

Offering Sound Pest Management Advice to the Public



Purdue Pesticide Programs

Purdue University Cooperative Extension Service

On the Cover

Dr. Cliff Sadof, Department of Entomology, Purdue University, assists a Master Gardener in identifying spruce spider mites during Advanced Master Gardener Training on campus.

Right

Walt Sell, Extension Educator, LaPorte County, Indiana, discusses flower bed management with Master Gardeners Carolyn Roebuck (left) and Karen Finlay.

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*Fred Whitford, Coordinator, Purdue Pesticide Programs
Karen Delahaut, Senior Outreach Specialist, University of Wisconsin
Steve Mayer, Extension Horticulture Educator, Marion County
Kris Medic, Author and Consultant, Groundsmith
Roy Ballard, Extension Agriculture and Natural Resources Educator, Floyd County
Ricky Kemery, Extension Horticultural Educator, Allen County
Peggy Sellers, Master Gardener State Coordinator, Purdue University
Arlene Blessing, Developmental Editor and Designer, Purdue Pesticide Programs*

Illustrations by Steve Adduci



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Phone calls to extension educators and master gardeners and conversations between garden center professionals and their customers generally revolve around questions such as, What can I spray to control . . .

- ants in the kitchen?
- aphids on my shrubs?
- black spot on roses?
- dandelions in the lawn?



It's all too easy to recommend a can, bottle, or bag of this-or-that pesticide as a solution, but is "spraying away the problem" sufficient to manage pests in and around the home?

Consider answering the question by comparing pesticides to medicines. What happens after a physician diagnoses a patient with high blood pressure? The doctor writes a prescription and tells the patient to come back for another checkup. But, while prescribing high blood pressure medicine is important, a good physician doesn't stop there. The doctor also advises the patient to lose weight, change his or her diet, get more exercise,

and reduce stress. The high blood pressure medicine effects immediate control of the situation, while changes in lifestyle and behavior improve the patient's long-term health: the one-two punch for getting well.

In the same way that a prescribed medication can alleviate an immediate health threat, a prescribed pesticide can kill a mouse, a weed, a plant disease, an insect, or bacteria. But we also need to use non-chemical methods to prevent pests from reinfesting our



homes, lawns, and gardens. Changes might include choosing plant varieties resistant to disease and insect pests, using mulches to control weeds in flower beds, repairing screens to keep out Asian lady beetles, or removing clutter that might harbor pests in and around the home. Such pairing of pesticide applications with site modifications to reduce or prevent future pest problems forms the one-two punch for managing pests around the home.

This publication emphasizes the importance of providing sound pesticide advice to consumers. Good diagnostic skills are essential. You personally must know and understand the behavior of various pests and have a working knowledge of the

various control options available; and you must ensure that your customers understand your recommendations—which can be difficult. If you have only a few minutes to spend with someone, your recommendation has to be concise, so *focus on measures that the individual is willing to take to control the pest.*



Happy customers are return customers!

Pests and Pesticides May Not Be What You Think

Three **PESTICIDES**:

- Bordeaux Mix **Fungicide**
- Preen **Herbicide**
- Sevin-5 **Insecticide**



Some people are confused by the words “pest” and “pesticide.” A pest is any living thing that competes with us for food or space, or that threatens our health or that of plants or domestic animals. A pest can be an insect on a tomato plant, a disease organism (fungus) on a sycamore tree, grass in a flower bed, a weed in the driveway, a mouse in the basement, a raccoon in the chimney, mold growing on the shower wall, etc.

The word *pesticide* is often considered synonymous with *insecticide*, but in fact it is not. An insecticide is but one of many kinds of pesticides.

Pesticides are substances that control pests. They are used to prevent, reduce, or eliminate pests and/or the damage they can cause. Common pesticides found around the home are fungicides, herbicides, insecticides,

germicides (disinfectants), miticides, dormant oils, horticultural soaps, repellents, and rodenticides.

It is important to understand that the words *pest* and *pesticide* are general terms. Each pesticide is designed to control a select group of pests such as weeds or insects or diseases. No one pesticide will kill all types of pests. For example, a spray that protects your apple tree against a certain insect will not control any disease that the tree might have, and it will not harm the tree itself. Pesticides are categorized by the pests that they control:

- Insecticides control insects.
- Herbicides control weeds.
- Fungicides control plant fungal diseases.
- Rodenticides control rodents.
- Miticides control mites.
- Disinfectants kill bacteria (germs).
- Repellents repel nuisance wildlife and insects.

These classifications are broad in scope; for example, while herbicides do control weeds, not every herbicide will control every weed. Some herbicides control broadleaf plants such as dandelions, while others control grasses such as crabgrass. Some herbicides, such as glyphosate (e.g., Roundup™) are non-selective; that is, they kill all vegetation. Some herbicides only prevent weed seeds from germinating; others kill existing plants and have little impact on seeds in the soil. It is crucial to know the exact identity, life cycle, and needs of a pest in order to select a pesticide product that will control it without incidental injury to nontarget species.



Pest Control Recommendations Depend on Customer Needs

Customers generally want only the information that will solve their immediate pest problems. But, in the process of making your recommendation for immediate control, you can offer practical advice on preventing each problem from recurring. It might be as simple as encouraging the individual to set his mower deck at a 3-inch cutting height while directing him to products to solve his immediate dandelion problem. Explain to him that 3-inch turf protects against weed germination by blocking the sun.



Realistically, our recommendations for solving pest problems in and around the home must be tailored to the needs, abilities, and special situations of those we are trying to assist. Following are some realizations that you may face in dealing with a customer's unique situation.

- The damage is mostly cosmetic and the plant will recover if watered and fertilized properly.

Tailor your solution to the abilities and needs of the client

PROFILE #1	PROFILE #2	PROFILE #3
<p>Mr. Do-It-Yourself</p> <ul style="list-style-type: none"> • loves hard work • cares for his plantings • prefers cultural over chemical solutions • knows his way around the garden • has a severe dandelion problem <p><i>Quoted as saying:</i> "There's never been a problem that hard work couldn't solve!"</p> 	<p>Mr. Easychair</p> <ul style="list-style-type: none"> • never goes outside • likes looking at his garden – through his living room window! • thinks chemical solutions work best • doesn't own any tools • has fungus on his tomato plants <p><i>Quoted as saying:</i> "Better living through modern science!"</p> 	<p>Ms. Tell-Me-What-To-Do</p> <ul style="list-style-type: none"> • has lots of energy, but no experience • demands perfection • has no prejudices against chemical solutions • is unfamiliar with pest management • has Japanese beetles on apple trees <p><i>Quoted as saying:</i> "Problem? Just tell me what to do and how to do it!"</p> 
<p>LOW HIGH</p> <p>TOLERANCE OF CHEMICALS SEVERITY OF PROBLEM TOLERANCE OF WORK</p>	<p>LOW HIGH</p> <p>TOLERANCE OF CHEMICALS SEVERITY OF PROBLEM TOLERANCE OF WORK</p>	<p>LOW HIGH</p> <p>TOLERANCE OF CHEMICALS SEVERITY OF PROBLEM TOLERANCE OF WORK</p>

- A single millipede in the house is a tolerable nuisance that doesn't justify pesticide use.
- The customer has waited too long: neither chemical nor nonchemical controls will provide any measurable benefit.
- The customer is unwilling to use pesticides (either natural or synthetic) and wants guidance in developing a chemical-free, pest-free landscape.



