p.m.**

Cost for the conference is \$100 after October 1; lunch is included. Visa/MC/checks accepted.  
On-site registration will be available from 7:15 to 7:45 a.m.

Carol Ramsay (509-335-9222 or [ramsay@wsu.edu](mailto:ramsay@wsu.edu))  
Carrie Foss (253-445-4577 or [cfoss@wsu.edu](mailto:cfoss@wsu.edu))  
Cheryl Hill (509-335-2830 or [hillcr@wsu.edu](mailto:hillcr@wsu.edu))

**<http://pep.wsu.edu/education/issues.html>**

# Turfgrass Clippings

## A Bagful of Lawn and Turf Issues

Drs. Eric Miltner and Gwen Stahnke, Turf Scientists, WSU

Turfgrass environments have become the focus of several pesticide and environmental quality issues recently. This article addresses a few of the hot topics related to turf management in urban areas.

### **Clippings, Clopyralid, and Compost**

Two recent incidents of herbicide-contaminated compost in eastern Washington have drawn a great deal of attention (see related article, "Compost Quality: New Threats from Persistent Herbicides," p. 9). In brief, separate and unrelated problems occurred at compost facilities in the Spokane area and at Washington State University (WSU) in Pullman. The Spokane compost was intended for home and garden use, while the Pullman compost was intended for agricultural use, but the cases had similarities.

In both cases, compost users noticed damaged plants with herbicide-like injury. In the Spokane case, the problem was traced to the presence of clopyralid in finished compost. Clopyralid is one of the two active ingredients in "Confront," a post-emergent broadleaf herbicide sometimes applied to turfgrass. This compost facility uses grass clippings as one of its source materials. When similar plant injury was subsequently traced to compost from the WSU facility, clopyralid was at first suspected, but was not detected. Picloram was found, however, and was traced back to pasture applications of Tordon. It is generally assumed that the composting process degrades pesticides. This is usually correct, but in these cases the damaging compounds were not degraded, or at least not enough.

Persistence of clopyralid in the compost should come as no surprise. Previous research has shown that clopyralid does not break down in the composting process. (Triclopyr, the other active ingredient, does break down). As a result, the Confront label specifies "do not use compost containing grass clippings from turf treated with Confront in the growing season of application." Although the label warns of the hazard, the composting facility did not know that the source material contained clopyralid.

The lesson to be learned from this incident is that clear communication between pesticide applicators, clients, and other affected parties is critical. (*ED. NOTE: Increased testing including bioassays may also play a role; see related article, p. 9.*) We do not attempt to define what each participant's legal obligation is in this process, only to point out what makes good common sense: whoever applies the pesticide should read the label; whoever owns the property should be aware of the restrictions; whoever cuts and disposes of the grass should be aware of the restrictions. This would be the only way to prevent the clippings from ending up in the wrong place. An incident such as this is a good argument for returning grass clippings to the lawn (also known as mulching or grasscycling), a practice we recommend anyway. Grass clippings are a significant source of nutrients and can reduce the need for supplemental fertilization.

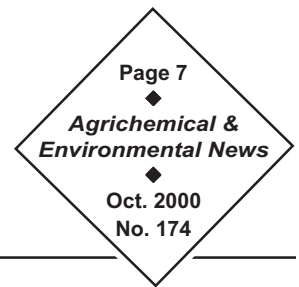
### **Zero-Impact Challenge**

New land developments are being held to stricter environmental standards in all arenas, including landscaping and turf. Centennial Park, a sports field complex recently built in Federal Way, is situated immediately adjacent to native wetland areas. Mitigated wetlands were also constructed as part of the park project. The park consists of four baseball/softball fields and several soccer fields, all using a sand-based rooting medium. Drainage from the fields is channeled through bioswales and constructed wetlands before eventually flowing into the native wetlands. Water quality in the drain lines and wetlands is monitored regularly to ensure that management of the turf does not adversely affect the neighboring environment.

Two new golf courses in western Washington face similar scrutiny. Washington National in Auburn is situated in a watershed that includes a tribal salmon hatchery. Wells on the property are sampled regularly, and permits state that the golf course can have no negative impact on water quality in the watershed. Trophy Lake Golf and Casting Club, near Port Orchard, has similar permit requirements. The golf

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# Turfgrass, cont.



**Drs. Eric Miltner and Gwen Stahnke, Turf Scientists, WSU**

course surrounds a central lake and wetland, and surface drainage from 16 of 18 of the holes eventually reaches this lake. Concentrations of nutrients and pesticides in sampling wells and in the lake cannot be higher than those in background samples collected prior to construction. These high standards were addressed via several innovative design features on the course. Surface drainage directs runoff and shallow subsurface flow into bioswales and constructed wetlands within the golf course. This slows the flow of the water, allowing plants and other organisms to mine nutrients, thereby filtering the water before it reaches the natural wetland and lake. It is curious that turfgrass is often criticized for its perceived pollution of waters, while engineers recognize that grasses are efficient nutrient scavengers. This is why grasses are often used in buffer strips and other biological filtration systems.

Considerable research shows that turfgrass can be managed with limited environmental impact. Turfgrass professionals have the knowledge, resources, and technology to achieve this goal. As the bar continues to be raised, innovative managers will have to rise to the challenge.

## **Tiers of Frustration**

After salmon were listed under the Endangered Species Act, the city of Seattle hired the Washington Toxics Coalition to create a "tier list" of pesticides. This list would assign a tier rank to each compound based, presumably, upon their relative dangers, with "Tier 1" being the most dangerous. The list would then be used as a tool toward the elimination of pesticide use within the city of Seattle and King County.

In brief, the creation of the tier list was not founded on science. If a pesticide label contained the word "danger," it was ranked "Tier 1." If it was cited on the Illinois endocrine disrupter list, it was automatically "Tier 1." Likewise, anything toxic to bees or fish, regardless of application and likelihood of reaching bees or fish, became "Tier 1." For a more thorough review of how the list was developed, refer to an article written by Heather Hansen, the Executive

Director of Washington Friends of Farms and Forests, in the June 2000 issue of *Washington Landscape Professional*. A rebuttal written by Tracy Dieckhoner of the Office of Environmental Management appeared in the July 2000 issue of the same magazine.

The city's overall goal is to reduce pesticide use by 30% by December 2002. As a supposed step toward this goal, any pesticide categorized as Tier 1 was eliminated from use on city property after June 30, 2000, unless an exception was granted through the Office of Environmental Management. Will this actually result in a 30% reduction in pesticide use? That is hard to determine.

The superintendents and managers of Seattle's four city golf courses (Jackson Park, Jefferson Park, West Seattle and Interbay), along with eight WSU scientists, participated in a review of the pesticides that might be needed to manage these facilities. Exception forms were filled out and filed in May 2000 for the products identified as necessary. Where possible, cultural practices or reduced-risk products were recommended as a part of their program, if they were not already in use. (The evaluation showed that the city golf courses had significantly reduced the use of pesticides on the golf course over the last 10 to 15 years as they have implemented their Integrated Pest Management, or IPM, programs.) Rather than respond formally to the applicants, the city of Seattle posted their decision on the Office of Environmental Management's website at [www.ci.seattle.wa.us/oem/pesticides/Pesticides.htm](http://www.ci.seattle.wa.us/oem/pesticides/Pesticides.htm).

