The Pesticide Label

Cooperative Extension Service
College of Tropical Agriculture and Human Resources
University of Hawai'i at Mānoa

Key to Pesticide Safety and Education

July–September 2013

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REGULATORY UPDATES

Special local need (SLN) labeling for Hawaii are now available from the Hawaii Department of Agriculture's webpage: *http://hdoa.hawaii.gov/pi/pest/licensed-pesticides/*. At that webpage, click on the green letters "List of current Hawaii special local needs registered pesticides" to download the list which includes links to the labeling.

NEW since the last issue of this newsletter:

- EPA SLN Number: **HI-130002**, for the product **Movento** with EPA Reg. No. **264-1050**, expires August 27, 2018.

EXPIRES October 1–December 31, 2013:

- EPA SLN Number: **HI-830011**, for the product **Uniroyal Maintain CF 125** with EPA Reg. No. **400-395**, expires October 27, 2013.
- EPA SLN Number: **HI-980007**, for the product **Maintain CF 125** with EPA Reg. No. **69361-6**, expires October 27, 2013.
- EPA SLN Number: **HI-030003**, for the product **Dormex** with EPA Reg. No. **54555-2**, expires October 27, 2013.
- EPA SLN Number: **HI-080002**, for the product **Rozol Pellets** with EPA Reg. No. **7173-151**, expires October 27, 2013.
- EPA SLN Number: **HI-080003**, for the product **BSP Lime-Sulfur Solution** with EPA Reg. No. **66196-2**, expires December 8, 2013.

RECERTIFICATION CREDITS may be earned by certified applicators who score at least 70% on the set of comprehension evaluation questions about the "recertification" articles in this newsletter. These articles have a title followed by "(recertification)". However, credits may not necessarily be applicable for the following categories: Private 2, Private 3, Commercial 7f, and Commercial 11. The question sets (quizzes) are written and administered by the Hawaii Department of Agriculture staff. To ask about earning recertification credits on Hawaii call Hilo at (808) 974-4143. On Oahu, Kauai, Maui, Lanai, and Molokai, call Honolulu at (808) 973-9409 or 973-9424.

APPLICATION OF IPM PRINCIPLES TO STRUCTURAL PESTS

(recertification)

For decades, Integrated Pest Management (IPM) has been a driving force in American crop production. Development and adoption of IPM was stimulated by recognition of the fact that, in most situations, the total eradication of a pest is neither economically feasible nor environmentally sound. A more reasonable alternative is to manage the pest and prevent the population from reaching levels that create unacceptable economic losses. At the same time, there was a growing realization that reliance on pesticides as the sole method of controlling pests increased the potential for adverse environmental consequences. The IPM approach should also be adapted to prevent or correct pest problems in structural situations. The "commodity" to be protected from pest infestation, in this case, is the building. Although structural pests are different from those found in agricultural settings, the concepts behind an IPM approach still apply.

What Is an IPM Approach?

Traditional pest control in the structural setting relies almost exclusively on preventive, calendar-based (monthly or quarterly), pesticide applications, without considering whether or not a pest problem actually exists. While a preventive chemical approach could be considered proactive, pesticide applications without information about actual pest problems is of questionable cost effectiveness. On the other hand, applying pesticides only after pests have reached intolerable levels, is equally unacceptable. IPM alternates proactive and reactive phases. The proactive phase determines whether there is actually a pest problem. Just as in agricultural situations, where fields are scouted for the presence of pests, IPM in a structural situation begins with site inspection. Phase 1 of an IPM program includes identifying the pest or pests and learning something about their biology and behavior: What is their life cycle? What do they eat? Where do they tend to be found?

This information is then applied to carry out Phase 2 which consists of determining the size and extent of any infestation found and determining possible causes of the problem.

Except for the occasional "nuisance pests" (such as millipedes or fungus gnats), pests commonly found in and around a structure ("peridomestic" pests) are attracted to the area by three factors: food, water, and harborage (a protected place in which to live and proliferate). Depending upon the pest, visual inspections and/or monitoring devices, such as sticky boards, can be used to help assess pest population density.