Using a thick layer of rock or mulch in flower beds and around trees and shrubs discourages weeds (lessening the need to use herbicides) and gives the landscape a manicured look. There are many types and colors available.



- The customer does not have the resources to replace disease-prone plants with disease-resistant varieties. She does not want to reseed thin spots in the turf nor fix her screens to prevent lady beetles from entering her home. So the application of a pesticide is a less expensive, more expedient solution.
- A customer's sentimental attachment ("They are my grandmother's roses") to the affected plants makes pesticide use a better solution than replacing them.
- The customer believes that using naturally-occurring chemicals is preferable to using synthetic pesticides.
- The customer does not have the math skills nor, perhaps, the patience to properly mix concentrated products; or he does not own application equipment for applying the



recommended product (and doesn't want to purchase it). Such a realization makes it more practical to suggest a ready-to-use product, even if it is more expensive.

- The person's landscape is large enough, and adequate time and equipment are available, to recommend using a less expensive, concentrated product rather than a more expensive, ready-to-use product.
- The client is not interested in preventive information: she wants only to know what pesticide to apply *today* to fix her problem.



- The client is unable or unwilling to do the required landscape work himself. If so, encourage him to hire a commercial firm—but don't recommend one company over another.
- There are no appropriate—safe, effective, legal—control methods to deal with the problem pest.

Why Good Recommendations Are Important

It is important to make good pesticide recommendations not only from the standpoint of effective and safe pest control but also to maintain your good reputation and that of your company or university. If inaccurate pesticide information results in harm, the source—that's you!—could be held liable. This is why proper training on giving pesticide recommendations is critical.

It is unprofessional and, more important, against state and federal laws and regulations to communicate pesticide information contrary to the label. Doing so invites legal problems. Never recommend a product for a use or site not stated clearly on the label.

Your goal in providing pesticide recommendations is to help your client achieve success in controlling a problem pest. Always make sure that the pest has been positively identified—it may be necessary to ask the client to provide a sample of the pest or the damage it has caused—then direct the individual to products labeled to control that specific pest at the site where it is present. It's this simple: If a site is not listed on the pesticide label, it is not legal to use the product on that site!

Briefly explain how the pesticide must be applied to be effective. For example, plants can be damaged if the wrong pesticide is used, if it is applied at the wrong time (temperature too hot, plants under drought stress, etc.), or if the wrong amount is used.

Whenever possible, give the client two or three options for control, explaining the pros and cons of each. This gives the client some control in the decision-making process and reflects positively on you. If you are unsure what is the best course of action, say so. Don't be afraid to admit that you don't know. Consult with someone who is likely to know—a colleague, an extension educator, a master gardener, or a university specialist—and respond to the client in a timely manner. The only good answer to a client's question is the right answer, even if you have to do some searching to find it.



A homeowner zapped his dandelions with a non-selective herbicide that also killed the turf!



If you don't know, just say so

Find the answer and get back to the client... don't guess

Sometimes there is no good answer. If your customer demands a pesticide remedy where none exists, be sympathetic to his plight but remain steadfast in explaining that there is simply no effective, legal, pesticidal solution to his problem. Go over all of the details fully and clearly to gain his understanding.

Repeat business should be a major goal whether you're an extension educator, a master gardener, or a salesperson at a garden center. Offer your clients good landscaping and gardening advice and they will remember where they heard it.



Having knowledgeable sales staff available to answer customers' questions and assist them in choosing just the right plant puts this garden center ahead of the rest.

Situations will arise—at festivals, fairs, garden shows, etc.—where you will field questions from people whom you may never see again, but don't shoot from the hip. Make an effort to understand the person's needs and offer sound recommendations based on solid technical knowledge. Always remember that your most effective advertising venue is word of mouth.

From Pests to Pesticides: A Continuum of Recommendations

Ask questions and be certain that you understand the problem before offering a solution. It is important to understand that offering sound advice on pest problems involves your opinion on whether pesticides are actually necessary for the problem at hand.

People think that rabbits and other wildlife are cute and fun to watch—that is, until they begin eating their favorite plants! Exclusion is often the best answer to the problem, but fencing has to be close-meshed in order to discourage the intruder. The open-meshed fence shown here is ineffective.



Offer your client the full range of control options and, if a pesticide is recommended, make sure she understands all safety requirements on the label.

Ask your clients to provide a pest specimen for identification, and ask them questions to gather enough information to address the problem. Get a feel for how your clients might prefer to handle the situation before making a recommendation:

- What does the pest look like?
- What do they think it is?
- What is the host plant?
- What does the damage or symptoms look like?
- How much more damage can the pest do?
- How much damage are they willing to accept?
- Are they concerned about aesthetics, plant health, or both?



- What can be done, if anything, to change the environment to make it less favorable to the pest?
- How do they feel about chemical versus nonchemical controls?

Keep in mind that answers to the following questions are critical to your recommendation:

- When during the pest's life cycle is it easiest to control?
- What nonchemical controls are available?
- Are there predators or other natural controls available for the pest?
- What natural and synthetic pesticides can be used to control the pest?
- What are the benefits and limitations of the pesticides labeled for the pest and site?
- What pesticide formulations are available?
- What hazards do these pesticides pose?
- What safety measures should be taken?

Confirming Pest Identification: The Difference Between Success and Failure

Why is positive identification of the pest so important? A pest might be classified as a weed, an insect, a rodent, an animal, or a disease. But moving beyond those classifications to the actual

name of the pest enables you to identify its life cycle, its ideal environment, and viable control options. For instance, replace weed with *dandelion*; disease with *black spot*; rodent with *mouse*; insect with *Japanese beetle*; and then address control options.

Let's say that the pest is a dandelion. Dandelions are perennial broadleaf plants that tend to invade weak, thin, unhealthy turf. They are difficult to control because they have a very deep taproot that stores enough energy to produce numerous blooms that in turn generate a large number of seeds.

Digging dandelions by hand is a cultural control option, but it is essential to remove the entire taproot; and it is



The one-two punch for managing problems
Combine long- and short-term solutions to eliminate pests

very difficult to extract the root intact without disturbing the turf around it. Other cultural control options are reseeding thin spots in turf, carefully timing fertilizer applications to thicken the turf, and setting the mower height at three inches to give the turf a competitive edge. There are nonchemical approaches to controlling almost every pest in and around the home.