Of the insecticides, nothing that controls crane fly larvae was granted an exception. Scimitar was denied an exception due to its lower efficacy than Dursban. Dursban, however, was also denied. At present, if a crane fly larvae population warrants treatment, there are no options available in Seattle without filing for an exception.

Of the herbicide exceptions, all but one (Finale, which was denied) were given temporary approval pending evaluation by a toxicologist. It is important that these

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Drs. Eric Miltner and Gwen Stahnke, Turf Scientists, WSU

products be evaluated for how they are used and their soil adsorption properties as well as just the toxicity of the product itself. Most pesticides are toxic to fish, but are never intended to reach the water. Proper use by licensed individuals, such as those on staff with the city, should limit water exposure.


These policies have been enforced on insecticides and herbicides only at this point. The fungicides, of which only two are not in the Tier 1 category, will face restrictions in the future.

A flaw of the restriction and exception process is that it has the effect of limiting the available solutions for a given problem to one or two products. This is the antithesis of IPM, which, in addition to encouraging use of reduced-risk products, advocates careful analysis of individual situations and use of a range of products to discourage resistance and achieve precise targeting of pests.

### **Crane Fly Conundrum**

For years, the major turfgrass insect pest west of the Cascade Mountains has been the European crane fly. Now we also have the common crane fly, which has two generations per year, as opposed to the European crane fly, which has only one. This results in multiple hatches and greater difficulty targeting and controlling the susceptible larvae. Chlorpyrifos (Dursban) was the most effective product available to control all larval instars of both crane flies. With Dow AgroSciences voluntarily pulling the registration for all homeowner outdoor landscape uses and public areas as of December 2001 (see related article "Chlorpyrifos Redux: It Ain't Over 'til the EPA Sings," *AENews* No. 171, July 2000), we will be reevaluating other control measures. Under the new situation, golf courses will still be able to apply 1 lb. active ingredient per acre of Dursban, which would allow for one application if they should need it for a severe larval infestation on a golf course green. (This would not, however, be allowed on Seattle or King County courses due to the new local ordinances described in the previous section.)

Several legal and effective "older chemistry" products are still registered for turfgrass use. Here are some of our thoughts on these products. Carbaryl, because of its serious bee kill implications, should only be used in the emulsifiable concentrate (EC) formulation at night after all weed flowers have been mowed off. Orthene (acephate) can also kill bees, so it should also be used in the absence of weed flowers. Diazinon is lethal to both bees and birds and cannot be used on sod farms or golf courses. We would not recommend diazinon for home lawns due to its impact on birds. Ethoprop is a restricted-use product labeled for commercial use only; it is not appropriate for home use. Bendiocarb is also a restricted-use product. It may be used on commercial turfgrass, and professional applicators might use it on home lawns, but it does not have a registration for homeowner use. As pesticide reviews continue pursuant to the Food Quality Protection Act, it is likely that some of these products will be cancelled, so we must concentrate on evaluating "newer chemistry" products and timing of applications. Several of these (e.g., thiomethoxam, Merit, Talstar) will be evaluated or reevaluated late this fall or in early spring 2001 for efficacy on crane fly larvae.

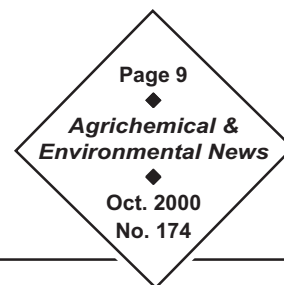
Our first recommendations have always been, and will continue to be, to maintain a healthy turfgrass area through use of the proper grass type for the specific area, adequate fertility, and proper mowing frequency and height (this can also help mask the damage caused by crane fly larval feeding). We are currently working on summarizing the evaluations of product efficacy over the past years. This process is still taking place, but will appear in an article by Drs. Art Antonelli and Gwen Stahnke in the proceedings of the 5<sup>th</sup> annual Pacific Northwest Pesticide Issues Conference to be held in Tacoma on October 19, 2000. 

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# Compost Quality

## New Threats from Persistent Herbicides



Dr. David Bezdicek, Mary Fauci, Dan Caldwell, and Rick Finch, WSU

Persistent herbicides were the culprit in two independent eastern Washington incidents where tainted compost damaged nursery and garden plants. In Spokane, tomatoes and other sensitive plants grown in a commercial greenhouse and gardens developed severe symptoms typical of phenoxy herbicide damage. In Pullman, similar symptoms were noted in tomatoes, potatoes, and leguminous plants like peas and beans. The compost was traced to facilities in Spokane and at Washington State University (WSU) in Pullman.

### **Composting: Public Perception**

The public generally views compost as a desirable and wholesome product, something that can be used with little risk in gardens, nurseries, landscaping, and cropland. Many recommendations from books, bulletins, and university sources suggest annual incorporation of liberal amounts of compost in soil to promote better plant growth, soil health, and environmental stewardship.

The public often assumes that all compost is of reasonably high and consistent quality, free from toxic and persistent chemicals. Unfortunately, this is not always the case. There are few universally acceptable standards for compost quality. Different feedstocks (raw materials), composting methods, and environmental conditions make it difficult to completely control the quality of product. End use of the compost differs as well; therefore, different types of compost are needed. For example, compost designed as a nutrient source for agricultural cropland and commercial vegetable media may not be suitable for mulching nursery stock.

### **Historical Issues in Compost Quality**

Past problems in compost quality have involved high soluble salts; extremes in pH, organic matter, ammonia, and/or organic acids; or high carbon-to-nitrogen ratio (nitrogen deficiency). Many of these problems can be overcome by recognizing the limitations of individual composts and using appropriate rates of compost for the task at hand. In a recent survey,

composts in Washington varied considerably in a number of critical parameters including soluble salts, pH, organic matter, and nitrogen content (3). These results point out the inconsistencies in compost quality and leave the consumer questioning what type of compost to use and at what rates.

As a general rule, however, most composts contain few if any residues of harmful chemicals. Common feedstocks used are usually low in chemical content and the composting process is presumed to detoxify these chemicals. In general, the composting community has been comfortable in the belief that compost feedstocks do not contain significant pesticide residues, and what little may be present are substantially decomposed in the composting process. Experimental evidence presented later will bear this out.

Commercial composting facilities in Washington, as in most states, must have permits. They are also required to routinely submit their products for testing. Compost from the WSU facility, for example, is routinely analyzed for pesticides, polychlorinated biphenyls (PCBs), chlorinated hydrocarbons, and petroleum compounds, and is subjected to an elemental screen. Results are sent to the county health department. So why didn't these tests detect potential problems? It all comes back to persistent herbicides.

### **Persistent Herbicides**

The cause of the two incidents in eastern Washington State was eventually identified as herbicides containing clopyralid or picloram, both picolinic acid herbicides. According to the Washington State Department of Agriculture (WSDA), compost from the solid waste facility on Elk-Chatтары Road near Colbert was used in a greenhouse potting mix in 1999 and 2000 (10). Irregular growth symptoms occurred on tomatoes, marigolds, parsley, and pansies. Some initial reports of the symptoms seemed to indicate soluble salts were the culprit, but plants had symptoms typical of phenoxy herbicide damage. Symptoms included cupping and slight twisting of leaves, accelerated growth, and a "fiddlenecked" appearance. No phenoxy herbicides (such as 2,4-D) were detected in the

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Dr. David Bezdicek, Mary Fauci, Dan Caldwell, and Rick Finch, WSU

samples sent to the WSDA lab, but traces of clopyralid were found at the MDL (minimum detection level) of 0.03 parts per million (ppm) (10). "Confront," a restricted-use herbicide produced by Dow AgroSciences and used by the lawn care industry, contains both clopyralid and triclopyr. Approximately 20% of the commercial lawn applications in Spokane may contain the active ingredient clopyralid (10). Typically, applications occur in the spring for control of dandelions and again in summer for clover control. The Confront label says "Do not use compost containing grass clippings from turf treated with Confront in the growing season of application." Apparently the sixty- to ninety-day composting process was not sufficient to break down the active ingredient at Spokane.

