Renewed

For managers of rangeland, pasture, uncultivated agricultural areas, and rural non-crop sites surrounding residential and resort areas—use of the pesticide Prozap® Zinc Phosphide Oat Bait (HACCO; EPA Reg. No. 61282-14)—requires having a copy of HI-010001, valid 7/27/2011–7/26/2016—note: For use only by or under “authorization” of the Hawaii Department of Health, Sanitation Branch, for the protection of public health. This is a restricted use pesticide.

New

For growers of corn grown for seed production only—use of the pesticide Tilt® Fungicide (Syngenta; EPA Reg. No. 100-617)—requires having a copy of HI-120002, valid 5/30/2012–5/29/2017—note: No part of the treated crop shall be diverted as food for human consumption or feed for animal consumption.
PESTICIDES, EPA, AND THE ENDANGERED SPECIES ACT
(recertification)

Pesticide use in Hawaii includes management of invasive species. Applications are often in areas of the islands that are habitats for birds, plants, snails, and other native species. The Endangered Species Act (ESA) requires federal agencies to ensure that any action they authorize will not jeopardize any listed species, or destroy or adversely modify the species’ habitat. This article discusses the ESA as implemented by the U.S. Environmental Protection Agency (EPA) and the pesticide applicator’s responsibilities under the Act.

EPA responsibilities

The Endangered Species Act of 1973 requires the EPA to ensure protection of endangered and threatened plants and animals and their habitats from pesticides. An endangered species is a species that is in danger of extinction in all or a large part of its range. A threatened species is a species that is likely to become endangered within the near future. Critical habitats are areas of land, water, and air space that an endangered species needs for survival. Critical habitats include breeding sites; sources of food, cover, or shelter; and surrounding territory that gives room for normal population growth and behavior.

The U.S. Fish and Wildlife Service (FWS) enforces the ESA on the land and in the fresh waters of the U.S. and its Territories. The National Oceanic and Atmospheric Administration’s (NOAA) National Marine Fisheries Service administers the ESA for marine and anadromous species listed as endangered. Fish that migrate from salt to fresh water to spawn, such as shad and salmon, are anadromous.

It is the EPA’s responsibility to reduce or remove the threat of pesticide use to endangered species. This starts when a pesticide is first registered, or when it is reregistered. EPA evaluates the known toxicity and ecological effects of the product to determine how it moves through and breaks down in the environment. The risk to birds, fish, invertebrates, mammals, and plants determines whether the pesticide is registered or reregistered.

The risk assessment results in an initial determination by EPA for a listed species: 1) the registered uses of the pesticide will have “no effect” on the endangered species; or 2) the registered uses “may affect”...
the species. If EPA determines the pesticide “may affect” the species, the assessment is refined to determine if its uses: 1) “may affect, but is not likely to adversely affect” the species; or 2) “may affect and is likely to adversely affect” the species.

If EPA determines the pesticide will have “no effect” or “may affect, but is not likely to adversely affect” a listed species, EPA will have “informal consultations” with the FWS and NOAA. They will either agree or disagree with the EPA finding, in writing.

If the FWS and NOAA do not agree that a pesticide is “not likely to adversely affect” a species, or if EPA determines the pesticide “may affect and is likely to adversely affect” a listed species, there will be a “formal consultation” between EPA, FWS, and NOAA.

In the “formal consultation,” EPA presents its findings and FWS and NOAA render a Biological Opinion. This Opinion is based on EPA’s assessment of the pesticide’s potential effect on the species. It recommends further steps that EPA should take, if any, to reduce or eliminate potential risk to the species or its habitat.

If EPA’s risk assessment and their formal consultation with FWS and NOAA determine that a pesticide’s registration, label, or use instructions need changing to protect a species, EPA will require those changes. If the changes are only necessary in a specific area rather than nationwide, EPA will issue geographically specific Endangered Species Protection Bulletins.

Pesticide applicator responsibilities

Under the ESA, “Pesticide users who fail to follow label provisions applicable to their pesticide application, whether that failure results in harm to a listed (endangered or threatened) species or not, will be subject to enforcement under the misuse provisions of FIFRA (EPA ESPP).” Before applying a pesticide, it is up to the user to determine whether endangered species are in or near the area of application. If in doubt, the user should contact the FWS Pacific Islands Fish and Wildlife Office at http://www.fws.gov/pacificislands/ or call (808) 792-9400.