Chemical control is also an alternative for controlling dandelions established in turf. “Selective” herbicides select and kill broadleaf weeds such as dandelions without damaging the turf itself, but timing is as critical to achieving control as proper pesticide selection and application rate. To be most effective against dandelions, a herbicide should be applied in the fall so that it can translocate (move down within the plant) to kill the roots. Herbicides applied in early spring may kill aboveground portions of the plant, but not the roots; and within a few weeks the roots will generate new foliage.

Pest Prevention Means Changes Around the Home and in the Landscape and Garden

Mice in the basement, termites in the crawlspace, crabgrass in the lawn, apple scab on crabapple trees, and bacteria growing on kitchen counters require certain conditions to survive and reproduce. In general, pests need these provisions:

- Food, water, and shelter for insects, spiders, and rodents
- Nutrients, light, space, and water for landscape weeds
- Favorable temperature, moisture, humidity, and susceptible plant hosts for diseases

Pests thrive and prosper in and around our homes because we *attract them!* That is, we *provide what they need to survive!* But there are things we can do to remove or disrupt ideal conditions and therefore discourage or eliminate them.

A pesticide application can kill carpenter ants in the kitchen, but spraying away the visible problem is only a temporary solution. The question is, What conditions enticed the ants into the home in the first place? You may spray to kill the existing infestation, but, if you don't eliminate favorable conditions in addition to spraying, their relatives will come back to haunt you! For example, if the leak underneath the sink remains unfixed, the next generation will discover it and move right in. So is spraying again the ideal answer? Probably not—unless you back it up by eliminating conditions favorable for reinfestation.

Following are some things that can be done in and around the home to discourage reinfestation of pests.

Insects and rodents:

- Clean up crumbs and spills immediately.
- Put dirty dishes in the sink or dishwasher.
- Empty the garbage regularly.
- Keep countertops and floors clean.
- Store food (including pet food and birdseed) in tightly sealed containers.
- Repair torn screens, loose-fitting doors, leaky plumbing or roof, etc.
- Discard old newspapers and cardboard.
- Store garbage in tightly sealed containers, pending pickup.

Fleas:

- Wash pet bedding frequently.
- Bathe pets regularly.
- Use flea combs.
- Vacuum the house regularly.

Head lice:

- Discourage children from sharing with other children items such as combs, hats, and sleeping mats.

Advise your clients to discourage garden pests by doing the following:

- Position plants where they will get the right amount of light.
- Allow plants ample space to mature without crowding.
- Water plants during hot, dry weather.
- Fertilize plants with the right type and amount of fertilizer at intervals recommended on the product label (don't overdo it).
- Nurture plants by providing everything they need for good health. Healthy plants are more likely to fight off invading pests and to recover from injury.
- Plant a variety of plants; diversity discourages buildup of pest populations.



Pesticides as a Last Resort: When All Else Fails

Pesticides can be valuable tools in managing pests in the home and landscape. However, in an integrated pest management (IPM) program, pesticides are recommended only after other methods—cultural, biological, physical—have failed. Also, there are times when pest damage is discovered in such an advanced stage, or when pest numbers are extremely high, that it is too late to use alternative management strategies. In these cases, pesticides may be the only effective treatment.



Pesticides provide many benefits around the home

When pest damage is not extensive, some clients may feel that the expense of a pesticide application isn't warranted. However, there are other situations where pesticides may be justified as the first line of defense:

- When brown recluse spiders inhabit a closet
- When cockroaches are causing someone's allergies to worsen
- When yellow jackets are nesting in the ground near a child's swing set
- When termites are found in a structure

Removal or destruction of beneficial insects such as honeybees and lady beetles also may be warranted if they are present in excessive numbers or in the wrong environment (for example, honeybees occupying a wall void).

Each situation has its own priorities, considerations, and level of urgency. For instance, many hybrid tea roses are susceptible to a disease called *black spot* that causes the leaves to yellow and drop prematurely despite proper nutrition, water, space, and light. If the client does not want to replace the susceptible roses with varieties that are more resistant to black spot, make sure he understands that he will have to apply fungicides every year to keep them healthy. In other situations, key plants—those highly valued due to sentimental attachment or to their prominent location in the landscape—may require immediate treatment because of their importance.

Encourage Your Clients to Check What They Have Before They Buy

Accumulation of unused pesticides is a common problem for homeowners. Once chemicals are out-of-date it is difficult to dispose of them properly; and the bigger the unused inventory, the more difficult it is to find secure places to store it.



This retail merchant takes time to listen to his customers' concerns. He makes sure he understands their needs before making a pesticide recommendation.

Advise your clients not to keep pesticides that they don't need. Encourage them to keep track of what they have on hand and use it before purchasing additional chemicals. Using products from inventory will help prevent out-of-date accumulations and reduce the possibility of children or animals gaining access to them.

Storing a pesticide in a cool, dry place in its original—labeled—container can extend its shelf life. Stored pesticide effectiveness depends on the type of product, the conditions under which it is stored, and how long it has been in storage. The best way to determine whether a

stored product is still effective is to test it.

These pesticides (in original containers) were dated by the applicator prior to storage. They sit in bins to contain any leaks that might occur.



It is easiest to tell if an insecticide is still good by applying it according to label directions: if the insects die, it's still effective! If the product in question is a herbicide, apply it to the target weeds as directed on the label; wait seven days to see if the weeds are curling, turning brown, or falling over. If the weeds seem unaffected, the herbicide is probably no good.

If a product is no longer effective or has changed form or consistency, instruct your client to print "DISCARD" on the container where it does not obscure the name. This will help to identify it as a product that should be taken to a tox-a-way collection site as soon as the opportunity arises. The county extension office, solid waste management district, or county sanitation office can provide dates and locations.

Buying Pesticides Is No Easy Process: There Is a Lot to Consider

Selecting a specific product to control a specific pest can be a daunting task. The local garden center, hardware store, or discount store aisles, lined with products of every description, can be intimidating. Advise your clients to begin by bringing a sample of the pest or damage to you for positive identification. Then do your best to recommend products that fit the need; offer multiple choices if you can, and allow the customer to make the final selection.

Consider the following factors when making a pesticide recommendation to a client:

- Is the pest that needs to be controlled listed on the label?
- Is the life stage of the weed or insect within the effective range of the product?
- Can it be used where the client needs it (e.g., indoors versus outdoors, on tomato plants versus shrubs)?
- Is personal protective equipment needed?
- Will it require mixing, or is it ready to use?



A garden center employee discusses insecticides with a customer.

- Does the client have the necessary application equipment?
- Will control of the pest hinge on multiple applications? If so, can they be made in a timely manner?

Any one of these questions might affect the decision on which (if any) product to recommend. In many cases, a slightly more expensive premixed product provides more in terms of safety and convenience—and, ultimately, effectiveness—than a less expensive product that requires mixing.