Approximately ninety miles south of Spokane, a second (independent) incident occurred at the WSU compost facility. WSU composts approximately 24,000 cubic yards of feedstocks from manure, separated dairy solids, and animal bedding from the university farms, potting mix from campus greenhouses, food from cafeterias, and a small proportion of coal ash. WSU also produces an organic compost without the coal ash. Compost from the WSU facility is sold to nurseries in the Moscow-Pullman area, and in the Spokane-Post Falls area. It was also distributed to Koppel Farm community gardens in Pullman and the newly formed Moscow community garden. Application rates by users varied. It was used as a mulch on trees and shrubs; one to three inches were added to gardens; and it was blended 50/50 with topsoil and sold by local nurseries.

By late spring of 2000, poor plant growth was reported at the Koppel Farm in Pullman and at the Moscow Community Garden. Affected plants included tomatoes and potatoes (the nightshade family) and beans and peas (legume family). Typical symptoms of plant injury were leaf cupping, distortion of stems, and a fiddlenecked appearance of leaves. While spray drift was suspect, the Koppel farm is located in Pullman away from farming operations. With time, WSU investigators and the community pointed to the WSU

compost as the common denominator. WSU and WSDA began an investigation. At the time of this writing, a formal report was not available from WSDA. Initially a series of laboratory tests of the compost did not reveal any contamination from any suspected herbicides. However after consultation with a local commercial analytical laboratory, procedures were modified and detection levels increased in sensitivity from about 0.06 to below 0.02 ppm. As a result, picloram was identified in the compost in concentrations from 0.05 to 0.28 ppm. No other herbicide residues were detected, including clopyralid (the chemical detected in Spokane compost) or 2,4-D.

The source of the contamination at Pullman was identified as Tordon, a Dow AgroSciences product containing picloram as its active ingredient. Picloram is used to control thistle and other broadleaf weeds in pasture, rangeland, and roadways. Pasture ground was initially treated with Tordon according to the label, but later the pasture was cut for hay and fed to livestock. Apparently, residues of picloram on the hay were ingested by livestock, passed through the animals (primarily via the urine), and deposited in the manure and bedding. Picloram residues were delivered to the composting facility with the livestock manure and bedding.

At the present time, efforts are underway in both Spokane and Pullman to further identify feedstocks for contamination and to identify methods of remediation in affected soils. Because analytical procedures do not always detect levels of picloram and clopyralid low enough to produce a toxic effect in sensitive plants, both the Spokane and Pullman compost facilities are conducting bioassays with sensitive crops to identify problematic feedstocks. Published studies and preliminary trials at Pullman indicate the no observable effects level (NOEL) is about 1 part per billion (ppb) for picloram in tomato—at least 10 times lower than the level of detection with instruments. In the bioassays, suspected compost is added to the potting mix and plants are grown for about six weeks.

Dr. David Bezdicek, Mary Fauci, Dan Caldwell, and Rick Finch, WSU

## Characteristics of the Herbicides

Both clopyralid and picloram belong to pyridine-carboxylic or picolinic acid family produced by Dow AgroSciences. Clopyralid is sold under the product names Reclaim, Stinger, Transline, Confront, and Curtail. Picloram is found in Grazon, Tordon K, Tordon 22K, Grazon P+D, Tordon 101. Some chemical and physical features are listed in Table 1 (11).

Clopyralid and picloram are growth-regulator type herbicides. Like 2,4-D and dicamba, they work by mimicking plant growth hormones called auxins. Clopyralid is an active ingredient in several products that have a wide variety of applications: Confront (with triclopyr) is used in turf; Lontrel is used in turf, sod, and woody ornamentals; Stinger is used in asparagus, Christmas trees, grass seeds, field corn, sugarbeets, mint, and grains; and Curtail (with 2,4-D) is used for hay, wheat, barley, grass pasture, and rangeland. The main target for clopyralid is broadleaf weeds. However, many desirable non-grass plants are susceptible to damage, particularly legumes (alfalfa, beans, peas) and plants in the nightshade family (potatoes, tomatoes, peppers). Both clopyralid and picloram are relatively slow to degrade and considered moderately to highly persistent in soil environments.

The label for Curtail (clopyralid and 2,4-D) cautions that, in drier areas of reduced microbial activity, sensitive crops like alfalfa, dry bean, and lentil may be injured for up to four years after application. For this reason, formulations containing picloram or clopyralid carry a statement that compost made from treated grass clippings or crop residues should not be used for mulch or in compost in the same growing season in which the herbicide was applied.

## Pesticide Persistence in Compost

In laboratory studies with herbicide-treated grass that was composted, Vandervoort et al. reported that flurprimidol, chlorpyrifos, and triclopyr were below the detection level of 0.01 ppm at 265 days, whereas clopyralid was still evident at levels slightly less than 1.4 ppm. However, at 128 days of composting,

TABLE 1		
Some chemical and physical features of clopyralid and picloram.		
Property	Clopyralid	Picloram
Formula (acid)	C <sub>6</sub> H <sub>3</sub> Cl <sub>3</sub> N <sub>2</sub> O <sub>2</sub>	C <sub>6</sub> H <sub>3</sub> Cl <sub>2</sub> NO <sub>2</sub>
Solubility (water) mgL <sup>-1</sup>	1000	430
Stability	Unstable in acid	Decomposed by UV light
pK <sub>a</sub> *	2.3	2.3
Persistence (field half life, days)	40 (12-70)	90 (20-300)
*pH of a solution in which the concentration of the neutral and the ionized forms of the pesticide are equal.		

clopyralid was found at levels of 4.7 to 31.9 ppm (9). These levels are well above the range needed to cause serious injury to sensitive crops since tomatoes were injured in the Spokane case at the MDL level of 0.03 ppm clopyralid (10). Stephenson et al. reported that although the actual quantities of 2,4-D, mecoprop, and dicamba from grass clippings decreased during composting, their concentrations increased by factors of 1.7, 2.0, and 2.8 times, respectively, because the organic materials in the compost degraded more quickly (7).

Michel et al. pointed out that 30,000 tons of pesticides are applied annually to lawns and gardens in the United States, with diazinon most widely used at 5000 tons/year, followed by 2,4-D at 3000 tons/year (4). In an Illinois survey, diazinon was found at levels up to 5 ppm in the majority of yard trimmings at composting sites. The final concentration of 2,4-D, diazinon, and pendimethalin was at or near the level of detection after composting (4).

Two extensive reviews on pesticide degradation during composting reported that while pesticide residues are found in composting feedstocks, herbi-

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Dr. David Bezdicek, Mary Fauci, Dan Caldwell, and Rick Finch, WSU

cides as a rule are degraded sufficiently during composting and are detected only rarely (1,2). Of the pesticides, persistent insecticides in the organochlorine class were most likely to be detected in compost, but these compounds were banned for use in the United States many years ago. Persistent insecticides like chlordane are often found in feedstocks and compost because of traces found in the soil from termite control. However, they present little threat to health or to plants and routine analysis for these pesticides doesn't seem warranted (8).