The federal government currently lists about 1,990 species as endangered. About 1,380 of these live partly or entirely in the U.S. Many of them are very small or only known to scientists and some naturalists. Most people are unaware of the complexity of life that surrounds them.
It is an intricate web and its species diversity is essential to its survival and health. Maintaining this diversity benefits us in many ways, including the following.

**Agriculture.** Most of our major food crops were once wild. Plant breeders often seek genes from wild species. These genes can confer pest or drought resistance in a crop, climate tolerance, new horticultural characteristics, etc. As pests become resistant to certain genes, the search continues for new genes. Biodiversity is the storehouse of new genetic material for an unknown future.

**Medicine.** Many of today’s medicines and pesticides come from plant and animal species. For example:

- Aspirin (acetylsalicylic acid) was extracted from willow bark as far back as 400 BC.
- Quinine and quinidine are extracted from *Chinchona* species and used against malaria and heart arrhythmias, respectively.
- Most antibiotics are synthesized from fungi (*Penicillium*) and bacteria (*Streptomyces*).
- Some of the most popular insecticides come from plants. The pyrethrins are extracted from certain chrysanthemum species and modified to produce the longer-lasting pyrethroids.
- Callisto® is an herbicide based on an allelochemical secreted by the roots of the lemon bottlebrush (*Callistemon citrinus*).

**Balance and stability.** We cannot predict which species may be needed in the future. The species that becomes extinct may hold the key to averting the next plant disease, human epidemic, or global climate change. The loss of a single species may disrupt a whole ecosystem as predators and prey, pests and their hosts, scramble to find an alternative energy source.

**The threat of invasive species**

Species extinction is natural, but global commerce and travel are introducing new species at a much faster rate. It is estimated that 11,500 species have become established in the Hawaiian Islands over the past 30 million years (Ziegler 2002). They arrived by wind, in or on birds, and floating on the sea. This is an average of about one natural colonization every 2,600 years. Today, more than 20 non-native species arrive every year in cargo or with humans. This artificial rate of species introduction is 52,120 times greater than the natural rate of species colonization. At
this rate and with no natural enemies to help control their populations, species that become established do so at the expense of existing species. Invasive species introduced by humans are the main cause of threatened and endangered species in Hawaii.

Bibliography
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EPA ESPP http://www.epa.gov/espp/basic-info.htm#field
NOAA Fisheries http://www.nmfs.noaa.gov/pr/laws/esa/
U.S. Fish and Wildlife http://www.fws.gov/endangered/

ROLE OF THE TENANT IN IPM

“The Tenant's Role in Integrated Pest Management (IPM)” is a 16-minute video about managing household pests like cockroaches, bedbugs, and rodents. It is for people who live in apartments or condominiums but property managers and homeowners would find it useful, too. It downplays spraying insecticides and emphasizes cleanup, maintenance and repair, and working on a problem area right away. Of course, this means recognizing problem signs so the video shows where to look and what to look for. Here are a couple of interesting tips about bedbugs from the video: Don't bring used furniture into your home unless you're absolutely sure it's free of bedbugs. When you're traveling away from home, put your luggage down away from a bed that might be infested with bedbugs.

This free video is available in six versions: 1) English audio, 2) English audio with English subtitles, 3) English audio with Spanish subtitles, 4) Spanish audio, 5) Spanish audio with Spanish subtitles, and 6) Spanish audio with English subtitles. All versions are downloadable from: http://www.stoppests.org/working-with-residents/residents-briefing-video/the-tenants-role-in-ipm-english/
EPA CONSIDERS NEW “SUSTAINABLE” GUIDELINES

The U.S. Environmental Protection Agency (EPA) is attempting to change their decision-making process for evaluating environmental pollutants, including pesticides. They have asked The National Academies, National Research Council (NRC) to help them develop a framework that will add sustainability to their current approach of risk assessment and risk management.

The NRC committee used the definition of sustainability from the 1969 National Environmental Policy Act to develop the framework. The Act defines sustainability as, “... to create and maintain conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations.”

The committee’s report incorporated sustainability into the EPA’s current risk-based approach that has been in effect since the 1980s. The committee considered the current framework as “not adequate to address many of the complex problems that put current and future generations at risk, such as depletion of natural resources, climate change, and loss of biodiversity.” New tools are now available to help evaluate these complex issues.