Natural vs. Synthetic

It is a common belief that synthetic (man-made) pesticides are more toxic than those that come from natural sources, but it is not always true. A pesticide is not necessarily safer to use because it is from a natural source. One example is the difference in toxicity between the insecticides carbaryl (Sevin™) and rotenone. Rotenone is a natural insecticide that comes from the root of a tropical legume, yet it is six times more toxic if ingested than the synthetic insecticide carbaryl.

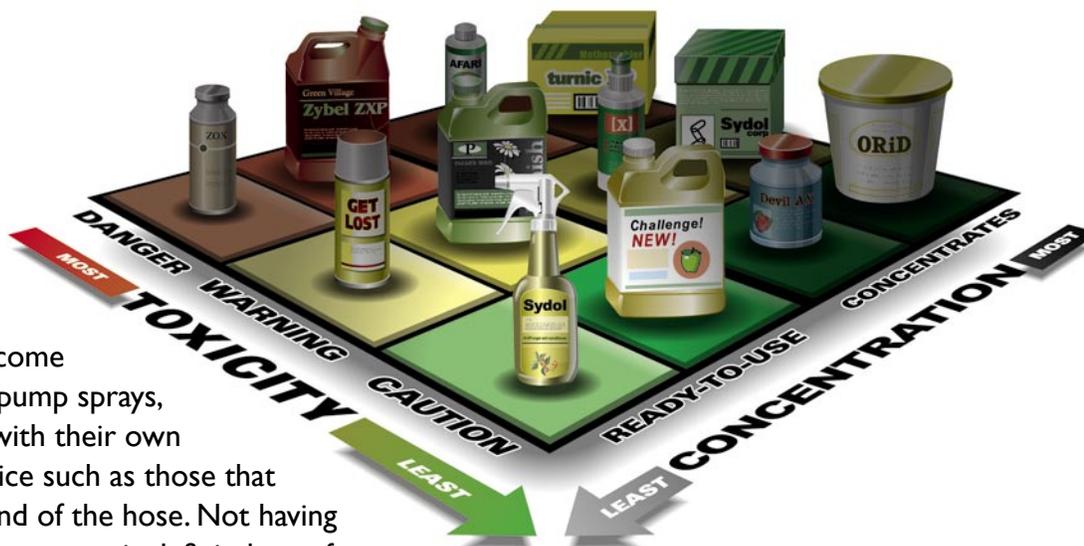
Homemade vs. Manufactured

Some people think that it is safer to make their own “pesticides” from products that they have around the house: mouthwash, dish washing detergent, Epsom salts, tobacco, beer, etc. This, too, is untrue. Any product that is registered as a pesticide has undergone extensive testing to determine how effective it is at controlling pests and how toxic it is to human health and the environment. Registered pesticides, when used according to the label, pose minimal risk. Homemade products obviously undergo no testing whatsoever and may be very harmful. Their effectiveness as a “pesticide” is uncertain at best.

Mixing a Concentrate or Applying a Ready-to-Use Product

What is the client’s comfort level when it comes to figuring out how much product to use and how to apply the right amount? It is necessary to learn how to calibrate the application equipment? Calculation and calibration are important considerations before buying a concentrated product that requires mixing, and many consumers just don’t want the hassle: they much prefer a ready-to-use product.

Always choose the **LEAST** toxic option and the **LOWEST** rate of product necessary to achieve control



Most ready-to-use pesticides come as aerosols or pump sprays, or they come with their own application device such as those that attach to the end of the hose. Not having to handle a concentrate is definitely a safety advantage.

Select the Least Toxic Product

It's not difficult to find the safest product to use. While all pesticide products are toxic, some are much less toxic than others, so look for the signal word on the front panel: CAUTION for slightly toxic; WARNING for moderately toxic; DANGER for highly toxic or corrosive. The signal word is displayed prominently on the label. Whenever possible, select products with the signal word CAUTION. If none is available, pick a product with the signal word WARNING rather than those products marked DANGER.

Buy What You Can Use

Buying only the amount that you can use is often an overlooked aspect of purchasing pesticides. It's one thing to compare canned good prices at the grocery store, yet another to compare pesticides based on price alone. It is a mistake to choose a pesticide solely on price comparison: buying the most for the least is not always the best option. Advise the consumer to consider the following:

- How long will the product be in storage?
- How much of the product actually will be used?
- How much will have to be disposed of once it is out-of-date?



Consider recommending the purchase of large quantities only if your client has a pesticide use history to support it. If not, suggest that he purchase a smaller amount even though it may be more expensive per unit. Purchasing a quart of pesticide concentrate might save money, initially, but if the client ultimately has to dispose of the excess it will likely become less economical than the higher priced, smaller quantity. Some pesticide concentrates such as multipurpose fruit tree sprays are packaged in small containers and require only a few tablespoons of product per gallon of water. It would take someone with only a few fruit trees *decades* to use a quart; and keeping the excess in inventory for long periods is undesirable.

Beware of the Special of the Day

Pesticides “on sale” might not be safe to use. Sometimes pesticide products are damaged in shipment between the distributor and the retail outlet; and, although most retailers are conscientious, some may be inclined to sell damaged goods. For example,



let’s say that a bottle of liquid product is broken in shipment and spills onto others in the case, obliterating the labels; the retailer might discount them just to get rid of them—even without a readable label! A pesticide bag broken in transit or in inventory at the store might be taped closed by the proprietor and

offered for sale anyway, despite the fact that the use instructions are no longer readable.

As a professional, you should advise store management personnel that leaking pesticide containers pose both a health risk and an environmental contamination hazard; and remind them that products with obliterated labels should not be sold at any price.

Bringing Pesticides Home: Write the Date on Containers

Unlike many other products, pesticides do not come with an expiration date printed on the container. Suggest to your clients that they write on every pesticide package—bag, bottle,

whatever—the year in which it was purchased so that, over time, they can easily determine which products need to be used ahead of others. This simple task will go a long way in helping them keep their inventories current.

Write or Circle the Pest on the Label

Pesticides are purchased for a reason. Advise your clients to write on each label the name of the pest for which the product was purchased. They will then be able to survey their inventory and see if they already have a product for a certain pest situation. This simple procedure will help them gain and keep control of their inventories. Certain pests present problems year after year—powdery mildew on phlox, black spot on roses, scab on apples, blight on tomatoes, grubs on turf—and by knowing what they have on the shelf your clients can avoid repetitive purchases. Not only will it save money, it will save them the effort of disposing of outdated pesticides, later.

Store Pesticides High and/or Lock Them Up

Five to ten percent of all emergency calls placed to poison control centers involve pesticide accidents in the home; and extension educators, retail personnel, and master gardeners are in ideal positions to help educate consumers on pesticide safety procedures. Offer this good advice:

- Never leave a pesticide unattended where children can get to it, even when the product is in use.
- Never store pesticides in fruit or drink containers.
- Store all pesticides and household chemicals in a locked cabinet at least five feet off the ground.
- Always maintain the integrity of the pesticide label: all information on the label is important—or it wouldn't be there in the first place!