With information about the pest and its distribution in the facility, Phase 3, selection and implementation of the best management tactics, can be carried out. The selection of management strategy for any particular situation takes into account not only their effectiveness in getting the job done, but also their possible environmental consequences.

The goal of IPM is to achieve satisfactory, economical pest control with minimal or negligible environmental consequences. Control must be considered in terms of both short-term and long-term strategies or objectives. The short-term objective is most often the immediate removal of the current pest infestation. The long-term focuses on preventing a recurrence of the problem. Unlike traditional pest control, which relied almost exclusively on pesticides, IPM integrates all possible methods of pest control: mechanical, chemical and (sometimes) biological. These include:

1. Limiting the pest's access to food, water, and harborage sites:
   a. proper storage of susceptible food and water supplies.

b. installation or repair of physical or mechanical barriers to future pest intrusion.

2. Use of mechanical devices (such as traps) to remove pests.
3. Pesticide applications that have minimal risks associated with their use. Factors for consideration here include selecting:
   a. pesticides with low toxicity to people and pets.
   b. application methods such as baiting or "crack and crevice" and the timing of these applications so that potential off-site movement or drift of the pesticide, as well as exposure of facility occupants is minimized.

The Limited Relevance of Thresholds

In agriculture, the pest population levels at which some control measures are enacted are referred to as action or economic thresholds. These thresholds are based on the value of the commodity (anticipated market value); the amount of damage that the particular pest populations could cause and the economic consequences of that damage; and, the cost associated with implementing particular control measures.

In the urban or structural setting, there are limits to complete adaptation of the IPM approach, particularly with regard to these thresholds. Although the cost of potential control measures can be calculated, it is difficult, if not impossible, to assign a realistic value to the "commodity" or to the economic consequences of infestation. Notable exceptions would be the wood-destroying pests, such as termites, where cost of repair can be more easily calculated. Likewise, contamination of food by cockroaches, rodents or ants renders it unmarketable or unusable, providing a somewhat more concrete value to the actual losses. However, for most of common peridomestic pests, the value of the "commodity" and the losses caused by pest activity may be of a more aesthetic or perceived nature.

For example, while the presence of cockroaches in some areas of a facility may be tolerated, their presence in the food preparation or consumption areas of that same facility would be unacceptable to county sanitation inspectors and to customers. In such a situation, the threshold is essentially set to zero. Attempts to establish workable "action thresholds", i.e., the pest level that triggers pest control procedures have met with limited success because of extenuating circumstances, such as state or federal regulations governing the facility, or simply because of the diversity of opinions on the part of facility occupants as to what constitutes "a problem".

Nevertheless, The fundamental components of IPM: inspection, monitoring, and long-term preventive strategies can and should be readily implemented in structural settings.

This article was originally titled, "Structural and Public Health Pests: Application of IPM Principles to Structural Pests," It is reproduced here with minor changes and with permission from one of the authors, M. Waldvogel, North Carolina State University. The original article is available at http://ipm.ncsu.edu/urban/cropsci/c11struc/sipm.html

If you can accept this level of mite damage on your hibiscus leaves, consider managing the mites and not trying to eradicate them. Courtesy of S. Nelson, University of Hawaii

HOW PESTICIDE TREATMENTS FAIL

(recertification)

If you find that a pesticide treatment does not give the result you expected, review the situation to determine what went wrong. Here are some possible explanations.

Eradicate a pest or manage it? Getting rid of every individual pest forever from a property is practically impossible if the pest is present in surrounding areas. The pest probably can continuously infest the property, so most pest managers will accept a small pest population and try to "manage" it. This means keeping the pest count low enough to avoid major complaints or damage. A pest management program can include such strategies as quarantine, sanitation, crop selection, traps, and barriers. Pesticides are just one more strategy; they are not the only one and are not a cure-all. Several pesticides can be used together or in sequence to control different stages in a pest's life cycle, or slow the onset of pesticide resistance. For example, window screens are very effective against adult flying mosquitoes trying to get into a building, while an insecticide is used to control the immature ("wriggler") stages swimming in stagnant water in nearby ponds and ditches.

