



The Pesticide Label

Key to Pesticide Safety and Education

October–December 2005

Department of Plant and Environmental Protection Sciences

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Staff's Notes

The Pesticide Safety Education Program has always urged Hawaii's agricultural producers to use integrated pest management to reduce their reliance on pesticides. Developing an integrated pest management plan, however, takes time and requires understanding the pest's biology, life cycle, habitat, host preferences, parasites and predators. When an invasive species suddenly appears on one of our crops, producers often want to know if pesticides can control it. Often little is known about the efficacy of registered pesticides against an invasive species or there may be nothing registered for use against it. The use of ineffective or illegal pesticides may lead to overuse or misuse.

Ideally, the logical approach to this problem is to keep alien species out of Hawaii. John McHugh, Chair of the Hawaii Farm Bureau Federation's Environmental Stewardship Committee, recently met

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Aloha,

Charles Nagamine, Instructor
Pesticide Risk Reduction Education Program

Regulatory Updates

EPA Finalizes Approach to Field Implementation of Endangered Species Protection Program

On November 2, 2005, EPA published in the Federal Register a notice that outlines the Agency's approach to field implementation of its Endangered Species Protection Program (ESPP). The notice also responds to comments received from the public in response to the Agency's December 2002, Federal Register notice proposing its approach to field implementation.

The goal of the ESPP is to carry out responsibilities under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in compliance with the Endangered Species Act by providing appropriate protection to listed species and their designated critical habitats from potential harm due to pesticide use, while at the same time not placing unnecessary burden on the agriculture community and other pesticide users. EPA will implement its program through pesticide label statements that refer users to Endangered Species Protection Bulletins (Bulletins), as appropriate, when geographically specific use limitations are necessary to protect federally listed species or their designated critical habitat. Bulletins will generally include a map of the county or parish to which it applies, a description of the species being protected, a list of the pesticides of concern and their use limitations. These use limitations will be enforceable under the misuse provisions of FIFRA. Once pesticide labels with such labeling appear in the marketplace, Bulletins will be available via the EPA's Website or via a toll free number; both of which will be identified on the pesticide label.

The Federal Register Notice can be found at: www.epa.gov/fedrgstr/EPA-PEST/2005/November/Day-02/p21838.htm. For additional information on the technical, scientific or risk assessment aspects of the program, contact Arty Williams at 703-305-7695 or williams.arty@epa.gov. If you have questions about field implementation of the ESPP, please contact Mary Powell at 703 305-7384 or powell.mary@epa.gov.

Source: EPA Pesticide Program Updates, 11/2/05 email, from EPA's Office of Pesticide Programs, <http://www.epa.gov/pesticides>.

* * *

Residents Reminded About Proper Use of Hydrated Lime to Control Coqui Frogs

August 26, 2005

HONOLULU – The Hawaii Department of Agriculture (HDOA) reminds residents, particularly on the Big Island, that there are specific directions that must be followed when using hydrated lime to control coqui frog infestations.

HDOA has received several reports that some residents are illegally applying the dust form of the chemical, a practice that is hazardous to humans and animals. The dust form is only allowed for agricultural operations, which can restrict access to the treated area for at least 48 hours after treatment. Residents are only allowed to use a three percent solution in a liquid form to spray on foliage or to drench the soil.

There has also been a report that dangerous misinformation has been posted anonymously in Pahoia that promote the use of leaf blowers to shoot hydrated lime dust across a wide area – a practice that is not only extremely dangerous, but illegal.

“We cannot emphasize enough the proper use of hydrated lime,” said Sandra Lee Kunimoto, Chairperson of the Hawaii Board of Agriculture. “If misused, this chemical may cause irreversible eye damage and skin burns and is harmful if swallowed or absorbed through the skin and may be fatal if inhaled.”

“The Pesticides Branch has made it a priority to investigate reported misuse of hydrated lime,” said Robert Boesch, manager of HDOA’s Pesticides Branch. “All pesticide dealers are also required by law to provide the label instructions to all customers purchasing the product for coqui control.”

HDOA’s Pesticides Branch has the enforcement authority for both state and EPA laws. Fines for violations of state and federal Environmental Protection Agency (EPA) rules for hydrated lime range between \$1,000 to \$5,000 per offense. Suspected improper use of a pesticide should be reported to HDOA at: Oahu 973-9401, Big Island 974-4140, Maui County 873-3555, Kauai 274-3069.

The labeling for Ash Grove Kemilime appears on pages 4–8. Review the do’s and don’ts before you buy the product and figure out if you are willing and able to comply with them.