Remind your clients to use good common sense:

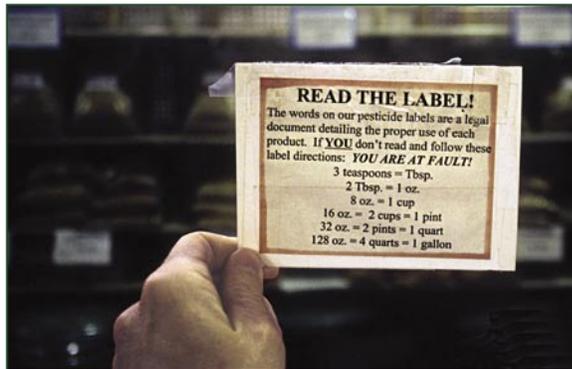
- Never leave a container of concentrated product open so that more can be mixed. Inquisitive children can be seriously injured.
- Never place rodent bait out in the open where it can be tempting to young children and pets.
- Always replace the caps on aerosol cans, and never leave aerosols unattended.



- Label utensils used for measuring, mixing, and applying pesticides, and store them in marked, sealed containers in a locked pesticide storage area. Clean them and return them to their proper storage area immediately after each use.

Never use drink or food containers to mix, measure, or store pesticides (right).

A garden center posts this notice to customers (below).



Break the Label, Break the Law

Every pesticide product has a label attached to the container. The product label is designed by the manufacturer and approved by the Environmental Protection Agency. It contains the following information:

- Product name, type, active ingredient, and information for contacting the manufacturer
- Pests for and sites on which the product can be used
- Application rate
- Instructions on how to use the product safely (e.g., what protective clothing to wear, how long to wait before harvesting pesticide-treated fruits and vegetables, the length of time to stay out of a treated area, etc.)
- First aid, storage, and disposal information
- Possible effects on nontarget species and the environment

The pesticide label is more than a set of instructions: *It is a legal document.* Federal and state laws stipulate that all pesticide labels bear the statement, *It is a violation of federal law to use this product in a manner inconsistent with its labeling.* The word *use* is broadly defined to include the purchase of the pesticide and all subsequent actions involving the product, up to and including the ultimate disposal of its container. *Use* also includes giving recommendations on application of the product; and when label instructions are not followed—that is, if you make use

recommendations contrary to the label—you are violating state and federal pesticide laws.

All states have pesticide inspectors who investigate complaints alleging that a pesticide application by a neighbor, a commercial pesticide applicator, a government employee, etc., injured them or caused harm to their property. The state agency has the authority to fine individuals who fail to follow label directions. Anyone who gives off-label instructions can be fined and/or face other penalties if the advice leads a person to cause damage involving the use of the product.

Although pesticide inspectors can fine an applicator, they cannot require the violator to pay restitution. The person or company that causes the damage usually *volunteers* to pay for repairing or replacing damaged property or turns the claim over to the insurer. But in some situations the person whose property was damaged may deem the restitution offer inadequate and file suit for additional compensation.

Consider the following off-label recommendations that are given all too often by “professionals” offering pesticide advice.

“I’m not sure, but I would recommend....”

Making off-label recommendations can have serious consequences. When you offer pesticide advice you must be certain that what you say agrees 100 percent with the pesticide label. If you have any doubt about how to answer a pesticide question, consult the product label. Never guess. If you give a customer bad advice, you may be held legally liable for his use of the product inconsistent with the label. Monetary compensation could be significant, as could the ripple effect on your reputation.

Most of the time, questions and answers are repetitive; and if you’ve answered the same question a dozen times you won’t feel a need to check the label. But product labels do change, so make it a point *at least once a year* to review the labels of products that you commonly address.



Don't let these phrases get you into trouble

The label is the law. Any deviation in use or recommendations is illegal!

When someone asks about a pesticide product that is unfamiliar to you, or if you're asked an unfamiliar question about a product you know well, *read the label*. Confirm the spelling of the brand name and ask your client to provide the EPA registration number

found on the front of the label; also find out what company manufactures the product. Use the brand name or company name to search the Internet for the label in question. Once you locate it, check the EPA registration number against the one the client gave you; if the numbers match, you have the correct label.



If you work in a retail outlet that carries the product in question, you can take it off the shelf for quick access, but always double check the

EPA registration number to make sure you have the exact same product about which your client is inquiring. It may be useful to create a label reference book by printing labels for products that clients ask about routinely. Many states' cooperative extension services have publications on crop and site recommendations, which might also be helpful.

You may access additional safety information from the material safety data sheet (MSDS) for each product. Contact the manufacturer, using the telephone number listed on the product label, or search the manufacturer's website for the MSDS.

“If some is good, more is better!”



Labels state the application rate that will control the unwanted pest. Telling someone to apply more than the label rate is not only illegal, it's useless. Mixing a stronger solution will not kill the pest any better: dead is dead. In many cases, applying a more concentrated solution will actually damage the plants, structures, etc., being treated. Over-application can also have harmful effects on beneficial insects that help keep certain pest levels low; and under-application can in some cases result in pesticide resistant insects, weeds, and diseases, ultimately making the situation worse.

It is important to know how much time it takes for a pesticide to work. Some knockdown

insecticides provide immediate results, while control by systemic products may not be evident for a week or more. Herbicides in general take a period of days to create the desired effect. Some herbicides must have time to translocate (circulate within the plant) to achieve the desired effect; increasing their concentration level would cause them to kill plant tissue on contact, and the herbicide would never reach the roots to kill the entire plant.

“If it kills beetles on my flowers, why not the beetles on my green beans?”

All pesticide products are registered for specific uses, whether they are to be applied to specific flowers or vegetables in the garden or indoors to control a pantry pest. It is illegal to use a product indoors that is intended for outdoor use. It is illegal to use a product on plants not listed on the label, especially food plants; tomatoes from plants sprayed with the wrong pesticide, for example, could be dangerous to eat. Using products off-label is much more than a legal problem: it can result in plant injury, property damage, or poisoning of humans or animals.



“I have a good solution. All you have to do is to mix this and that....”

It is unwise, illegal, and sometimes dangerous to offer recommendations that include home remedies, even if you know they work. Maybe you know from personal experience, from television, or from a garden magazine: it doesn't matter. Whether you work for the Cooperative Extension Service or a local retailer, don't do it. If you stick with information clearly stated on a registered pesticide label, you will be covered by the manufacturer's guarantees. But if your recommendation includes a home remedy, your problems are strictly your own. Any problem that arises from your home remedy advice is between you and the customer. Nobody will bail you out: not your boss, not your company or institution, and certainly not the manufacturers of the ingredients used.