The design and implementation of this new Agency-wide concept of sustainability, if endorsed, would take many years to develop. According to the chair of the NRC committee, however, “Assuming that EPA adopts the goal of sustainability, there will be benefits for the United States as a whole. There is likely to be a closer meshing of economic and environmental policies, and the result should be both a cleaner environment and a stronger economy.”

Bibliography
The full report, “Sustainability and the U. S. EPA” is online at http://www.nap.edu/openbook.php?record_id=13152&page=R1
PESTICIDE DECISIONS: SAFETY CHECKLIST
(recertification)

If you use pesticides, or are responsible for others using them, you have important decisions to make even before the chemical is applied. The following checklist will help you make safe, cost-effective, legal choices for yourself, your handlers, and others.

This article reviews ways to avoid exposure to pesticides, what PPE is required, how to reduce the spread of pesticide residue, instructing handlers, and preparing for emergencies.

1. Read all applicable labeling
   - Determine what you need to know before being exposed to the pesticide
   - Find the instructions for safe use of the pesticide

2. Avoid exposure
   - Keep food and personal belongings out of storage and handling areas.
   - At break, rinse and remove gloves, wash your hands and face thoroughly before touching your skin, eating, smoking, or using the toilet.
   - Be aware of sources of contamination: mixing, loading, applying, spill cleanup, repair or maintenance of equipment, and handling pesticide containers.

3. Use required Personal Protective Equipment (PPE)
   - What PPE does the label require?
   - Is the PPE clean and in good condition?
   - Have all the necessary PPE assembled and ready to use.
   - Make sure you and your handlers know how to use the equipment.
4. Avoid the accidental spread of pesticides

- Always be aware of how pesticides can be spread.
- Do not touch people, animals, or objects with contaminated gloves.
- Do not sit in a chair or car while wearing contaminated clothing.
- Pesticides on clothing or PPE can also contaminate your home furniture, carpets, etc.
- Wash contaminated clothes separately from the family wash; clean the machine after use.
- Properly clean up even the smallest spill and dispose of the waste properly.

5. Instruct your handlers

- Be sure handlers understand the personal and environmental hazards of pesticide use.
- Educate handlers on ways they might be exposed to pesticides and how to limit their exposure.
- Handlers should know how to obtain information from pesticide labeling.
- Give handlers specific instructions about the pesticide and the duties they must perform.

The label will list required PPE including: eyewear, respirator, chemical-resistant material for gloves, coveralls, apron, etc. Courtesy of NASDARF
As a certified applicator, you are legally required to provide information to those you supervise on safe handling of a restricted use pesticide.

6. Prepare for emergencies before they happen
   - Personal decontamination: have on-hand clean water, detergent, paper towels, and a change of clothes.
   - First aid: prepare a well-stocked first aid kit with dispenser for gently washing eyes.
   - Spill cleanup: have on-hand a plastic bucket or liners, shovel, broom, dustpan, absorbent material, and PPE required for handling the spilled pesticide.
   - General: have a telephone available (call 911).
   - Remove any pets or unauthorized people from the contaminated area.
   - Allow only trained, equipped handlers to be present during pesticide handling tasks.

References


Unless otherwise credited, all images are courtesy of the “National Pesticide Applicator Certification Core Manual,” National Association of State Departments of Agriculture Research Foundation (NASDARF). The Core Manual is available online at http://www.nasda.org/workersafety/

In the next issue, look for:

“Pesticide Decisions: Preapplication Checklist”

(Acceptable for recertification credits by the Hawaii Department of Agriculture).
This webpage presents a dichotomous key to four subfamilies of ants in Hawaii: Myrmicinae, Formicinae, Dolichoderinae, and Ponerinae. The key's developer says, "It is still in draft form but should be pretty accurate." To use this method of identification, you will need at least a good hand lens and experience with insect keys. Written descriptions are illustrated with line drawings of the mandibles, eyes, antennae, gaster, petiole, and some fine structures of adult worker ants (see below). To understand the location and general appearance of these structures, study the illustrated glossary near the bottom of the webpage. With this key it is possible to identify some ants to species level.
After many years of testing, a program coordinated by the Hawaii Department of Agriculture has developed a new, effective way to control little fire ants. These ants are difficult to control for several reasons:

- the ants and their colonies are small and difficult to find, treat, and monitor.
- little fire ants nest in trees and bushes as well as on the ground.
- colonies often contain more than one queen.
- colonies are interconnected, so if one is damaged it will be repopulated by a nearby colony.
- insecticide sprays and dusts kill only the workers that come into contact with them; these ants are quickly replaced by the colony.
- baits are more effective than sprays and dusts, but must kill workers slowly so they can return to the nest and share the bait with others.
- most commercial baits are granules, which lose their effectiveness when wet; they are not as effective in rainy areas.