Questions regarding the proper use of all pesticides may also be directed to those phone numbers. Label instructions and forms are available on the HDOA website at: www.hawaiiag.org/hdoa/pi_pest_forms.htm

On April 26, 2005, the EPA approved an emergency exemption requested by HDOA to allow the use of hydrated lime, also known as calcium hydroxide (CA(OH)₂), to control coqui and greenhouse frog infestations in Hawaii.

In granting the exemption, EPA requires that HDOA create a product label detailing the conditions under which hydrated lime may be used, which include the following:

- Agricultural establishments are allowed to use the dust form of hydrated lime and worker entry into treated areas must be restricted for 48 hours after treatment.
- Residential, commercial or public uses must be sprayed in a solution form.
- Must not be applied to food crops;
- Applicators must wear protective clothing, chemical-resistant gloves and protective eyewear and approved respirators;
- Include a precautionary statement that it is harmful if swallowed;
- Must not be used in areas that were recently treated with ammonium-containing fertilizers, which may react with the lime and release ammonia.
- Must not be applied to areas where children play or congregate;
- Must not be applied to trees to avoid the potential for subsequent dripping of the chemical on people or property, such as automobiles;
- For non-agricultural uses, such as around homes, persons other than the applicator are prohibited from entering the treated area until the spray has dried.

The Pesticides Branch held statewide workshops on proper use of hydrated lime in May and June.

“All applications in natural areas

must be performed by state or federal agencies (e.g., Hawaii Department of Land and Natural Resources, National Park Service, etc.) or non-governmental organizations such as The Nature Conservancy.”

—From the labeling for Ash Grove Kemilime

**Section 18 Quarantine Exemption
For the Use of**

Ash Grove Kemilime (97.0% a.i.)

To Control

Coqui and Greenhouse Frogs (*Eleutherodactylus coqui* and *E. planirostris*)

**In Outdoor Ornamental Plants in Nurseries and Residential Areas, Parks,
Hotels & Resorts, Forest Habitats and Natural Areas***

For Use in the State of Hawaii Only

Ash Grove Kemilime may be used in the State of Hawaii (Oahu, Kauai, Maui, Lanai, Molokai and the Island of Hawaii) to control the coqui and greenhouse frogs in outdoor ornamental plants in nurseries and residential areas, parks, hotels and resorts, forest habitats, and natural areas* from **April 26, 2005 through April 26, 2008** under a Quarantine Exemption granted by the U.S. Environmental Protection Agency under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as Amended.

*A natural area is defined as any area in the State Conservation District or any area known to contain a listed plant species. All applications in natural areas must be performed by state or federal agencies (eg. Hawaii Department of Land and Natural Resources, National Park Service, etc.) or non-governmental organizations such as The Nature Conservancy.

Active ingredient:

Calcium hydroxide.....97.0%
Other ingredients..... 3.0%
Total.....100.0%

**KEEP OUT OF REACH OF CHILDREN
DANGER (PELIGRO)**

First Aid	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
If in eyes	·Hold eye open and rinse slowly and gently with water for 15-20 minutes. ·Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. ·Call a poison control center or doctor for treatment advice.
If on skin or Clothing	·Take off contaminated clothing. ·Rinse skin immediately with plenty of water for 15-20 minutes. ·Call a poison control center or doctor for treatment advice.
If inhaled	·Move person to fresh air. ·If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. ·Call a poison control center or doctor for further treatment advice.
If swallowed	·Call poison control center or doctor immediately for treatment advice. ·Have person sip a glass of water if able to swallow. ·Do not induce vomiting unless told to do so by the poison control center or doctor. ·Do not give anything by mouth to an unconscious person.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Page 1 of 5: The entire copy of this labeling must be in the possession of the user at the time of application.

Precautionary Statements:

Hazards to Humans and Domestic Animals
Danger

Corrosive. Causes irreversible eye damage and skin burns. Do not get in eyes, on skin, or on clothing. Harmful if swallowed. May be fatal if inhaled. Do not breathe dust. Harmful if absorbed through the skin. For handling activities, use a NIOSH-approved respirator with an organic vapor (OV) cartridge or canister with any N, R, P, or HE prefilter, or a full-faced respirator. Wear coveralls worn over long-sleeved shirt and long pants, protective eyewear (goggles or face shield), chemical-resistant footwear and socks, and chemical-resistant gloves. When cleaning equipment, wear a chemical-resistant apron. For overhead exposure, such as when applying foliar sprays to tall ornamentals, wear chemical-resistant headgear.

Personal Protective Equipment (PPE):

Applicators and other handlers must use the following PPE:

Coveralls worn over long-sleeved shirt and long pants, chemical-resistant footwear and socks, and chemical-resistant gloves, protective eyewear (goggles or face shield) and NIOSH-approved respirator with an organic vapor (OV) cartridge or canister with any N, R, P, or HE prefilter, or a full-faced respirator. When mixing, loading or cleaning equipment, wear a chemical-resistant apron. For overhead exposure, such as when applying foliar sprays to tall ornamentals, wear chemical-resistant headgear.