Tips for Pesticide Use

Wear Safety Equipment



The pesticide label lists the personal protective equipment required when using the product. Generally the list includes long pants, a long-sleeved shirt, and shoes and socks. However, many labels, particularly those on concentrates, also recommend the use of chemical-resistant gloves and protective eyewear. The manufacturer's choice of safety

equipment mandated on the label is directly related to the toxicity of the product: the more toxic the product, the more safety equipment is needed. Keep in mind that the term *use* includes more than just applying pesticides. Actions such as handling containers, mixing pesticides, cleaning application equipment,



disposing of pesticide waste, and touching freshly treated surfaces all fall under the *use* umbrella. Conventional garden gloves or surgical gloves do not provide suitable protection from products for which chemical-resistant gloves are recommended. If in doubt, wear more (or better) protective equipment than is listed on the label. For example, a wide-brimmed hat and safety glasses can be useful when spraying overhead, even if they are not mentioned on the label.

Spray Small Areas

There are many instances where a pesticide can be applied to a specific spot in the yard, a specific shrub or tree, or a specific location in the home, so make recommendations according to the need. For example, if a client has grubs in a specific portion of his turf, don't advise him to treat his whole yard; explain that a spot treatment will suffice. Tell clients to spray individual weeds that are scattered over a lawn or confined to an ornamental bed rather than treating the entire area. If a client has cockroaches in the kitchen, recommend treating the precise location where they are known to be, not the whole house. Spot treating not only limits the potential for non-target exposure, it saves money.

Deal with Leftover Chemicals

Anyone who has used pesticide concentrates or fielded questions from the public has faced the question of what to do with a diluted pesticide left over from an application.

When the leftover amount is minimal, advise the client to apply it to a site listed on the label. Ideally, you should advise people never to mix more than they need, thereby preventing the problem of how to store the leftover mixture.

Only if absolutely, positively necessary—and only if you know that your client will use it soon—should you advise storing a leftover diluted pesticide in the sprayer. Have him write the name of the product, its EPA registration number, the word “diluted,” the date, and the name of the target pest on a sign and tape it conspicuously to the sprayer. Kids love sprayers, so make sure he knows to place it well out of their reach and cover it so that it doesn't become an attractive nuisance.



Never allow pesticides to flow into a street drain (above), and never store leftover pesticides in beverage bottles (below).



Explain that some diluted products break down rapidly under certain conditions and may not be as effective if stored in diluted form for long periods of time. Stress that the leftover diluted mixture should be used as soon as possible.

Posting the Lawn

When offering advice on lawn applications, tell your client to post the area with flags that say “Pesticide Application: Keep Off Grass.” Leave them in place for a couple of days to alert neighbors to keep children and pets away from the treated turf. While homeowners in most states are not *required* to flag their lawns, it’s a good-neighbor policy to do so. The flags can be purchased at most home improvement and garden stores.

Container Disposal

The product label always tells how to properly dispose of the empty container. Empty, ready-to-use-product containers should be wrapped in newspaper and placed in the trash (if the label allows). The same procedure should be followed for pesticide-impregnated materials such as flea collars, no-pest strips, and bait stations. It is best to delay putting these items in the trash until the day of collection to reduce the chance of exposure of children and pets.

Labels on concentrated-pesticide containers often stipulate that they must be triple-rinsed before disposal. *Never reuse them for any purpose. Never bury or burn them. Do not recycle them, even if the plastic is recyclable in your community.* The only exception to this would be to deliver them to a collection recycling program intended solely for pesticide containers.



Triple-rinsing a pesticide container requires filling it 1/3 to 1/2 full of clean water, shaking it, and pouring the contents into the spray tank. This procedure is done three times, hence the term *triple-rinse*. It is always best to triple-rinse a container as soon as it is

The first jar has been rinsed once; notice that you cannot see the black lines behind it. The second jar has been rinsed twice, the third jar three times, and the fourth jar four times. The likeness of rinses three and four demonstrates that triple rinsing is adequate.

emptied so that the rinsate (rinse water containing residues from inside the container) can be used as part of the dilution for application. It is illegal to recommend pouring the rinsate into a sink, toilet, or outdoor street drain.

Deal with Spills and Accidents

Labels state clearly that spills must be dealt with promptly. Most liquid pesticide spills can be cleaned up with cat litter, vermiculite, or oil soak-up that can then be applied to an appropriate treatment area. Dry materials can be swept up—with a broom designated for outdoor use only—and applied to a treatable area. If a pesticide is spilled on clothing, advise the person to remove it immediately and wash exposed skin with soap and water. If the spill is a diluted product, wash the clothing thoroughly with detergent, separate from the family laundry; if the spill is a pesticide concentrate, however, throw the clothing away.



This spill was left behind when the applicator completed the job. It should have been swept, recovered, and applied to the application site or returned to company headquarters for appropriate use or disposal.

Clean Up After Using Pesticides

An important aspect of using pesticides safely is to wash thoroughly afterward. Even if safety equipment has been worn, it is always best to use soap and water to wash away any pesticide residues that might be on the face, hands, or arms. For quick and easy clean-up, an old nylon stocking containing a bar of soap can be attached to an outside faucet.



Advise your clients to wash their hands with soap and water after applying pesticides: first with their gloves on, then with them off.

Store and Wash Dirty Clothes Separately

When applying pesticides to the yard or spraying them high into trees, the average homeowner probably gets enough chemical residue on his shirt and pants to warrant washing them separate from the family laundry. Advise your clients to place the contaminated work clothes in a plastic garbage bag and tie it shut until you have time to wash them. Wear rubber gloves when handling pesticide-contaminated clothes. Wash them in hot water with a heavy-duty detergent and, if possible, dry them outdoors. Rinse the washing machine before doing additional laundry.



Never transport pesticides in the passenger compartment of a vehicle—not even en route to a tox-a-way day as shown here.

Know What to Do with Old Chemicals

Old chemicals that have been in storage (sometimes for decades) may no longer be legal for use under federal law, may no longer be effective, or may have illegible labels; others may no longer be needed or wanted. Advise your customers to take unwanted materials to a local tox-a-way site so that they can be disposed of safely and legally; county extension educators should let the public know when there will be a tox-a-way day in the area. Advise clients to identify the material, as unidentified products are sometimes turned away.

When waiting to dispose of pesticide products, make sure that they are placed on plastic containers (e.g., restaurant trays, plastic bins or buckets, etc.) to contain any leaks that might occur.

Practice Calling 911 with Children

Children are quick learners. Speak to them concerning when and how they should call 911. It is critical that children understand that it is all right to call 911 when they feel there is an emergency or when they suspect trouble. Be sure the child understands they will not get in trouble if the problem turns out to be less serious than they originally thought.



A child practices how to place a 911 call during Spring Fest activities at Purdue University.

Place the National Poison Control Phone Number on Your Refrigerator

The National Poison Control Center number is (800) 222-1222. Poison information centers operate 24 hours a day, 7 days a week.