This newly developed control uses a mayonnaise-like gel that can easily be made by homeowners and others. An insecticide, Tango®, is added to the gel to make effective bait. The active ingredient in Tango® is S-methoprene, an insect growth regulator that keeps ant larvae from becoming adults. It does not affect mature ants, allowing them to carry the bait back to the colony.

A recent fact sheet [https://docs.google.com/a/hawaii.edu/file/d/0B61oU9xUD-DMV3p2bUFZMjk4N2c/edit?pli=1](https://docs.google.com/a/hawaii.edu/file/d/0B61oU9xUD-DMV3p2bUFZMjk4N2c/edit?pli=1) lists the simple, inexpensive ingredients, how to prepare them, and how to apply the bait with a simple spray bottle.

To contact the Hawai’i Ant Lab, go to their website at [http://www.littlefireants.com/](http://www.littlefireants.com/) or call (808) 315-5656.

**About the Photos**

CHOOSING PESTICIDES FOR GREENHOUSES AND NURSERIES
(recertification)

When you’re choosing a pesticide to treat plants under or within a structure, start by determining if the treatment would be legal. Review the product’s labeling to be sure it allows you to use it for your type of agricultural plant-producing operation, either a greenhouse, nursery, forest, or farm. These four terms are used by pesticide regulators to determine whether an agricultural pesticide treatment is legal or not. The rules apply to both individuals and agencies acting as operators. Following are descriptions and notes about each type of operation.

GREENHOUSE

Greenhouses are operations that produce agricultural plants indoors in an area that is enclosed with nonporous covering and that is large enough to allow a person to enter. Examples: polyhouses, mushroom houses and caves, and rhubarb houses, as well as traditional greenhouses. Malls, atriums, conservatories, arboretums, and office buildings that grow or maintain plants primarily for decorative or environmental benefits are not included.

In Hawaii, you may use a pesticide to treat plants in a greenhouse only if the product’s labeling specifies greenhouse for your crop, like this statement from the label of a plant growth regulator:

[Pesticide product name] is… for use on ornamental plants grown in containers in nurseries, greenhouses, shade houses, and interiorscapes.

and these from an insecticide’s label:

**CONTAINER DRENCH APPLICATIONS – SMALL CONTAINERS:**

For applications only to ornamental plants in greenhouses and nurseries … and vegetable transplants*, using soil drench, micro-irrigation, … or hand-held motorized irrigation equipment.

Do not use a pesticide product to treat a greenhouse crop if its labeling clearly prohibits use in a greenhouse, for example, like this statement: “Do not use this product in greenhouses.”
NURSERY

Although some people say “greenhouse” to describe a plant-growing area protected only by panels of shade cloth and/or strips of thin wood (laths), pesticide regulators would consider it a nursery.

**Nurseries** are operations that produce agricultural plants outdoors for transplants to another location, or flower or fern cuttings. Examples: flowering and foliage plants or trees; tree seedlings; live Christmas trees; vegetable, fruit, and ornamental transplants; and turfgrass produced for sod.

FOREST and FARM

Pesticide regulators recognize a farm and a forest as outdoor operations. They definitely are not greenhouses.

**Forests** are operations that produce agricultural plants outdoors for wood fiber or timber products.

**Farms** are operations, other than nurseries or forests, that produce agricultural plants outdoors.

SUMMARY

Greenhouses are indoor operations. Nurseries are outdoor operations; some are protected by porous structures but others are in open fields. Farms and forests are outdoor operations.

Reference

The descriptions of greenhouses, nurseries, forests, and farms are from page 8 in the US Environmental Protection Agency’s booklet titled “How to Comply With The Worker Protection Standard For Agricultural Pesticides” (June 2006).
INSECT CADAVERS CARRY NEMATODES

A custom-made machine for packaging mealworms infected with beneficial nematodes could improve the delivery, timing and use of the wormlike organisms as biological control agents.