Wrong pesticide or misidentification of the pest. A treatment may fail because the pest manager applied a pesticide that was not meant to control the targeted pest. This can happen if the manager misidentifies the cause of a problem and then chose a pesticide based on the misidentification. For example, the manager may see a fungus growing from holes in some fruit and apply a fungicide to control the fungus. But if an insect created the holes, the fungicide treatment wouldn't stop more holes from forming.

Slow-acting pesticides. A pest manager may be disappointed with the action of a new pesticide product when compared to that of a familiar, faster-acting product. It's possible that the new product just needs more time to affect the pest.

Bait shyness. This problem involves rodent baits containing a "single-dose" or "acute" poison such as zinc phosphide. Single-dose poisons are fast-acting and only kill the rodent if it eats a lethal dose of the bait

A proper identification of the problem is the first step in pest control and efficient use of pesticides. Galls on a hibiscus leaf (above) are caused by mites. Galls on Ohia (below) are caused by psyllids. Two different pesticides, a miticide and an insecticide may be needed to manage the problem. Photo courtesy of S. Nelson, University of Hawaii

in one feeding. But if it eats just enough to make it sick after the first feeding, the rodent recovers and learns to avoid the bait, thus becoming "bait shy." This is usually not a problem with baits containing slow-acting "multiple-feed" poisons. Baits containing multiple-feed poisons such as diphacinone kill the rodent only after it feeds several times and accumulates a lethal dose.

Newly arrived pests. A pesticide treatment may have worked well but a new infestation or infection can quickly restart the problem. Wind, water, people, and both large and small animals can bring in pests from outside the treated area. Some examples: wind spreads mites and aphids; flowing water spreads snails and weeds; aphids and hoppers spread agents of plant diseases (such as viruses and phytoplasmas); certain ants spread (and take care of) mealybugs, scales, and aphids; dogs and cats spread flea eggs; and people move many pests (within a property, across a country, or around the world).

Pest resurgence. Some insecticides are "non-selective" or "broad spectrum" in action, which means they can kill not just the targeted pest insects but also organisms that eat the pests. These "beneficial organisms" (such as spiders, and certain mites, bugs, and wasps) are also called "natural enemies" or just "beneficials." They should be protected because they help managers control the pest. Without beneficial organisms, the pest insects that survive the insecticide treatment can "resurge." This means they can reinfest the treated area faster and in higher numbers than before the treatment.

Secondary pest outbreak. After an effective insecticide treatment to control a major pest insect, a minor ("secondary") pest insect can thrive and eventually become the new major pest. The insecticide treatment could have killed the beneficial organisms that were suppressing the minor pest. The treatment also could have killed enough of the major pest individuals to relieve the minor pest from competition for food and territory. This can happen with two or more species of ants.

Pest resistance to a pesticide. Rarely does a pesticide kill all the individuals in a pest population. Each time a pesticide is used, it selectively kills the most susceptible individuals. Some do not come into contact with the pesticide. Others withstand the treatment by breaking down the pesticide in their bodies. However they do it, these resistant survivors will pass their traits for resistance to the next generation. When a pest manager uses one pesticide repeatedly, each succeeding generation of the pest will have a higher percentage of resistant individuals than before. If this selective process works on a pest population long enough, there will be so many resistant individuals at some point that an additional pesticide treatment will not give the pest manager a satisfactory result. Some managers will try higher doses and more frequent treatments, but this will eventually create a pest population with greater resistance to the pesticide.

The opportunity for resistance is greater when a pesticide is used over a wide geographic area or when a pesticide is applied repeatedly to a small area where the pest population is isolated. Resistance generally will build faster in pests that complete their life cycles in shorter periods of time. Several ways to avoid or slow development of resistance are: (1) using as many other pest control strategies as is practical so that fewer pesticide treatments are needed, (2) alternating treatments with a pesticide that controls the pest by a different mode of action, or (3) tank-mixing pesticides with different modes of action. **Caution**: When choosing an alternative pesticide or tank-mix partner for a pesticide, only choose one that is also labeled for the crop, animal, object, or site you want to treat.