User Safety Recommendations:

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove contaminated clothing and wash clothing before reuse.

Environmental Hazards

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

AGRICULTURAL USE REQUIREMENTS:

Use of this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Page 2 of 5: The entire copy of this labeling must be in the possession of the user at the time of application.

AGRICULTURAL USE REQUIREMENTS (Continued)

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, wear: coveralls over long-sleeved shirt and long pants, socks and chemical resistant footwear, protective eyewear (goggles or face shield), and chemical-resistant gloves.

NON-AGRICULTURAL USE REQUIREMENTS:

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Residential areas, parks, hotels and resorts, forest habitats and natural areas are not within the scope of the Worker Protection Standard.

Do not allow people (other than applicator) or pets to enter treated areas until sprays have dried.

Sites of Application: (Ash Grove Kemilime is not to be applied to food crops.)

Ash Grove Kemilime calcium hydroxide may be applied to outdoor ornamental plants in nurseries and residential areas, parks, hotels & resorts, forest habitats and natural areas*.

- Calcium hydroxide should not be applied to areas recently treated with ammonium-containing fertilizers and should not be stored where there is a possibility of coming into contact with such fertilizers. (Calcium hydroxide can react with fertilizers containing ammonium ion to release ammonia.)
- Calcium hydroxide (both as dust and aqueous suspension) should not be applied in areas where children play or congregate.
- Calcium hydroxide should not be applied to trees where there is the potential for subsequent dripping of hydrated lime solution (which might occur if the originally applied calcium hydroxide has dried, but mist or dew condenses on the foliage) on either people or property, such as automobiles.

In field testing, no phytotoxicity was observed on any of the ornamental plants used in the trials. However, due to the large number of species and varieties of plants, it is impossible to test every one for safety. Prior to any large-scale application on any plants of value, the user should determine the safety of calcium hydroxide by testing a small number of the type of plants to be treated and observing the treated plants over a one to two week period for phytotoxicity.

* A natural area is defined as any area in the State Conservation District or any area known to contain a listed plant species. All applications in natural areas must be performed by state or federal agencies (eg. Hawaii Department of Land and Natural Resources, National Park Service, etc.) or non-governmental organizations such as The Nature Conservancy. **The U.S. Fish & Wildlife Service (USFWS) Must Be Notified Prior to Application to Natural Areas.**

Page 3 of 5: The entire copy of this labeling must be in the possession of the user at the time of application.

Method of Application:

Ash Grove Kemilime may be used as a dust applied directly to the substrate, in combination with water as a soil drench, or as a foliar spray with appropriate ground application equipment. Dust applications are limited only to agricultural establishments that can control entrance into the treated sites for a minimum of 48 hours. **This product is a contact pesticide, therefore, thorough coverage of the treated area or commodity is necessary for good control.** Aerial application and chemigation are prohibited.

Timing of Application:

During the day, frogs generally hide in substrate near or on the ground, then at dusk, climb onto taller vegetation to feed. To maximize effectiveness, daytime treatments should be limited to dust and soil drench applications when frogs are near to or on the ground surface areas. Foliar applications should be after dusk during the early evening when frogs have climbed up into taller foliage. Monthly monitoring for frogs should be done to ensure populations remain low.

Mixing Rate Chart to Achieve a 3% Solution

Pounds of Ash Grove Kemilime	Gallons of water
2.50	10
25	100
125	500
250*	1000

*Soil Drench Application Only.

Mixing Procedure:

Using the above chart as reference, fill spray tank half-full with water, begin agitation, add calcium hydroxide, and continue filling tank with water to desired level. Failure to follow mixing procedure may result in clogging of hoses. Maintain continuous agitation throughout application.

Methods of application:

Foliar and Soil Drench Application:

Apply as a 3% solution in sufficient volume to achieve thorough coverage. **Thorough coverage is essential to maximize effectiveness of treatment.**

For **foliar application**, do not exceed 125 pounds of Ash Grove Kemilime per acre per application (ie., 500 gallons of a 3% solution).

For **soil drench application** do not exceed 250 pounds of Ash Grove Kemilime per acre per application (ie., 1000 gallons of a 3% solution).

Dust Application (For Agricultural Use Only):

Apply as a **dust** to ground / nursery floor areas where control is desired. Do not apply as a dust to plants. Do not exceed 500 pounds of Ash Grove Kemilime per acre per application.