The machine is the result of a cooperative research and development agreement involving U.S. Department of Agriculture (USDA) scientists and Southeastern Insectaries, Inc. of Perry, GA.

*Heterorhabditis* and *Steinernema* nematodes can infect and kill a wide array of insect crop pests, including Japanese beetles, vine weevils, root borers, and fungus gnats. About 10 years ago, entomologist David Shapiro-Ilan and colleagues with USDA's Agricultural Research Service (ARS) and Virginia Polytechnic Institute and State University showed that the nematodes performed best when applied in the dead bodies of the insect hosts used to mass-produce them. When juvenile nematodes emerge from the insect cadavers, they are able to attack the pests immediately.

There is a tendency for some commonly used host insects to rupture or stick together during storage, transport and application. This technical hurdle has kept the insect-cadaver approach from gaining widespread commercial acceptance.

Southeastern Insectaries owner Louis Tedders solved the problem by packaging the insect cadavers in masking tape. He also devised a prototype device to automate the process, later refined by other ARS scientists.

Using readily available parts, the scientists built a device to sort the mealworms mechanically by size. The largest are placed in shallow dishes where the nematodes can infect them. After a few days, a mechanical arm reaches in, picks up the dead, infected mealworms, and places them between strips of masking tape at the rate of one insect every two seconds. The rerolled tape filled with insect cadavers is easily stored, transported, and applied to pest-infested soils.

Laboratory tests of the insect-cadaver taping system showed no adverse effects on the nematodes' survival or their ability to control pests. In fact, 15 days after application, nematodes from the taped cadavers killed up to 78 percent of small hive beetles and 91 percent of root weevils used in the tests.

Economic Threshold: In integrated pest management, the pest population level at which a control action, such as a pesticide spray, must be taken to prevent economic injury; same as “action threshold” or “treatment threshold.”

Label example: Begin applications when insect populations reach recognized economic threshold levels.

MSHA/NIOSH approval number prefix. Approval codes for designating types of respirators (see pictures) that were tested and certified by the National Institute for Occupational Safety and Health (NIOSH). The codes are printed on labels of many pesticides and on boxes containing the facepiece of the respirator.

Label example: Applicators and other handlers must wear: …For exposures in enclosed areas, a respirator with either an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA-NIOSH approval number prefix TC-23C) or a canister approved for pesticides (MSHA/NIO SH approval number prefix TC-14G).

The definitions in this glossary are intended to help understand the terms used on pesticide labels. Other definitions may be available for these terms. Mention of a trademark, company, or proprietary name is not an endorsement and does not imply a recommendation to the exclusion of other companies or products.
Vegetative filter strip, vegetative buffer strip. A managed area of gently sloping land that is covered with vegetation and is located between a potential, pollutant source area and a body of surface water that receives runoff from the source area. The land manager purposely sites, shapes, and maintains the strip in order to intercept soil particles and harmful chemicals in the runoff water that would enter the water body.

Label example: Only apply products containing [pesticide ingredient name] onto fields where a maintained vegetative buffer strip of at least 10 feet exists between the field and down gradient aquatic habitat.

Instar: Insect, centipede, or other arthropod as it appears between the egg stage and pupa or adult stages of development.

Label example: For best results, applications should be made when eggs have hatched and the majority of the grasshopper population is 2nd – 3rd instar nymphs.
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Archived issues of “The Pesticide Label” available for free download at

http://pestworld.stjohn.hawaii.edu/pat/Newsletter_main.html

This newsletter is published by the Extension Pesticide Programs. For information on pesticide programs, please contact:

Charles Nagamine
Department of Plant and Environmental Sciences
3050 Maile Way, Gilmore 310
University of Hawaii at Manoa
Honolulu, HI 96822

Telephone: (808) 956-6007 (Nagamine)
E-mail: cynagami@hawaii.edu
Web: http://pestworld.stjohn.hawaii.edu/pat/newsletter_main.htm

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Caution: Pesticide use is governed by state and federal regulations. Pesticides and pesticide uses mentioned in this newsletter may not be approved for Hawaii, and their mention is for information purposes only and should not be considered a recommendation. Read the pesticide’s labeling to ensure that the intended use is included on it and follow all labeling directions.