Pesticide breakdown. Some pesticide treatments last longer than others. Given enough time, however, all residues will eventually break down. It may be necessary for pest managers to treat again and include other control strategies in their pest management plans. Reapplying a mosquito or tick repellent would be very important where these pests could transmit viruses or bacteria that cause human disease. Some pesticides begin to breakdown as soon as they are exposed to air or mixed with water in the sprayer tank. Others contain active ingredients that breakdown very quickly when mixed with alkaline (high pH) water (see Table). There will be warnings and advice about this on their label . Also, the potency of a tank mix kept overnight may be reduced, so make only enough tank mix for the job at hand.

Half-Life of Some Active Ingredients (A.I.) in Pesticide Products

A.I.	Soil	Water	Plant/Soil Surface
Picloram	3–90 d	3 d	—
2,4-D	7 d	15 d	—
Permethrin	12–113 d	19–27 d	1–3 wk (plant)
Imidacloprid	40–120 d	—	3–5 d (soil, plant)
Malathion	1-7 d	1.5 d @ pH 8, 17 d @ pH 6	—

Half-life: time it takes half of the compound to break down in the environment; Times are estimates based on environmental conditions, soil characteristics, etc.

Incompatible tank mix. It's possible for one pesticide to reduce the potency of another when they are combined in a tank mix. Review the labeling of both products. Do not tank mix products if the labeling any one prohibits tank mixing. Seek advice from agricultural extension agents, experienced pesticide distributors, and applicators. Also remember that a pesticide's potency could be reduced when tank-mixed with an incompatible fertilizer or surfactant. In the worst case, an incompatible tank mix can damage or kill the plants you want to protect.

Old pesticide. Even if the manager applied the right pesticide, the treatment may not work if the pesticide was in storage too long.

Bait contamination and spoilage. The pest may reject bait that has been contaminated with a repellent chemical. Reduce contamination by storing baits in tightly closed containers and away from chemicals that give off strong odors. Replace old bait. Ants have been known to ignore old bait. Rats and mice prefer fresh, high-quality food. They will reject bait spoiled by age, rot, or insect infestation if another food is available.

Timing of treatment. Many pests undergo changes in form as they mature, reproduce, or encounter harsh conditions. Some of these forms can resist pesticide treatments because they are inactive, have hard coverings, or stay in hard-to-treat places. Examples of resistant forms are dormant weed seeds, dormant forms of nematodes, fungi, and bacteria, and eggs and pupae of many insects. Examples of pests in hard-to-treat places are insects in cracks and crevices, in the center of plant stems or fruits, and between the upper and lower surfaces of leaves, and coqui and greenhouse frogs under bushes and leaf litter or among rocks. A pesticide treatment will only control these individual pests after they germinate, hatch, or emerge from their resistant forms or hard-to-treat places. This often happens after favorable changes in their surroundings such as more warmth, light, moisture, or sunrise or sunset. In the case of the cat flea (which lives on dogs as well as cats), the biting adult stage emerges from its inactive pupal case (stuck on fibers of carpeting, pet bedding, and furniture fabric) when stimulated by vibration and some other cues generated by people and pets. Learn what stage of the pest's life cycle your pesticide will control. Apply the pesticide when it will affect most of the pest individuals in their susceptible forms. You may have to make follow-up treatments to control individuals that germinate, hatch, or emerge later.

Application equipment. Effective treatments are made by pest managers who choose the right application equipment and set up and operate

Wondering if you are getting good coverage with your spray application? Try using an indicator dye made specifically for this purpose. Photo USDA Forest Service Archives, Bugwood.org

it to make a thorough treatment. A pesticide's labeling will usually specify important factors for each combination of pesticide, application equipment, and the crop, animal, object, or site to be treated. Important factors involve pump pressure and nozzle tip selection for sprayers, and gate openings for granule spreaders. Speed and pattern of travel through the treatment site are important for applications of sprays and granules.

Dosage and dilution. A treatment can fail if the dosage or dilution is too weak. Review the pesticide's labeling to learn the proper dosage or dilution for the specific pest. Calibrate application equipment often to ensure thorough coverage and proper dosage, especially after changing nozzles, spraying pressure, or speed of travel through the treatment site.