In a New York study by Richard and Chadsey, twelve samples of finished compost were analyzed for 200 pesticides. Only four pesticides were detected, mainly persistent chlorinated insecticides. They concluded that low levels of pesticides are to be expected in yard waste when collected, but these levels will be even lower after composting (5). These conclusions are based on the assumptions that commercial yard care companies use fairly low levels of relatively biodegradable pesticides (insecticides) and that there is dilution of homeowner-treated lawn clippings with untreated clippings. However, these assumptions may not apply where persistent herbicides are used in lawn maintenance. In these cases, it is essential to confirm experimentally the levels of pesticides in yard waste and eventually in compost that will be sold to the public. Analytical monitoring of compost may not always detect these persistent herbicides at levels low enough to predict injury to sensitive crops. Plant bioassays are needed unless more sensitive analytical procedures are used.

### **Preventive Measures at Pullman**

Feedstocks and finished compost will now be bioassayed to significantly reduce the risk of contaminated compost reaching the public. WSU has initiated a series of measures at Pullman to further safeguard the public against contaminated compost.

- ◆ WSU greenhouse and garden trials at the Koppel Farm and Moscow Community Garden have been initiated to determine the quantity of activated charcoal needed to neutralize the

effects of the herbicide. WSU will provide activated charcoal to affected users either this fall or next spring as a means of remediating the effects of the compost.

- ◆ WSU will provide a service of conducting bioassays on soil and compost suspected of being contaminated.
- ◆ Vendors supplying hay and other feedstocks to WSU must sign an affidavit certifying that these products are free of picloram and clopyralid residues. Prior to payment, feedstocks will be bioassayed and suspect materials will be subjected to appropriate laboratory tests.
- ◆ WSU has initiated a program where affected users of the compost will be financially reimbursed for any losses as a result of using the affected compost.


### **Implications for Yard Waste Composting Facilities**

The Spokane incident presents some unique challenges for facilities that compost yard wastes. While homeowners, municipalities, farmers, and commercial landscapers are encouraged to recycle, many materials like grass clippings are banned from landfills and cannot be burned. Composting sites have become logical recipients for these materials. According to Dr. Bob Rynk in *BioCycle* magazine, "there is a contradiction...in regard to herbicide use; how can communities and regulatory agencies on one hand encourage recycling and composting of yard trimmings yet, on the other hand, allow the use of chemicals that render the compost (or mulch) harmful?" (6) From an immediate and practical viewpoint, compost facilities must now assure the quality of their product through adequate testing that includes both residue analysis and bioassays. The industry cannot rely solely on analytical testing as the levels of these herbicides are often toxic at an order of magnitude lower than what instruments can detect. (ED. NOTE: *Communication must also play a role. See related article, "Turfgrass Clippings," p. 6.*)

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# Compost, cont.

Dr. David Bezdicek, Mary Fauci, Dan Caldwell, and Rick Finch, WSU

Should those registering persistent herbicides give more consideration to the potential end use of their products? With composting now being accepted as a standard practice of waste reduction, should not the entire waste reduction and pesticide industries assure that chemicals applied to potential composting feedstocks be compatible with the potential end users of the compost? Better awareness and communication between chemical suppliers, lawn care providers, homeowners, other chemical users, and the composting community is needed to recognize the risks of using persistent herbicides as many feedstock customers don't always know the history of their feedstocks. Ultimately, the general public should be more aware that grasscycling is the best solution to the problem of green wastes being transported to local compost facilities. The Washington Organic Recycling Council (WORC) is actively involved in educational recycling programs and is fully aware of the persistent herbicide problem nationwide. Recent events can be seen at the WSU Compost Home Page at <http://css.wsu.edu/compost/>. 

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## REFERENCES

1. Buyuksonmez, Fatih, Robert Rynk, Thomas F. Hess, and Edward Bechinski. 2000. Occurrence, degradation and fate of pesticides during composting. Part II: Occurrence and fate of pesticides in compost and composting systems. *Compost Sci. and Utilization*. 8(1):61-81.
2. Buyuksonmez, Fatih, Robert Rynk, Thomas F. Hess, and Edward Bechinski. 1999. Occurrence, degradation and fate of pesticides during composting. Part I: Composting, pesticides, and pesticide degradation. *Compost Sci. and Utilization*. 74(1):66-82.
3. Compost Connection for Washington Agriculture. 1996. WSU Cooperative Extension. Vol. 1 and 2.
4. Michel, Frederick C., Dan Graeber, Larry J. Forney, and C. Adinarayana Reddy. 1996. The fate of lawn care pesticides during composting. *BioCycle*. 37: 64.
5. Richard, T. and M. Chadsey. 1990. Environmental impact of yard waste composting. *BioCycle*. 31(4):42-46.
6. Rynk, Robert. 2000. Dealing with herbicide residues in compost. *BioCycle*. 41(9):42-47.
7. Stephenson, G., P. Charbonneau, S. Lang, C. Bowhey, and M. Carter. 1994. Persistence of pesticides (2,4-D, Dicamba, and Mecoprop) in composted turfgrass clippings. GTI Annual Research Report. Guelph Turfgrass Institute.
8. Strom, Peter F. 2000. Pesticides in yard waste compost. *Compost Sci. and Utilization*. 8:54-60.
9. Vandervoort, C., M. J. Zabik, B. Branham, and D. W. Lickfeldt. 1997. Fate of selected pesticides applied to turfgrass: effect of composting on residues. *Bull. Environ. Contam. Toxicol.* 58:38-45.
10. WSDA. 2000. WSDA Case 003S-00 on Spokane compost incident, R. Scott Nelson reporting.
11. WSSA Handbook. 1994. Weed Science Society of America Herbicide Handbook, 7<sup>th</sup> edition.

## PNW Ag/Water Quality Conference

"Designed to improve communication, build understanding, and foster cooperation between people in agriculture, the environment, and government," **Agriculture and Water Quality in the Pacific Northwest** is being held

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# Structural Pest Management Out of the Shadows

Gene Chafe, Senske Pest Control

“Just who the heck are you guys?” asked a House of Representatives staffer on the steps of the Longworth House office building this past February. Before I could respond, he continued, “I’ve seen you guys all over the place this morning.”

“Us guys” were over 600 representatives of the structural pest management industry attending our National Pest Management Association’s annual legislative days in Washington, DC. Our purpose that morning was to demonstrate to our elected representatives just who, in fact, we were and to point out what their actions regarding the implementation of the Food Quality Protection Act (FQPA) and the proposed Children’s Environmental Protection Act (CEPA) would mean to our industry as well as to the health and welfare of their constituents back home.

## **So...Who ARE We?**

“Just who the heck are you guys?” is a question that we, as an industry, have grappled with since our organization’s inception in 1933.

From my perspective, as a third generation pest management professional, we are indeed “Guardians of your Environment,” a slogan utilized by the National Pest Management Association (NPMA) and very much disputed by a number of environmental organizations. In the recent past, well-meaning but misguided public advocacy groups have portrayed the structural pest control industry as simply purveyors of pesticides, assassins utilizing World War II “nerve toxin” technology. Our U.S. Environmental Protection Agency (EPA) has forced cancellations of important pesticide registrations, ignoring scientific data that indicate a history of safe, beneficial uses. In the midst of this seemingly daily barrage of bad publicity, the Professional Pest Management Alliance (PPMA), an affiliate organization of NPMA, conducted a series of consumer focus groups, to more accurately determine how the general public perceived our industry.