Trained professionals answer questions, help determine the seriousness of a poisoning, and give specific advice on how to deal with the incident. Recommend to clients that they keep this number with other emergency numbers in the home—perhaps on the refrigerator.



Recommend Hiring A Professional Service

There are many reasons why a customer might consider hiring a pest management company to handle pest problems. Many homeowners simply do not have enough spare time to manage their homes and landscapes, so hiring a pest management professional makes sense. Others choose not to handle pest problems and the pesticides necessary for their control. In some cases, homeowners lack the necessary application equipment or can't purchase the most effective products without a license. Some just do not care to apply chemicals any more than they care to change the oil in their car or prepare their own taxes.

Which company do you recommend? is a question you hear repeatedly. In general, cooperative extension service and garden center personnel try not to recommend specific companies. We explain that pest control businesses vary from small to large, from locally-owned to nationally franchised, and from low- to high-priced. And there is a wide range of technical experience

within each company. Advise your clients to do their homework and select the company that best meets their needs relative to price, service, options, and contracts.

To avoid bias, recommend checking the yellow pages for a list of pest management companies (usually listed under pest control).

Too many choices?

The client can't decide on a solution



which approach?



which product?



which solutions?

Too much work?

The client won't bother with it



pest identification?



proper application?



extensive labor?

Too much responsibility?

The client doesn't want the burden



dangerous products?



environment risks?



neighbor exposure?

In some instances it might be appropriate to offer the names of companies that have good reputations, but encourage your client to consult multiple businesses before making his choice.

Advise the client that before making his choice he should verify that the company is licensed and insured; in Indiana, have him call the Office of the Indiana State Chemist, (800) 893-6637, or

Recommend professional help when needed*

***but not a specific company...**

check it out online at <http://www.kellysolutions.com/in/>. Also encourage your client to ask if the prospective company belongs to a state or national trade association; those that are active in promoting the good reputation of their industry usually do.

Advise your client

- to find out how each company plans to manage the pest problem before signing a contract.
- to ask if they will make a single application or multiple applications.
- to ask what product will be used and what its specific guarantees are.
- to find out if he will have to prepare the application site.

Suggest that they ask for referrals. Speaking with other customers about their satisfaction levels can be both helpful and enlightening.

A client has the right to ask for and receive a copy of the pesticide label and MSDS *before* the application is made. Along with this information, the company should provide the scheduled

application date and the name, address, and telephone number of a person who can provide them with more information if needed.

Give Advice on Filing A Complaint

Complaints range from minor to major. Sometimes a service company doesn't deliver what it has promised: perhaps the work is unsatisfactory or was not performed in a safe manner. The first and best approach, and generally the one that gets the quickest results, is to advise the client to call the responsible party directly. Advise him to give the person or company an opportunity to work out the problem to everyone's satisfaction.

Sometimes the issue cannot be amicably resolved. Perhaps the communication between the company and the consumer has broken down. The person who is complaining may not want to call the person or company that is responsible, or he may call and get an unsatisfactory response. In these cases, you may have to recommend that your client call the proper authorities to officially register his complaint. The state agency list can be accessed at <http://aapco.ceris.purdue.edu/>. In Indiana, contact the Office of the Indiana State Chemist at (800) 893-6637. If a client does not have access to a computer at home or work, advise him to go to a local library that provides internet services.

Advise the client to document the problem while he is waiting for state pesticide investigators to show up. Answers to the following questions will be helpful to the person assigned to investigate the complaint:

- Who made the application (company and individual technician)?
- What was the date of application?
- What symptoms of damage were observed?
- If the application was made outdoors, what was the wind speed, wind direction, and temperature at the time of application?
- Who was called regarding the incident?
- What were the responses to complaints filed with the company or neighbor?

Advise the customer to supplement his notes with videotape to document any damage. If a video recorder is not available, advise the person to take photographs or digital images. If there is damage to plants, have the customer place a few samples in a sealable plastic bag and keep them in a cool location pending the arrival of the investigator.

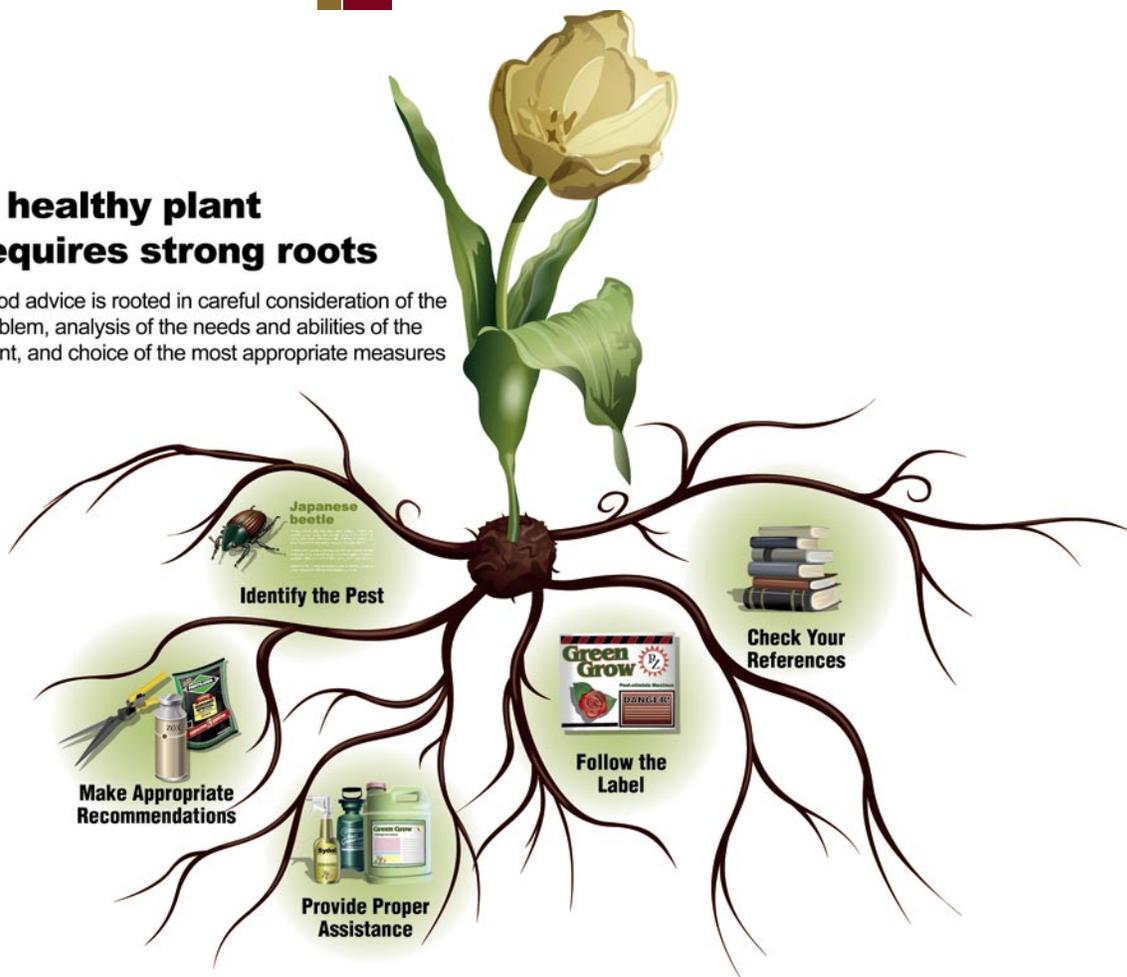
Conclusion

Making pest control recommendations for a homeowner can be difficult. But, like most things, experience is the best teacher. Every time you research something on behalf of a client, you make yourself better in the process. Dealing with the public and fielding their questions is valuable experience.