Coverage. A pesticide—either as vapor, residue, or a direct spray—must contact the pest to be effective. Some pesticides work only when the pest walks or settles on the residue. These kinds of pesticides should form a chemical barrier protecting all surfaces where pests begin to infest or infect. When controlling pests on plants this usually means covering both sides of the leaves, plus stems, and fruits. This includes leaves still expanding or unrolling and parts of fruit touching stems. Adding surfactant to the tank mix can improve coverage of waxy plant parts. Choose surfactants carefully, because some can cause chemical burns on plants. For control of indoor insects, residual insecticides should be applied to places where insects stay out of sight (such as in cracks and crevices) as well as to places where they've been seen moving about. **Caution**: When using any pesticide, follow label restrictions that tell where or what *not* to treat.

Bait should be applied where the target pest will find it. Some pests are more efficient than others at finding bait. Some flies and wasps sense food and mates at a distance and can fly to them. Ants, termites, cockroaches, snails, and slugs leave their colonies or resting sites and move about their territory until they get close to the bait. Rats and mice stay along well-used trails. They don't wander unless drought, flooding, or other disturbances cause them to move to a neighboring property. For pests that search less efficiently, exact placement or closer spacing of baits or traps are more important. Find information about placement and spacing on the labeling for the bait. **Caution:** Placement and spacing instructions are enforceable and may be checked by a pesticides inspector. Place bait only in areas allowed by the labeling. Put bait in bait stations when required. Do not space bait stations closer than allowed by the labeling.

It is important to seal the edges of a tarp, container, or structure thoroughly when applying fumigants. Photo by USDA Forest Service Archives, Bug-

Obstructions. Things that block or change a pesticide application pattern can protect the pest. In outdoor situations, trash, leaves, stems, and large clods of soil can stop a pesticide from reaching where the pest lives. Tall weeds can shield shorter weeds from herbicide spray treatments. On indoor surfaces, an insecticide or disinfectant can be absorbed or deactivated by grease, dust, or crumbs.

Barriers broken. Even if an applicator has set up a chemical barrier by thoroughly treating the object, crop, animal, or site, parts of the barrier may later be disturbed. This would leave gaps where pests may start an infestation or infection.

Fumigant covers and seals. A fumigant pesticide works best when the chemical is contained and surrounds the site or object being fumigated. The pest may survive if the gas escapes too quickly. To keep fumigant gases in place, containers, tarps, plastic sheets, or irrigated soil surfaces are used. A fumigant treatment can fail if these are not sealed properly, of if they shake loose, tear, or otherwise develop leaks.

This article is based on Unit 1—Principles of Pest Control—in ***Applying Pesticides Correctly: Guide for Private and Commercial Applicators***, a 1991 manual jointly published by the U.S. Environmental Protection Agency and the U.S. Department of Agriculture.

RESTRICTED USE PESTICIDES REQUIRE AN EXTRA LEVEL OF CARE

(recertification)

Always check the label of any pesticide for required personal protective equipment. Photo courtesy of USDA Forest Service, Region 8, Bugwood.org

The owner of a horticultural company was fined recently for using a restricted use pesticide (RUP) in ways that were inconsistent with the product label. The product's use was restricted due to human health concerns, but workers had applied the product without proper training or the required personal protective equipment (PPE). In another recent case, a company was fined because it failed to keep the records required for RUPs.

"RUPs are pesticides that have been determined by the Environmental Protection Agency (EPA) to have a greater chance of causing harm to public health, farm workers, domestic animals, wildlife, certain crops, water, or other sensitive organisms or sites," says Gina Alessandri, President of the Association of American Pesticide Control Officials and Director, Pesticide and Plant Pest Management Division, Michigan Department of Agriculture and Rural Development. "As a result, there are more stringent requirements regarding applicator training, oversight and record-keeping, as well as product-specific requirements, such as more extensive PPE."

The concept of restricted use pesticides originated in California over 60 years ago, when there were concerns about protecting sensitive crops from phenoxy herbicide drift. In 1972, amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) established RUPs at the national level.

What triggers an RUP classification? A variety of human health concerns may result in a product being restricted. Examples include acute toxicity if exposed to a product through the mouth, skin or lungs, or the ability of the active ingredient to cause genetic changes (mutagenicity) or tumors (oncogenicity) in laboratory tests.