## **Public Perception**

The PPMA focus groups were conducted in six major U.S. cities (including Portland, OR) with over 150

homeowners between 25 and 64 years of age. Their profile of a structural pest management professional was a male, who was knowledgeable, trustworthy, pleasant, of slender build, and a problem solver.

When citing the reasons for possibly utilizing the services of a structural pest management professional, the groups mentioned “peace of mind” and “guaranteed results” as leading decision making factors. Surprisingly, environmental factors did not figure prominently as an argument against utilizing the services of a pest management professional. In fact, the use of toxic chemicals was not considered a large deterrent—those questioned said they would prefer organic methods, but they believed these methods were less effective.

Of particular interest is that those questioned were comfortable with the perception that structural pest management professionals utilize potentially “toxic chemicals,” but these same homeowners were relatively ignorant about appropriate qualifications for professionals who apply these chemicals. Those surveyed believed that certification and training took place at the company level, but great uncertainty was exhibited regarding the qualifications of service technicians. Indeed, most pest management firms provide initial on-the-job training. But in addition, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires states to establish core competency criteria for commercial pesticide applicators. These criteria vary from state to state, but in general, applicants must demonstrate knowledge of state and federal pesticide rules and regulations; show basic understanding of entomology; be able to identify pesticides and their properties; know the factors leading to pest infestation and damage; and exhibit some degree of financial responsibility.

## **Changes in the Industry**

If asked to cite one example of significant change within the structural pest control industry over the last twenty to thirty years, I would cite the very thing we apparently fail to communicate to our customers: advances in industry education. When I began

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# Structural Pest Management, cont.

## Gene Chafe, Senske Pest Control

working in the structural pest management field some thirty years ago, training was primarily “on the job” and certification was non-existent. Today’s pest management professional is likely to have at least some post-high-school education and often receives upwards of ten to twenty hours of industry-specific education per year. Standard coursework includes pest identification, biology, and eradication procedures. Increasingly, since approximately 95% of pest management professionals are small business owners, training is offered in business practices such as human resource management as well.

Industry associations such as the National Pest Management Association (NPMA), Responsible Industry for a Sound Environment (RISE), Washington Friends of Farms & Forests (WFFF), the Washington State Pest Control Association (WSPCA) and the Pacific Northwest Pest Management Conference (PNWPMC) are but a few entities offering nationally recognized technical educational opportunities to Pacific Northwest pest management professionals.

Here in Washington State, the Pacific Northwest Pest Management Conference and the Washington State Pest Control Association exemplify the industry’s commitment to education. These organizations work to enhance the effectiveness, conscientiousness, and image of the pest control industry through education and communication. Recognizing the need for region-specific research and education, these organizations have taken their efforts a step farther, working toward funding an endowed chair in urban pest management at Washington State University.

In conclusion, the structural pest management industry continues to thrive, with some 19,000 firms making over 50,000,000 consumer contacts per year. Despite serious attacks and enormous changes, the American public seems supportive of our efforts to protect their health and property. 

*Gene Chafe works with Senske Pest Control in Kennewick. He can be reached at (509) 736-0754 or [gchafe@owt.com](mailto:gchafe@owt.com).*

## 2000 Pesticide Container Recycling Schedule

Washington Pest Consultants Association organizes a series of collection dates and sites for empty pesticide containers. Information is subject to change; use the names and telephone numbers provided to confirm.

### CONTAINER CRITERIA:

- Rinsed—no residue
- Majority of foil seal removed from spout
- Clean, dry, and odor-free
- Lids removed
- Half-pint, pint, quart, one, and two-and-a-half gallon containers accepted whole
- Five-, 30-, and 55-gallon containers accepted whole if lids and bails removed

DATE	TIME	LOCATION	SPONSOR	CONTACT	PHONE
Oct. 3	9a-10a	Ellensburg	DOT	Susanne Tarr	(509) 962-7577
Oct. 13	8a-3p	Othello	Conner Flying Inc.	Mark Conner	(509) 488-2921
Oct. 16	8a-10a	Waterville	Western Farm Service	Dale Gromley	(509) 745-8857
	11a-2p	Coulee City		Pete Thiry	(509) 632-5697
	3p-5p	Ephrata	The Crop Duster	Martin Shaw	(509) 754-3461
Oct. 17	8a-11a	Wilbur Airport	Greg’s Crop Care	Greg Leyva	(509) 647-2441
	1p-4p	Davenport Airport	Northwest Aviation Inc.	Lee Swain	(509) 725-0011
Oct. 18	8a-Noon	Rosalia	Western Farm Service	John Hartley	(509) 523-6811
	1p-3p	Mockonema	McGregor’s	Dale Deerkop	(509) 635-1591
Oct. 19	8a-10a	Connell	B&R Aerial Crop Care	Chris Eskildsen	(509) 234-7791
	1p-3p	Pasco, Kahlotus Rd.	Air Trac	Gerald Titus	(509) 547-5301
Oct. 23	8a-10a	Spokane, 222 N Havana	WSDA & WSU	Tim Schultz	(509) 533-2690
				Jim Lindstrom	(509) 533-2686
	11a-1p	Mead	Cenex	Todd Race	(509) 466-5192
Oct. 26	3p-5p	Deer Park	Inland Agronomy	Jim McAdams	(509) 276-2611
	9a-Noon	Coulee City	Cenex	Huck Dilling	(509) 632-5292
	1p-3p	Almira		Don Felker	(509) 639-2421
Oct. 27	8a-Noon	Moses Lake	Tom Dent Aviation	Tom Dent	(509) 765-6926
	2p-5p	Warden	Kilmer Crop Dusting	Terry Kilmer	(509) 349-2491
Oct. 30	9a-3p	Outlook	Snipes Mtn. Trans. Stn.	Mark Nedrow	(509) 574-2472
Oct. 31	8:30a-3p	Yakima	Terrace Hts. Landfill		

# Putting the Bite on Mosquitoes In Western Washington

From an interview with Dr. Terry Whitworth, Owner, Whitworth Pest Control

Mosquitoes are an intermittent and highly localized problem in western Washington. When conditions favor their breeding and development, they can make life miserable. The suburban homeowner who wants to sit out on her deck with a cool drink at twilight can find her plans ruined by thirsty hordes of these pesky bloodsuckers. The group of youths trying to practice football in an infested field will have a hard time concentrating on their scrimmage if they're busy slapping every inch of exposed skin.

So, what are urban dwellers to do from early July through mid-September, when mosquitoes are at their worst?

Individually, there is not much they *can* do. According to the American Mosquito Control Association (AMCA), mosquito control by individuals is limited to repellents and space sprays, both of which can have immediate (albeit limited) but short-term effect. Personal repellents can be applied to skin or clothing per label directions. Space repellents such as candles, torches, or coils containing oil of citronella are effective under windless conditions, and generally are less effective than personal repellents. Insecticidal space sprays such as foggers and aerosols can kill enough mosquitoes to provide limited, temporary relief. Sprays and foggers are more effective indoors than outside, and label directions should be followed carefully.