Maximum Number of Applications per Acre per Year:

Re-apply as needed to reduce frog populations, but do not exceed twelve (12) applications per twelve-month period. Calcium hydroxide will alter the acidity of the soil. If applied to soils of plants requiring acid conditions for optimum growth, the calcium hydroxide may adversely affect plant vigor and health. It is recommended that the soil pH be tested periodically to ensure that the use of calcium hydroxide does not exceed the soil requirements of the plants.

Storage and Disposal:

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store bag tightly closed in a cool, dry, well-ventilated area that is inaccessible to children, pets, and domestic animals. Do not store near fertilizers containing ammonium. (Calcium hydroxide can react with fertilizers containing ammonium ion to release ammonia.)

Container Disposal: Completely empty bag into application equipment. Do not reuse bag. Dispose in landfill.

Pesticide Disposal: If the product cannot be disposed of through labeled usage, dispose of pesticide as hazardous waste.

Other Restrictions:

- Do not apply to food crops.
- Do not apply by aerial application.
- Do not apply by chemigation.
- Adverse effects shall be reported to the Hawaii Department of Agriculture, Pesticides Branch, immediately at (808) 973-9401.

USFWS Contact Information:

Ms. Catherine Swift
U.S. Fish & Wildlife Service
Pacific Islands Fish & Wildlife Office
P.O. Box 50088
Honolulu, HI 96850

Phone: (808) 792-9459

Fax: (808) 792-9580

Recordkeeping Requirements:

Dealers shall maintain sales records on forms supplied by the Hawaii Department of Agriculture. Record forms shall be submitted to the Department of Agriculture, Pesticides Branch (1428 S. King Street, Honolulu, HI 96814) within two (2) weeks after the end of the month.

Failure to comply with the imposed restrictions and requirements may result in immediate termination of this specific exemption.

This specific exemption is scheduled to expire on APRIL 26, 2008.

File Symbol No.: 04-HI-03

Revised 5/10/2005

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Insect Repellent Use and Safety

Mosquito prevention tips are provided by the Hawaii Department of Health at their website, www.hawaii.gov/health/family-child-health/contagious-disease/wnv/mosquitoes/mosquito-prevention.

Hawaii has no cases of disease caused by the West Nile virus. For the latest news on West Nile virus, see the Hawaii department of health's website, www.hawaii.gov/health/family-child-health/contagious-disease/wnv/contagious-disease/wnv/index.html.

*H*awaii's rainfall is greatest during the winter months, except on the Kona coast of the island of Hawaii. (Rainfall there peaks during summer.) Plentiful rain greens up our landscapes and fills our waterfalls but it also makes more mosquito breeding sites. So now is a good time for property managers to renew basic mosquito control strategies, like fixing window and door screens and draining standing water. These non-chemical methods are very efficient methods for lowering the risk of being bitten. People venturing outdoors should consider wearing long-sleeve shirts and long pants and using insect repellent because perfect control outdoors is impossible. To help you learn about repellents, we present the following question-and-answer article from the website of the U.S. Department of Health and Human Service's Centers for Disease Control and Prevention, www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm.

GENERAL QUESTIONS

Q. Why should I use insect repellent?

A. Insect repellents can help reduce exposure to mosquito bites that may carry viruses such as West Nile virus that can cause serious illness and even death. Using insect repellent allows you to continue to play and work outdoors with a reduced risk of mosquito bites.

Q. When should I use mosquito repellent?

A. Apply repellent when you are going to be outdoors. Even if you don't notice mosquitoes there is a good chance that they are around. Many of the mosquitoes that carry West Nile virus bite between dusk and dawn. If you are outdoors around these times of the day, it is especially important to apply repellent. In many parts of the country, there are mosquitoes that also bite during the day, and some of these mosquitoes have also been found to carry West Nile virus.

Q. How often should repellent be reapplied?

A. In general you should re-apply repellent if you are being bitten by mosquitoes. Always follow the directions on the product you are using. Sweating, perspiration or getting wet may mean that you need to re-apply repellent more frequently.

Repellents containing a higher concentration (higher percentage) of active ingredient typically provide longer-lasting protection.

Q. How does mosquito repellent work?

A. Female mosquitoes bite people and animals because they need the protein found in blood to help develop their eggs. Mosquitoes are attracted to people by skin odors and carbon dioxide from breath. The active ingredients in repellents make the person unattractive for feeding. Repellents do not kill mosquitoes. Repellents are effective only at short distances from the treated surface, so you may still see mosquitoes flying nearby.