Environmental concerns may also result in an RUP classification, such as toxicity to bees, fish, birds or certain crops, ground or surface water concerns, or a history of accidental exposure.

Source of this article
This article is based on a 12 November 2012 statement by the Weed Science Society of America, the American Phytopathological Society, and the Plant-Insect Ecosystems Section of the Entomological Society of America. It is accessible through the WSSA website at http://wssa.net/2012/12/wssa-pesticide-stewardship-series-05-restricted-use-pesticides-require-an-extra-level-of-care/

If you have questions about a restricted use pesticide product, call the pesticide manufacturer or the [pesticide regulatory agency for your state](#).

Here are a few important points to remember about RUPs:

- **The label.** When a pesticide is classified as restricted use by the EPA, the words "Restricted Use Pesticide" will appear at the top of the front panel. The reason for the RUP classification will usually be shown as well.
- **The formulation.** The RUP classification is for a specific formulation(s). For example, a highly concentrated emulsifiable concentrate (EC) formulation of an active ingredient may be restricted, while the granular formulation or low concentration EC may not.
- **The intended use.** The formulation may be restricted for agricultural, residential or indoor uses, all uses, use on certain crops, etc.
- **The sale.** Distributors, dealers and retailers must be licensed to sell RUPs. They must carefully document these sales and must sell only to buyers who are certified to apply RUPs for the intended use.
- **The application.** The RUP may only be applied by a certified applicator or someone under a certified applicator's direct supervision, and only for those purposes covered by the applicator's certification.
- **The RUP list.** Some states use the EPA's RUP list as their RUP list, while other states require that certain additional products be restricted, usually due to local conditions that result in environmental concerns. A product on the EPA's RUP list must also be restricted for use in every state that licenses it. Some restricted use products may be federally registered but not licensed at all in certain states.

"Classification of a pesticide as restricted use to protect human health or the environment is a critical component of the pesticide registration process," says Alessandri. "It allows certain products to be available by establishing stricter conditions of use."


HSE
Health and Safety Executive

The Pesticide Users' Health Study

Survey of pesticide usage

Prepared by the **Health and Safety Laboratory** for the Health and Safety Executive 2013

RR957
Research Report

PESTICIDE USERS HEALTH STUDY, 2013 (UK)

A new survey of commercial pesticide users in the United Kingdom has been published. The "Pesticide Users Health Study" is available at http://www.hse.gov.uk/research/rrhtm/rr957.htm The following is a summary section from the report.

Observations from survey

In 1996, the Epidemiology and Medical Statistics Unit at HSE [Health and Safety Executive, United Kingdom] conducted a pilot study on pesticide usage among licensed agricultural pesticide users from a sample of 4,000 individuals on the City & Guilds Land Based Services's [sic] database. The response rate was 50%, though comments were made on the survey being too long and being sent out when workers were very busy. When the survey was sent to the 65,993 individuals on the PUHS [Pesticide Users' Health Study] database, the response rate was much lower at 14%. This may partly be attributable to the global trend of decreasing response rates to surveys (Galea and Tracy, 2007). As in the initial study some responders commented on the timing of the survey but also that the information requested was very detailed; the poor response rate was probably also attributable to these factors. The low response rate may limit the generalisability of the results, although the differences in age and sex distribution between responders and non-responders were negligible.

About 90% of responders had used pesticides, confirming that a large proportion of individuals on the City & Guilds Land Based Services database were actively employed, or had been employed, in pesticide usage. The median number of years exposed in all jobs was 16 years, with a range of 0 to 85 years. The median duration of exposure was 40 hours per year and 20 days per year.

The commonest main areas of pesticide usage reported were amenity weed control and cereals. Responders listed 2,496 unique trade names and 677 unique active ingredients. The wide variety of products available for pesticide usage made it very difficult to summarise or to link with any ill-health variables.

The proportion of respondents who were current smokers was very small (14%), and the majority of respondents were never smokers (56%). As a comparison, the proportion of current smokers among adults aged over 16 years in Britain, was no lower than 26% during the 1990s and was 24% in 2005 (NHS IC, 2009). These statistics suggest that as a group, these workers were at lower risk of the smoking-related diseases, including lung cancer and cardiovascular disease.