There are pitfalls to offering pesticide use recommendations, but knowledge, common sense, and caution go a long way toward avoiding them. Feeling and exhibiting genuine concern for the wants, needs, abilities, and resources of your clients will help you

A healthy plant requires strong roots

Good advice is rooted in careful consideration of the problem, analysis of the needs and abilities of the client, and choice of the most appropriate measures



build solid personal relationships. You will gain a reputation as someone they can depend on. They will feel secure in asking your advice because they have confidence in your ability to steer them in the right direction.

Keeping landscape and garden plants healthy through proper care will allow them to compete with insects, diseases, and weeds for

space and nutrients. Remind your clients that removing weeds and debris from the landscape helps eliminate overwintering sites for diseases and insects. Advise them to be diligent in reducing shelter as well as food and water sources that might attract ants, cockroaches, mice, etc. These cultural practices are important in preventing pest problems.

Occasionally pests get the upper hand in spite of it all! And in such cases it may be necessary to use a pesticide to bring the system back into balance before resuming a nonchemical approach to prevention and control. For example, perhaps a client will need to apply a herbicide to control dandelions. But, once the weed is controlled, nonchemical measures such as reseeding, aerating, proper mowing, watering, and fertilizing can help the grass stay ahead of the weeds.

The use of pesticides in the home and landscape must be handled with caution and understanding; and as a professional you should lead, not follow. Advise your clients to look at the whole picture before deciding that chemical control is the best approach in a given situation.

Safety is the first and foremost consideration in using pesticides. Advise your clients to use chemicals according to instructions on the label, and encourage them to re-read the label before every use, even if they think they know it by heart: Safety first. Always.

You—the professional—may be the only buffer between pesticide use and misuse, so always spend time with your clients and provide whatever information they're seeking, even if you have to do a little research. And always, always, always insist that they **READ THE LABEL!**

Additional Resources

Books

- The Complete Federal and State Compliance Guide for Hoosier Businesses. Whitford, F. Purdue University Press. 2001.
- The Complete Book of Pesticide Management: Science, Regulation, Stewardship, and Communication. Whitford, F. Wiley and Sons. 2002.

Pesticide Programs Publications

Pesticides and Personal Safety (PPP-20)
Pesticides and Food Safety (PPP-22)
Pesticides and the Label (PPP-24)
Pesticide Applicator Certification (PPP-25)
Pesticides and the Home, Lawn, and Garden (PPP-29)
Pesticides and the Balancing Act (PPP-33)
Pesticides and Pest Prevention Strategies for the
Home, Lawn, and Garden (PPP-34)
Pesticides and the Law (PPP-36)
Pesticides and Personal Protective Equipment (PPP-38)
Pesticide Safety and Calibration Math
for the Homeowner (PPP-39)
Lawncare Pesticide Application Equipment:
Granular Spreaders (PPP-46)
Landscape Pesticide Application Equipment:
Liquid Sprayers (PPP-47)
Children and Poisoning (PPP-53)
Conflicts with Wildlife Around the Home (PPP-56)

Purdue extension publications can be obtained by calling (888) 398-4636 and asking for "Media Distribution." Once you have been transferred to Media Distribution, ask for the publication by name and number; the cost is \$1 each. The publications may be downloaded free of charge from Purdue Pesticide Programs' website:

<<http://www.btny.purdue.edu/PPP/>>

Purdue University Websites for the Home, Lawn, and Garden

- Purdue Extension Publications
<<http://www.ces.purdue.edu/extmedia/index.html>>
This is the main website for Purdue extension publications. Under the subject matter listings are links to related Purdue University's Botany and Plant Pathology, Entomology, and Horticulture web pages.
- Purdue Lawn Publications
<<http://www.agry.purdue.edu/turf/>>
All of the current lawn publications are found here. The web page also includes information on turf insects, turf diseases, and moles in addition to the (AY) publications on turfgrass establishment and maintenance. Click on Turf Tips.

- Purdue Horticulture Publications
<http://www.hort.purdue.edu/ext/garden_pubs.html>
This listing, on the Purdue Consumer Horticulture website, is primarily Purdue gardening publications, by topic, and gives the latest revision or review date of the horticulture (HO) publications.
- Purdue Consumer Horticulture Website
<<http://www.hort.purdue.edu/ext/conhort.html>>
This website has a good search feature at the top of the page, including the following: Purdue Gardening News Articles, Purdue Gardening Publications, Purdue Master Gardener Program, Upcoming Gardening Events, Prairie Wildflowers, Gardens to Visit in Indiana, Purdue Plant and Pest Diagnostic Lab, Purdue Extension Garden Tips, Purdue's Turf Tips, Purdue vegetable insect website, and others.
- Purdue Extension Entomology
<<http://www.entm.purdue.edu/entomology/ext/>>
Click on Quick Link to review categories of interest.
- Purdue Plant and Pest Diagnostic Lab (P&PDL)
<<http://www.ppd.l.purdue.edu>>
At the top of the page you can search the entire website for information on insect, disease, weed, and other plant problems. The P&PDL Updates provide current plant and pest information during the growing season. Check out the Picture of the Week during the growing season and the Frequently Asked Questions link.
- Purdue Pesticide Programs
<<http://www.btny.purdue.edu/PPP/>>
This website provides current information on pesticide education opportunities and is an excellent source of pesticide educational materials.

Other Websites

- Pesticide Database Searches
<<http://www.kellysolutions.com>>
- Ohio State Extension Ohioline
<<http://www.extension.uiuc.edu>>
- Michigan State University Extension
<<http://www.msue.msu.edu>>
- University of Kentucky Extension Publications
<<http://www.ca.uky.edu/agc/pubs/pubs.htm>>
- University of Florida E-Answers
<<http://edis.IFAS.UFL.edu>>
- North Carolina Extension Consumer Horticulture
<<http://www.ces.ncsu.edu/depts/hort/consumer>>
- University of Wisconsin Extension Publications
<<http://ipcm.wisc.edu/pat>>
- Ortho Problem Solver
<<http://www.ortho.com>>

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