ACTIVE INGREDIENTS (TYPES OF INSECT REPELLENT)

Q. Which mosquito repellents work best?

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A. CDC recommends using products that have been shown to work in scientific trials and that contain active ingredients which have been registered with the US Environmental Protection Agency (EPA) for use as insect repellents on skin or clothing. When EPA registers a repellent, they evaluate the product for efficacy and potential effects on human beings and the environment. EPA registration means that EPA does not expect a product, when used according to the instructions on the label, to cause unreasonable adverse effects to human health or the environment.

Of the active ingredients registered with the EPA, CDC believes that two have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature. Products containing these active ingredients typically provide longer-lasting protection than others:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)

Oil of lemon eucalyptus [active ingredient: p-menthane 3,8-diol (PMD)], a plant-based repellent, is also registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the US it provided protection similar to repellents with low concentrations of DEET.

Q. How does the percentage of active ingredient in a product relate to the amount of protection it gives?

A. Typically, the more active ingredient a product contains the longer it provides protection from mosquito bites. The concentration of different active ingredients cannot be directly compared (that is, 10% concentration of one product doesn't mean it works exactly the same as 10% concentration of another product.)

DEET is an effective active ingredient found in many repellent products and in a variety of formulations. Based on a 2002 study (Fradin and Day, 2002.):

- A product containing 23.8% DEET provided an average of 5 hours of protection from mosquito bites.
- A product containing 20% DEET provided almost 4 hours of protection.
- A product with 6.65% DEET provided almost 2 hours of protection.
- Products with 4.75% DEET were both able to provide roughly 1 and a half hour of protection.

These examples represent results from only one study and are only included to provide a general idea of how such products may work. Actual protection will vary widely based on conditions such as temperature, perspiration, and water exposure.

Choose a repellent that provides protection for the amount of time that you will be outdoors. A product with a higher percentage of active ingredient is a good choice if you will be outdoors for several hours while a product with a lower concentration can be used if time outdoors will be limited. Simply re-apply repellent (following label instructions) if you are outdoors for a longer time than expected and start to be bitten by mosquitoes.

Q. Why does CDC recommend certain types of insect repellent?

A. CDC recommends products containing active ingredients which have been registered with US Environmental Protection Agency (EPA) for use as insect repellents on skin or clothing.

All of the EPA-registered active ingredients have demonstrated repellency however some provide more longer lasting protection than others. Additional research reviewed by CDC suggests that repellents containing DEET (N,N-diethyl-m-toluamide) or picaridin (KBR 3023) typically provide longer-lasting protection than the other products and oil of lemon eucalyptus (p-menthane-3,8-diol) provides longer lasting protection than other plant-based repellents. Permethrin is another long-lasting repellent that is intended for application to clothing and gear, but not directly to skin. In general, the more active ingredient (higher concentration) a repellent contains, the longer time it protects against mosquito bites.

People who are concerned about using repellents may wish to consult their health care provider for advice. The National Pesticide Information Center (NPIC) can also provide information through a toll-free number, 1-800-858-7378 or npic.orst.edu

Q. How can you know which active ingredient a product contains?

A. Check the product label if you have questions—repellents must specify their active ingredients. In some cases you will note the chemical name in addition to/instead of the “common” name:

- DEET is N,N-diethyl-m-toluamide
- Picaridin is KBR 3023, sometimes known as “Bayrepel” outside the US
- The active ingredient in oil of lemon eucalyptus is p-menthane 3,8-diol (PMD)

Q. What is permethrin?

A. Certain products which contain permethrin are recommended for use on clothing, shoes, bed nets, and camping gear, and are registered with EPA for this use. Permethrin is highly effective as an insecticide and as a repellent. Permethrin-treated clothing repels and kills ticks, mosquitoes, and other arthropods and retains this effect after repeated laundering. The permethrin insecticide should be reapplied following the label instructions. Some commercial [garment] products are available pretreated with permethrin.

Q. Where can I find these repellents?

A. Most of these repellents are sold at multiple retail, discount and drug stores. A wider selection may be available at “outdoor” stores or in hunting and camping sections. At this time picaridin is not yet registered with the state pesticide programs in NY and CA, and thus is not available in those areas.

Q. Where can I find more information about picaridin?

A. An technical fact sheet covering picaridin is available from EPA (www.epa.gov/opprd001/factsheets/picaridin.pdf)

An **arthropod** is an animal, like an insect, spider, mite, tick, scorpion, centipede, millipede, sowbug, crab, lobster, shrimp, or a barnacle. Its legs are jointed. It has no backbone (or bones of any kind). Its body is covered in a hardened skin biologists call an “exoskeleton.” (This is like full-body armor containing and supporting the muscles, nerves, fat, and organs.) An arthropod sheds its old exoskeleton before it grows bigger or changes its body shape. Its body is formed of sections (“segments”).