On the whole, however, mosquito control is not a yard-by-yard or business-by-business proposition. These insects can cover a large geographic area (some mosquitoes can travel up to twenty miles a day in search of sustenance) and their breeding grounds are often widely dispersed, so spraying your deck isn't the solution.

## **Control Strategy: Larvae or Adults?**

The traditional method of controlling mosquitoes is treating their breeding grounds with larvicide. Knocking down populations in the larval stage can be very effective. This can be tricky, however, when breeding

grounds are widely dispersed, as is the case in western Washington.

Terry Whitworth, a PhD entomologist, recognized pest control expert, and owner of Whitworth Pest Control, described a situation he encountered when the city of Renton approached him for pest control services. The source of the problem spanned sixty acres of mostly city-owned wetlands below a residential area. Initially, Whitworth treated the wetland breeding grounds. Due to the sensitive nature of the wetlands (not an uncommon consideration in western Washington), he used Altosid (methoprene), a very soft chemistry. The treatment was fairly effective, but very expensive due to the cost of the pesticide and the size of the acreage treated. Additional wetlands beyond the treated area further complicated the problem. The immediate populations were controlled, but others migrated in.

In situations such as this, Whitworth finds that treating the adult mosquitoes with an adulticide such as Biomist is more effective than trying to eradicate the widely dispersed larvae. Not only is the treatment less expensive, it concentrates on the nuisance mosquitoes—those that find their way to residential neighborhoods—rather than trying to eliminate the entire mosquito or larva population.

## **Get 'Em Where They Live**

When targeting adults, Whitworth seeks the areas he calls "micro-refugia"—the brushy, damp, shaded areas where the mosquitoes hang out by day.

Whitworth developed this technique while working with Puget Power (now Puget Sound Energy) in the early 1980s. The company's water diversion had created marshy areas throughout which mosquito larvae were widely dispersed. As with the Renton situation described above, finding and treating these many pockets of juveniles was so time-consuming as to be cost-prohibitive. In an effort to find a more time- and cost-effective strategy, Whitworth tried treating the brushy hillside area where the adult mosquitoes spent their daylight hours, between the lowland marshes and the hilltop residences. It worked.

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# Mosquitoes, cont.

From an interview with Dr. Terry Whitworth, Owner, Whitworth Pest Control

Because of the mosquitoes' high reproductive rate and overlapping generations, knocking down adult mosquitoes on the fringes of populated areas generally requires repeated treatments. Treatment, in fact, may be necessary as often as weekly. While this frequency of treatment raised environmental concerns, careful monitoring has shown that treatment at the allowed levels does not harm vertebrates.

## Treatment in Residential Areas

The city of South Bend presented Whitworth with a slightly different mosquito abatement problem. South Bend hosts an annual Labor Day weekend celebration that results in a great influx of tourists. Coincidentally, Labor Day tends to be peak time for the salt marsh mosquitoes (*Aedes dorsalis*) that breed at the nearby mouth of the Willapa River.

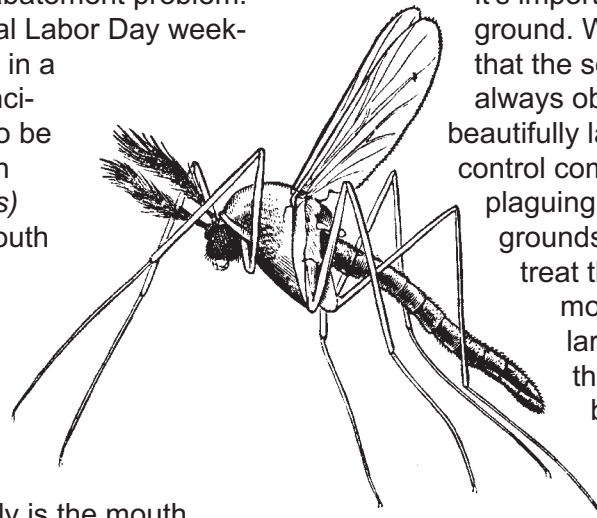
As with other western Washington areas, it was expensive and complicated to treat the breeding grounds of South Bend's mosquitoes. Not only is the mouth of the Willapa a large area, it is a sensitive oyster bed environment. Moreover, mosquitoes from this area only present a problem in South Bend when conditions are exactly right—when tide and temperature align, and when the prevailing wind blows from the west to bring a fresh hatch into town. When this happens, it creates an immediate and intolerable situation in South Bend. Some years, this happens only once, but other years it may happen six or seven times. Targeted treatment during these times of infestation makes sense for South Bend. In this case, adulticide chemistries are applied right in town, on the property of the residents who request it.

By agreeing to add a dollar or two to their utility bills, the citizens of South Bend were able to begin a comprehensive mosquito control program. Now Whitworth Pest Control is "on call" for times of mos-

quito emergencies. Even though the initial impetus for mosquito abatement came from the tourists in South Bend, the residents admit they love having their outdoor evenings back, too.

## Know the Source

While targeting adult mosquitoes is an effective alternate strategy in special situations, treating mosquito breeding grounds is still effective, and still the most widely used mosquito abatement technique. But in order to attack mosquitoes where they breed, it's important to correctly identify the breeding ground. Whitworth's experience has shown that the source of a mosquito infestation is not always obvious. A representative from a beautifully landscaped winery contacted the pest control company because mosquitoes were plaguing guests at events on the winery grounds. The winery wanted Whitworth to treat their ornamental ponds, "where the mosquitoes breed." In fact, sampling for larvae revealed that the ponds weren't the breeding grounds at all. The wily buggers were winging their way in from nearby wetlands on private property and ecological preserves. Treating those large and sensitive areas was going to be impractical if not impossible.



Urban environments, where populations are dense and land is subject to mixed uses, present difficulties for mosquito control (or control of any pest insect). If the affected individual or business does not control land on which the breeding takes place, the options include treating the adult mosquitoes on the site of concern and getting together with neighboring property owners to solve the problem jointly.


## Pooling Resources

Mosquitoes don't respect property lines. Given their mobility, they can create a pest problem spanning many acres and affecting numerous jurisdictions. In situations such as this, parties can get together and form a mosquito abatement district by popular vote.

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## Mosquitoes, cont.

From an interview with Dr. Terry Whitworth, Owner, Whitworth Pest Control

A number of these districts are in place in eastern Washington, and a few have been established west of the mountains as well, including a successful district along the drainage of the Upper Cowlitz River. Provisions for forming a mosquito control district in the state of Washington are given in RCW 17.28. 

*This article was taken from an interview with Dr. Terry Whitworth and from information provided by the American Mosquito Control Association (AMCA). Dr. Whitworth is an entomologist and past president of Washington State Pest Control Association. He writes and lectures extensively on pest control issues. He can be reached at [wpctwbug@aol.com](mailto:wpctwbug@aol.com) or (253) 535-1818, or visit his website at [www.whitworthpestcontrol.com](http://www.whitworthpestcontrol.com). The AMCA website, with further information on mosquito control, is [www.mosquito.org](http://www.mosquito.org).*

### WaPCA Annual Meeting

Washington Pest Consultants Association will hold its annual meeting

#### November 9 and 10, 2000 Yakima Convention Center

Pre-registration is \$65 (\$75 on-site), and includes Thursday lunch, annual WaPCA dues, and a year's subscription to *AENews!* This year's sessions will highlight tree fruits and grapes, row crops, dryland crops, agricultural burning, spider mites, plant physiology, and pesticide application buffer zones. For further information, contact Ron Turner at (509) 760-2705 or Ellen Bentley at (509) 786-2226.