Currently, the only health-related information that is available on this cohort of pesticide users is obtained from the NHS Central Register in the form of cancer and death registrations among the PUHS cohort participants. The mortality analysis indicated that the PUHS cohort has significantly lower all cause mortality than the general British population. However, occupational exposure to pesticides has long been associated with chronic ill health, particularly neurological disorders such as Parkinson's Disease. From the limited health data that [were] collected in this survey of pesticide usage, a significantly elevated risk of "ill health" was associated with occupational exposure to pesticides, and a positive trend with increasing exposure was observed. Unfortunately, the current data do not allow for more detailed analysis, and further clarification of symptoms or disease/condition would be required.

About 3,000 responders added a final comment in the survey form. Many of them commented on the difficulty in completing the form accurately due to vast amount of information required. The PUHS Survey of Pesticide Usage has shown the wide variation in the types of chemical used, and in the number of pesticides used by an individual.

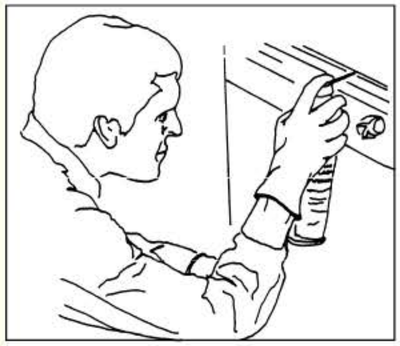
[Note: document changes, in brackets, supplied by the editor.]

ILLUSTRATED GLOSSARY
Terms from Pesticide Labels (Recertification)

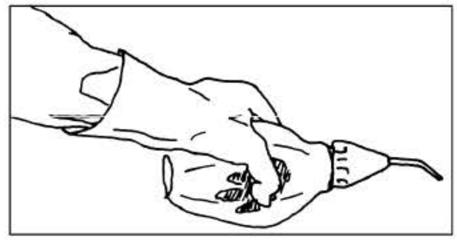
Crack and crevice treatment or **crack-and-crevice treatment**: Injection of small amounts of insecticide or insect bait *into* cracks and crevices in structures, often through a tube-like or needle-like nozzle to avoid contaminating surrounding surfaces. Cracks and crevices are places where cockroaches, bedbugs, or other pest insects stay out of sight. Examples: Expansion joints between different elements of construction or between the equipment bases and the floor, wall voids, motor housings, junction boxes or switch boxes, conduits, or hollow equipment legs.

Label example: *[Insecticide product name] is authorized for use in Federally Inspected Meat and Poultry Plants as a* ***crack and crevice treatment****.*

Images (left & below): US Environmental Protection Agency's booklet, *Urban Integrated Pest Management, A Guide for Commercial Applicators*, July 1992)



Pressurized sprayer can with nozzle extension tube



Bulb dust-

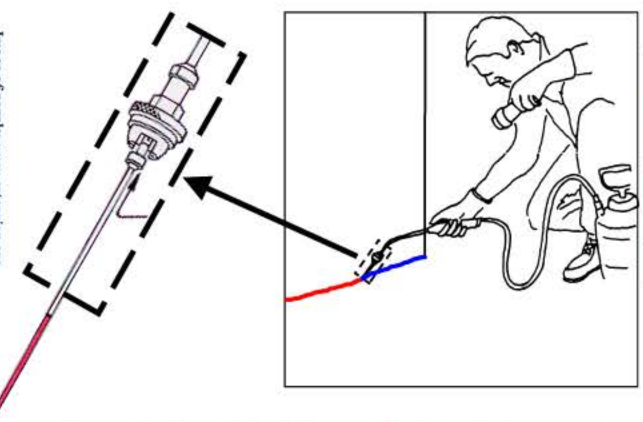


Image of nozzle: www.extension.org /pages/17869/equipment#.UiEiY39imSp

Image of applicator: US Environmental Protection Agency's booklet, *Urban Integrated Pest Management, A Guide for Commercial Applicators*, July 1992)

Nozzle extension tube on hand-held compressed air sprayer

Flow meter: A device used to measure the speed or amount of fluid moving past a point, especially in a tube, hose, pipe, or open channel.