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USING REPELLENTS PROPERLY

Q. What are some general considerations to remember when using insect repellents?

- A.** Always follow the recommendations appearing on the product label.
- Use enough repellent to cover exposed skin or clothing. Don't apply repellent to skin that is under clothing. Heavy application is not necessary to achieve protection.
 - Do not apply repellent to cuts, wounds, or irritated skin.
 - After returning indoors, wash treated skin with soap and water. (This may vary depending on the product. Check the label.)
 - Do not spray aerosol or pump products in enclosed areas.
 - Do not spray aerosol or pump products directly to your face. Spray your hands and then rub them carefully over the face, avoiding eyes and mouth.

Q. What are some reactions to be aware of when using insect repellents?

A. Use of repellents products may cause skin reactions in rare cases. Most product labels also note that eye irritation can occur if product gets in the eye. If you suspect a reaction to a product, discontinue use, wash the treated skin, and call a poison control center. If product gets in the eyes flush with water and consult health care provider or poison control center. If you go to a doctor, take the product with you.

There is a national number to reach a Poison Control Center near you: 1-800-222-1222.

CHILDREN

Q. Can insect repellents be used on children?

A. Repellent product labels must state any age restriction. If there is none, EPA has not required a restriction on the use of the product.

According to the label, oil of lemon eucalyptus products should NOT be used on CHILDREN UNDER 3 YEARS.

In addition to EPA's decisions about use of products on children, many consumers also look to the opinion of the American Academy of Pediatrics (AAP). The AAP does have an opinion on the use of DEET in children (see below). AAP has not yet issued specific recommendations or opinion concerning the use of picaridin or oil of lemon eucalyptus for children. CDC will post a link to such information from the Academy when/if it becomes available.

Since it is the most widely available repellent, many people ask about the use of products containing DEET on children. No definitive studies exist in the scientific literature about what concentration of DEET is safe for children. No serious illness has been linked to the use of DEET in children when used according to manufacturer's recommendations.

The American Academy of Pediatrics Committee on Environmental Health has updated their recommendation for use of DEET products on

children in 2003, citing: “Insect repellents containing DEET (N,N-diethyl-m-toluamide, also known as N,N-diethyl-3-methylbenzamide) with a concentration of 10% appear to be as safe as products with a concentration of 30% when used according to the directions on the product labels.” AAP recommends that repellents with DEET should not be used on infants less than 2 months old.

Parents should choose the type and concentration of repellent to be used by taking into account the amount of time that a child will be outdoors, exposure to mosquitoes, and the risk of mosquito-transmitted disease in the area.

If you are concerned about using repellent products on children you may wish to consult a health care provider for advice or contact the National Pesticide Information Center (NPIC) through their toll-free number, 1-800-858-7378 or npic.orst.edu

Q. What guidelines are available for using a repellent on children?

A. Always follow the recommendations appearing on the product label when using repellent:

- When using repellent on a child, apply it to your own hands and then rub them on your child. Avoid children’s eyes and mouth and use it sparingly around their ears.
- Do not apply repellent to children’s hands. (Children may tend to put their hands in their mouths.)
- Do not allow young children to apply insect repellent to themselves; have an adult do it for them.
- Keep repellents out of reach of children.
- Do not apply repellent under clothing. If repellent is applied to clothing, wash treated clothing before wearing again. (May vary by product; check label for specific instructions.)

Q. How else can I protect children from mosquito bites?

A. Using repellents on the skin is not the only way to avoid mosquito bites. Children (and adults) can wear clothing with long pants and long sleeves while outdoors. DEET or other repellents such as permethrin can also be applied to clothing (but is not registered for use on skin), as mosquitoes may bite through thin fabric.

Mosquito netting can be used over infant carriers.

Finally, it may be possible to reduce the number of mosquitoes in the area by getting rid of containers with standing water that provide breeding places for mosquitoes.

Q. Can insect repellents be used by pregnant or nursing women?

A. Other than the routine precautions noted earlier, EPA does not recommend any additional precautions for using registered repellents on pregnant or lactating women. Consult your health care provider if you have questions.

INSECT REPELLENTS CONTAINING DEET AND SUNSCREEN

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Q. Can I use an insect repellent and a product containing sunscreen at the same time? What are the recommendations for combination sunscreen/insect repellent products?

A. Yes. People can, and should, use both a sunscreen and an insect repellent when they are outdoors. Follow the instructions on the package for proper application of each product. In general, the recommendation is to apply sunscreen first, followed by repellent.

It is recommended NOT to use a single product that combines insect repellent containing DEET and sunscreen, because the instructions for use of insect repellents and use of sunscreen are different. In most situations, insect repellent does not need to be reapplied as frequently as sunscreen. While no recommendations are available at this time regarding products that combine other active ingredients and sunscreen, it is important to always follow the label on whatever product you are using.