## Pesticide Applicator Training Courses

Washington State University provides pre-license and recertification training for pesticide applicators.

Pre-license training provides information useful in taking the licensing exam. For details, see <http://pep.wsu.edu/education/plt.html>.

Licensed pesticide applicators in Washington have two choices to maintain their license; either retest every five years or participate in the state recertification (continuing education) program. See <http://pep.wsu.edu/education/recert.html>.

**General Info:**  
<http://pep.wsu.edu/>

		EASTERN WASHINGTON			WESTERN WASHINGTON			
		Date	City	Facility	Date	City	Facility	
<b>PRE-LICENSE</b>		Jan. 16, 17, 18	Pasco	Doubletree	Jan. 2, 3, 4	Vancouver	WSU Vancouver	
		Jan. 22, 23, 24	Yakima	Conv. Center	Jan. 9, 10, 11	Tacoma	Pac Lutheran U	
		Jan. 30, 31 Feb. 1	Pullman	University Inn (Moscow)	Feb. 6, 7, 8	Kirkland	Lake WA Tech College	
		Feb. 6, 7, 8	Spokane	Valley Doubletree	Mar. 13, 14, 15	Puyallup	WSU Puyallup Allmendinger Ctr	
		Feb. 13, 14, 15	Moses Lake	Conv. Center	Mar. 27, 28, 29	Bellingham	Whatcom Comm. College	
<b>RECERTIFICATION</b>		Nov. 7, 8	Pasco	Doubletree	Nov. 13, 14	Lynnwood	Edmonds Comm. College	
		Nov. 8 SPANISH	Pasco	Doubletree	Jan. 3, 4	Vancouver	WSU Vancouver	
		Jan. 17, 18	Pasco	Doubletree	Jan. 10, 11	Tacoma	Pacific Lutheran University	
		Jan. 23, 24	Yakima	Conv. Center	Jan. 18, 19	Lynnwood	Edmonds Comm. College	
		Jan. 25, 26	Wenatchee	Doubletree	Jan. 29, 30	Lacey	St. Martin's Coll. Worthington Ctr.	
		Jan. 30, 31	Pullman	University Inn Moscow	Feb. 1, 2	Des Moines	Highline Comm. College	
		Feb. 7, 8	Spokane	Valley Doubletree	Feb. 7, 8	Kirkland	Lake WA Tech. College	
		Feb. 14, 15	Moses Lake	Conv. Center	Feb. 13, 14	Port Orchard	Givens Comm. Center	
	<b>SPECIAL WORKSHOPS include</b>					Mar. 8, 9	Seattle	UW Ctr. For Urban Hort.
	<b>Integrated Plant Health Jan. 23-25, Puyallup; Conifer/Christmas Tree Jan. 29, Lacey; and Commercial Applicator Feb 9, Spokane</b>					Mar. 27, 28	Bellingham	Whatcom Comm. College

# Insect of the Month

## Lady Beetle

The lady beetle is also called ladybug, ladybird, and ladybird beetle. Adult lady beetles are oval and convex, like little domes. They are red or orange and black, with many variations of spot schemes; some have no spots. Generally, they are shiny and have short legs and antennae. An adult lady beetle is about one-fourth-inch long.

### Life Cycle

Lady beetles go through four distinct life stages: egg, larva, pupa, and adult. The entire cycle takes about a month. The eggs are tiny and yellow, and are found in clusters underneath leaves. They hatch into larvae about four or five days after they are laid, then the larvae feed and grow for two or three weeks before pupating. Adults emerge from the pupae after about six days.

### Behavior

Both adult and larval lady beetles are known as beneficial insects primarily because of their propensity to feed on aphids. They have huge appetites, and are quite effective at diminishing aphid populations. They also eat other pest insects and some feed on pest diseases such as mildew.

In the fall, lady beetles congregate in warm, protected areas. Sunny, southern-exposure walls are a favorite, especially for the Asian lady beetle (*Harmonia axyridis*). This species is drawn to vertical surfaces reminiscent of its cliffside habitat in its home countries of Japan, Korea, and other parts of Asia. Asian and other lady beetles may gather under leaves, along fences, under logs or rocks, or in your nice warm house, shed, or barn. Clusters can sometimes number hundreds or even thousands.

The United States Department of Agriculture released large numbers of Asian lady beetles in the late 1970s and early 1980s in Chelan, Klickitat, and Yakima counties for control of pear psylla and other fruit pests. While the insects did not establish in eastern Washington where they were released, residential

infestations in western Washington increased in the early 1990s, peaking with a 1993 explosion.

### Control

Since lady beetles are beneficial insects, chemical control is not recommended. If pesticides are employed, the remaining lady beetle carcasses can serve as food for other insects, such as carpet beetles, and lead to a different sort of infestation.

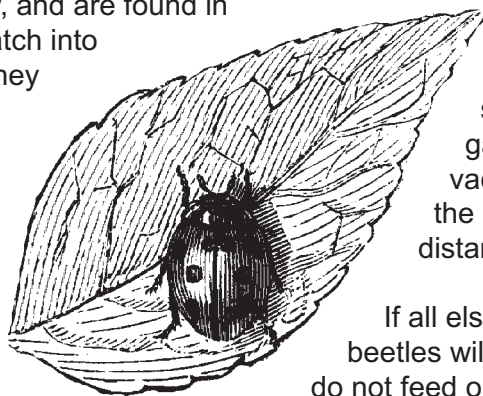
The best defense against lady beetles in your home is sealing off the cracks and crevices through which they might enter. Make sure screens and doors fit tightly. Caulk gaps and cracks. Use a wet-dry ("shop vac") type vacuum cleaner to remove the bugs and release survivors a good distance from the house.

If all else fails, remember that many lady beetles will eventually move back outside. They do not feed on wood or stored products. Their defensive odor repels predators, but does not generally affect humans. Apart from the nuisance factor, lady beetles are good insects. Their presence in the environment has the potential to reduce pesticide use, so it's in everyone's best interest to let them live.

### Ask the Experts

For information on controlling lady beetles or other pests, contact your county extension agent. Pesticides registered for use in Washington and Oregon are listed in the Pesticide Label Database on the Pesticide Information Center On-Line (PICOL) website, <http://picol.cahe.wsu.edu>. If you have any doubts about performing pest control operations yourself, contact a pest control professional. 🍎

Thanks to Dr. Art Antonelli, WSU Puyallup Research and Extension Center, and Art Losey, Washington State Pest Control Association. Portions of this article were adapted from WSU Cooperative Extension bulletin WSU PLS-144 by Dr. Daniel A. Suomi of Washington State Department of Agriculture.