Label example: *The injection rod should be coupled to a* ***flow meter*** *to monitor the correct volume* [of insecticide mixture] *applied per root ball* [of a potted plant] *using an injection pressure of at least 30 psi.*

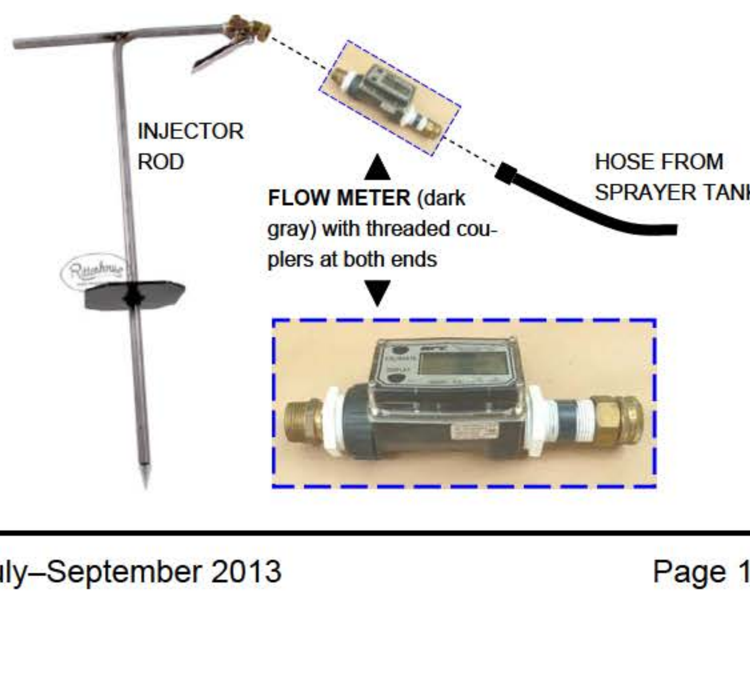


Image of injector rod: rittenhouse.ca/asp/Product.asp?PG=713

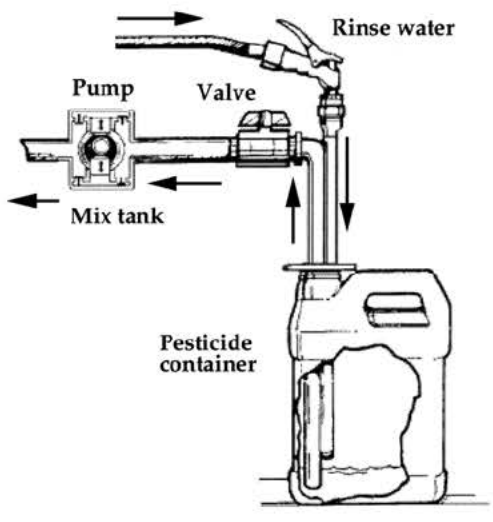
A top-of-the-line commercial seed treater. Photo courtesy of USC, LLC

Closed system: A device that takes the pesticide out of its container, and then rinses the container. It also moves the pesticide into the application tank and then rinses the hoses. If run properly, it keeps the pesticide away from your body. This means you may need less personal protective equipment.

Label example: *When handlers use **closed systems**, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agriculture pesticides . . . , the handler PPE requirements may be reduced or modified as specified in the WPS.*

Seed treater: a machine for chemical treatment of seed with pesticides to kill agents of disease and grain pests.

Label example: *For use in commercial **seed treaters** only, with the exception of application to canola, cotton (delinted seed), ...*



A closed pesticide delivery system. Courtesy of R. Gardner, Pesticide Management Education Program, Cornell University. *http://psep.cce.cornell.edu/Tutorials/core-tutorial/module16/*index.aspx

The definitions in this glossary are intended to help understand the terms used on pesticide labels. Other definitions may be available for these terms.

The Pesticide Label

July – September 2013

PREVIOUS RECERTIFICATION ARTICLES

January–June 2013—Bedbugs and Pesticide Misuse (p. 2), Maintaining Personal Protective Equipment (p. 7), Diluting Pesticides (p. 11)

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