To protect from sun exposure and insect bites, you can also wear long sleeves and long pants. You can also apply insect repellent to your clothing, rather than directly to your skin.

MORE INFORMATION

Q. Where can I get more information about repellents?

A. For more information about using repellents, please consult the Environmental Protection Agency (EPA) web site or consult the National Pesticide Information Center (NPIC), which is cooperatively sponsored by Oregon State University and the U.S. EPA. NPIC can be reached at: npic.orst.edu or 1-800-858-7378.

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RECERTIFICATION CREDITS may be earned by certified applicators (except those in *commercial* categories 8 and 10) who take advantage of any “recertification topic” article in this newsletter.

To earn credit(s) for an article, an applicator must correctly answer at least 70% of the evaluation questions prepared by the Hawaii Department of Agriculture staff. For more information, telephone one of these HDOA offices: Kauai 274-3069, Oahu 973-9409 or 973-9424, Maui 873-3960, Hawaii 974-4143. The area code for all offices is 808.

**How Pesticide
Treatments Fail
(Recertification
Topic)**

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 will be practically impossible if the pest can thrive in surrounding areas. The pest probably would continuously infest the property so most pest managers would accept a small pest population and strive only to “manage” it. This means keeping the pest count low enough to avoid major complaints or damage. A pest management program may include such strategies as quarantine, sanitation, traps, and barriers. Pesticides are just one more strategy; they are not the only one and they are not a cure-all. Several could be used together or in sequence to control different stages

in the pest's life cycle. For example, window screens could be used very effectively against adult flying mosquitoes trying to get into a building while an insecticide could be used to control the immature ("wiggler") stages swimming in stagnant water in nearby ponds and ditches.

Wrong pesticide or misidentification of pest. A treatment may fail because the pest manager applied a pesticide that was not meant to control the targeted pest. This could happen if the manager misidentified the cause of a problem and then chose a pesticide based on the misidentification. For example, the manager may see insects infesting holes in some fruit and apply an insecticide to control the insects. But if a fungus started the holes, the insecticide 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.

Rodenticides for Control of Norway Rats, Roof Rats and House Mice (The University of California's 1996 leaflet) discusses selection and use of rodenticides on poultry farms. It covers types of poisons in baits, bait choice and placement, prebaiting, bait shyness, and resistance. See details on the Internet at <http://animalscience.ucdavis.edu/Avian/pfs23.htm>.

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 will only kill the rodent if it eats a lethal dose of the bait in one feeding. But if it eats only 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 could 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 mycoplasmas); 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 that 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 that 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.

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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 any pesticide kill all the individuals in a pest population. Each time a pesticide is used, it selectively kills the most susceptible individuals. Some avoid the pesticide treatment by resting where most of the others do not. 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. Where 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 make the problem worse.

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 of avoiding or slowing 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 though, 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 mixed with water in the sprayer tank. The active ingredients in some of these products breakdown very quickly when mixed with alkaline (high pH) water. Instructions on such a product's label will give warning and advice about this. Also, the potency of a tank mix kept overnight could be in doubt. So make only enough tank mix for the job at hand.

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 of any one prohibits tank mixing. Seek advice from 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 with the treatment.

Old pesticide. Even if the manager applied the right pesticide, the treatment would 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. Also 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, they have hard coverings, or they 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 stems, 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 the daily 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 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, 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 residue or as a direct spray—must contact a pest to have any kind of effect on it. Some pesticides work only when the pest walks or settles on the residue. These kinds of pesticides should form a

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chemical barrier protecting all surfaces where pests begin to infest or infect. When controlling pests on plants, this usually means covering all sides—top, bottom, front, and back—of leaves, stems, and fruits, including leaves still expanding or unrolling and parts of fruit touching stems. Addition of surfactant to the tank mix can improve coverage of waxy plant parts. (Choose surfactants carefully, though, because some can cause chemical burns or discoloration of the plants you want to protect with the treatment.) For control of indoor insects, residual insecticides should be applied to places where insects rest (such as in cracks and crevices) as well as to places where they've been seen moving about. **Caution:** When using any pesticide, heed label restrictions that tell where or what *not* to treat.

Baits should be applied where the target pest will find it. Some pests are more efficient than others at finding and reaching bait. Some flies and wasps sense food and mates at a distance and can fly to the source. Ants, termites, cockroaches, snails, and slugs leave their colonies or resting sites and walk or crawl about their ranges until they get close to the bait. Rats and mice stay along well-used trails. (They don't wander much unless drought, flooding, or other disturbances cause them to move to neighboring property.) For the pests that search less efficiently, exact placement and closer spacing of baits (and 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.