# Tolerance Information

Chemical (type)	Federal Register	Tolerance (ppm)	Commodity (raw)	Time-Limited		
				Yes/No	New/Extension	Expiration Date
avermectin (insecticide/miticide)	8/4/00	0.05	basil	Yes	Extension	7/31/01
	pg. 37874					
Comment: With this action, EPA is re-establishing a time-limited tolerance that had expired. The tolerance is being re-established in response to EPA again granting a Section 18 emergency exemption for the use of avermectin to control leafminers in California basil.						
diflubenzuron (insecticide)	8/4/00	6.00	rangeland grass	No	N/A	N/A
	pg. 47877					
carfentrazone-ethyl (herbicide)	8/9/00	0.30	cereal grain hay	No	N/A	N/A
		0.30	cereal grain stover			
		0.20	field corn, sweet corn, and sorghum forage			
	pg. 48620	0.10	cereal grain group			
		0.10	sweet corn, kernel+cob w/husk removed			
		1.00	cereal grain straw (excluding corn and sorghum)			
fenpropathrin (herbicide)	8/9/00	15.00	currants	Yes	Extension	12/31/01
		15.00	soybean forage			
		20.00	soybean hay			
		1.00	soybean hulls			
	pg. 48617	0.20	soybean meal			
		1.50	soybean refined oil			
		0.10	soybean seed			
Comment: These time-limited tolerances are being extended due to EPA again granting Section 18s for the use of fenpropathrin to control twospotted spider mites in soybeans in Delaware and Maryland and for the control of stem borers in Washington currants.						
imidacloprid (insecticide)	8/9/00	0.30	turnip and beet roots	Yes	Extension	6/30/02
	pg. 48634	3.50	turnip and beet tops			
Comment: These time-limited tolerances are being extended due to a continued emergency situation with aphids in California and a newly identified exemption need in Arizona.						
pymetrozine (insecticide)	8/9/00	0.05	cucurbit vegetables (Crop Group 8)	No	N/A	N/A
	pg. 48626	0.05	fruiting vegetables (Crop Group 9)			
sodium chlorate (desiccant)	8/9/00	exempt	wheat	Yes	Extension	12/31/02
	pg. 48637					
Comment: This time-limited exemption is being extended by EPA due to a continued need for the use of sodium chlorate on Arkansas wheat.						
coumaphos (insecticide)	8/16/00	100.00	beeswax	Yes	New	12/31/02
	pg. 49927	0.10	honey			
Comment: These time-limited tolerances are being established in response to EPA granting Section 18s for the use of coumaphos to control varroa mite and small hive beetle in bee hives in 45 states.						

...continued on next page

# Tolerance Info, cont.

Chemical (type)	Federal Register	Tolerance (ppm)	Commodity (raw)	Time-Limited		
				Yes/No	New/Extension	Expiration Date
propiconazole (fungicide)	8/17/04	0.20	grain sorghum grain	Yes	Extension	1/1/06
		1.50	grain sorghum stover			
		20.00	sorghum, aspirated grain fractions			
	pg. 49924	0.50	dry beans			
		8.00	dry bean forage and hay			
		1.00	blueberries, cranberries, and raspberries			
Comment: These time-limited tolerances are being extended in response to EPA granting Section 18s for the use of propiconazole in various states. The diseases at issue are sorghum ergot and rust in sorghum and dry beans, cottonball disease in cranberrie						
zinc phosphide (rodenticide)	8/17/04	0.20	barley hay	Yes	New	1/1/06
		0.01	barley grain			
		0.02	barley straw			
		0.01	wheat aspirated grain fractions			
	pg. 49936	0.01	wheat hay			
		0.01	wheat grain			
		0.01	wheat straw			
Comment: These time-limited tolerances are being established in response to EPA granting a Section 18 exemption for the use of zinc phosphide to control voles in Idaho barley and wheat.						
fosetyl-al (fungicide)	8/19/04	0.50	cranberries	No	N/A	N/A
	pg. 50431					
dimethenamid (herbicide)	8/25/04	0.01	dry bulb onions	Yes	New	1/1/07
	pg. 51544	0.01	sugar beet roots and tops			
		0.05	sugar beet pulp and molasses			
Comment: These time-limited tolerances are being established in response to EPA granting Section 18 exemption for the use of dimethenamid on New York onions and sugarbeets in Washington.						
buprofezin (insecticide)	9/1/04	5.00	head lettuce	Yes	New	1/1/09
	pg. 52938	13.00	leaf lettuce			
		0.05	cucurbits			
Comment: These time-limited tolerances are being issued in response to a petition made by Aventis for a product they plan to register, Applaud 70WP.						

## AENews Hard-Copy Subscription

*Agrichemical and Environmental News* is provided free of charge in both HTML and PDF format on the Internet each month at [www2.tricity.wsu.edu/aenews](http://www2.tricity.wsu.edu/aenews). There, you'll also find instructions on becoming an e-subscriber—receiving a free e-mail notice each month when the new issue goes on line. *AENews* is also available in a hard copy subscription for \$15 per calendar year. If you would like to receive a hard (paper) copy of this newsletter delivered to your home or office each month in 2001, send a \$15 check, made out to WSU, to **Sally O'Neal Coates, AENews Editor, Pesticide Information Center, WSU Tri-Cities, 2710 University Drive, Richland WA, 99352-1671**. Please include **full name and address** of newsletter recipient. Should you require an invoice, just let us know by phoning (509) 372-7378 or e-mailing [scoates@tricity.wsu.edu](mailto:scoates@tricity.wsu.edu).

# Federal Register Excerpts

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*In reviewing the August postings in the Federal Register, we found the following items that may be of interest to the readers of Agrichemical and Environmental News.*

In the August 2 Federal Register, EPA announced that the human health and ecological risk assessments for propargite are available for review and comment. EPA has not established a formal public comment period; however, the agency has stated that comments submitted within the first 30 days are most likely to be considered. Electronic copies of these documents are available on the web at <http://www.epa.gov/pesticides/reregistration/propargite/>. (Page 47494)

In the August 16 Federal Register, EPA announced that the revised risk assessment for chlorpyrifos was available. The agency is soliciting risk management ideas or proposals and will accept comments until October 16, 2000. (Page 49982)

In the August 18 Federal Register, EPA announced that the human health and ecological risk assessments for vinclozolin were available for review and comment. Electronic copies of these documents are available at <http://www.epa.gov/pesticides/reregistration/vinclozolin/>. (Page 50523)

In the August 28 Federal Register, EPA announced that the human health and ecological risk assessments for diclofop-methyl were available. While there is no formal public comment period, the EPA has indicated that comments submitted within the first 30 days are most likely to be considered. Electronic copies of these documents are available at the following URL: <http://www.epa.gov/pesticides/reregistration/diclofop-methyl/>. (Page 52114)

In the August 30 Federal Register, EPA issued a Pesticide Registration (PR) Notice announcing the formulation of an industry-wide task force to jointly develop residential indoor exposure data for pesticides containing one or more of the active ingredients: synthetic pyrethroids, pyrethrum and synergists. The notice explains why these data are being developed and how registrants may wish to participate in the development of these data by joining the task force. (Page 52733)

In the August 30 Federal Register, EPA announced that it was revising the glyphosate tolerance, 40 CFR 180.364, to include residues from the application of the ethanolamine salt. (Page 52660)

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## PNN Update

The Pesticide Notification Network (PNN) is operated by WSU's Pesticide Information Center for the Washington State Commission on Pesticide Registration. The system is designed to distribute pesticide registration and label change information to groups representing Washington's pesticide users.

PNN notifications are available on our web page. To review those sent out in August, either access the PNN page via the Pesticide Information Center On-Line (PICOL) Main Page, <http://picol.cahe.wsu.edu/>, or directly, at <http://www.pnn.wsu.edu/>.

We hope that this new electronic format will be useful. Please let us know what you think by submitting comments to Jane Thomas at (509) 372-7493 or [jmthomas@tricity.wsu.edu](mailto:jmthomas@tricity.wsu.edu).