Obstructions. Things that block or distort a pesticide application pattern will protect the pest. In outdoor situations, trash, leaves, stems, and large clods of soil can stop a pesticide from depositing 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, and 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 applicator can trap and keep the fumigant gas in place so that it surrounds the site or object being fumigated. The pest will survive if the gas escapes too quickly. To keep fumigant gases in place, tarps, plastic sheets, or irrigated soil surfaces are used. A fumigant treatment can fail when these shake loose, tear, or otherwise develop leaks.

SOURCE: 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.

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Regional Comment Coordinator Helps Hawaii Producers Retain Needed Pesticide Registrations

Under the Food Quality Protection Act the Environmental Protection Agency is required to review pesticide registrations to ensure that they do not result in an unreasonable risk to consumers, workers or the environment. EPA establishes a “risk cup” for each active ingredient. The pesticide registrant and EPA generally cancel uses if exposures to residues of a particular pesticide exceed its risk cup. Too often minor crops bear the brunt of such cancellations. Since most of Hawaii’s crops are minor crops, our producers are disproportionately affected by such decisions.

Before canceling a registered use EPA publishes its proposed regulatory action in the Federal Register and requests comments from users as to how they might be affected. USDA’s Office of Pest Management Policy also works to provide data to EPA. In the absence of actual use data provided by growers or their organizations, EPA relies on default or worst case assumptions regarding use. Default assumptions generally overestimate use and exposure and therefore work to the detriment of growers.

The College of Tropical Agriculture and Human Resources at the University of Hawaii is fortunate to have a Regional Comment Coordinator (RCC) to respond to pesticide use requests from EPA and Office of Pest Management Policy. Cathy Tarutani, the RCC for the Pacific Islands, seeks out organizations and individuals who can provide the needed information. In the past three years she has identified 30 issues which potentially warranted responses from Hawaii or other political entities in the American Pacific. Of these, 20 comments were submitted, 14 of them to the EPA Docket and the others to OPMP via the Western Region Integrated Pest Management (IPM) Center. Ms. Tarutani has also responded to EPA for follow-up information.

The RCC has responded to EPA requests for information regarding use of ametryn on pineapple, EBDCs on papaya, dacthal on sweet potato, and mancozeb use on ornamentals. Two of the responses resulted in regulatory decisions favorable to Hawaii growers. EPA approved continued use of dacthal after reviewing data submitted by the RCC. Retention of the sweet potato use was particularly important for growers in Hawai’i (in 2003 sweet potatoes were valued at \$861,000). The re-entry intervals for mancozeb treated ornamentals were retained rather than lengthened as proposed by EPA. Lengthening the re-entry intervals would have prevented growers from harvesting their flowers on a timely basis or resulted in less effective pest management. Two other requests for information are still pending responses from stakeholders. In addition, two responses from stakeholders were submitted directly to the EPA after the RCC notified grower groups of EPA’s need for additional information.

Only three states in the Western Region have Regional Comment Coordinators. The RCCs are funded year to year on a competitive basis by the Western Region IPM Center. The Hawaii Farm Bureau Federation recognized the importance of the RCC position by urging the Congress to provide continued support for the regional IPM centers. Loss of funding for the RCC position would have a detrimental impact on Hawaii’s ability to retain important pesticide use registrations.

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Caution: Pesticide use is governed by state and federal regulations. Pesticides and pesticides 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.

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with Hawaii's congressional delegates to urge support for expanding federal Plant Pest Quarantine inspections to cover all incoming "produce and plant or plant part shipments..." In 2004 the Hawaii Department of Agriculture Plant Quarantine Branch reported "activity of 27,144 ship and aircraft arrivals, 4,268,559 passenger arrivals, and 13,937,820 pieces of baggage, cargo, and mail inspected parcels." Dr. McHugh emphasized that "To thoroughly inspect, identify and mitigate threats and enforce regulations without causing undo delays will require more resources." He went on to say that the HFBF supports Representative Ed Case's bill (the Hawaii Invasive Species Prevention Act) because successful passage will reduce introduction of alien species in Hawaii. With fewer alien pest introductions there will be less pressure on producers to respond by applying pesticides. Not having to apply pesticides helps keep the cost of production down thus benefiting Hawaii's farmers and consumers alike.

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Hawaiian Place Names

Kauna-kahakai. Old name for Kaunakakai, Moloka'i. Lit. *beach landing.*

Ke'ehi. Lagoon and beach park east of Honolulu International Airport. Lit. *tread upon.*

From Place Names of Hawaii, a book by Mary Kawena Pukui, Samuel H. Elbert, and Ester T. Mookini. 1974. The University of Hawaii Press.

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