

Dogs and Pesticide Use

Introduction

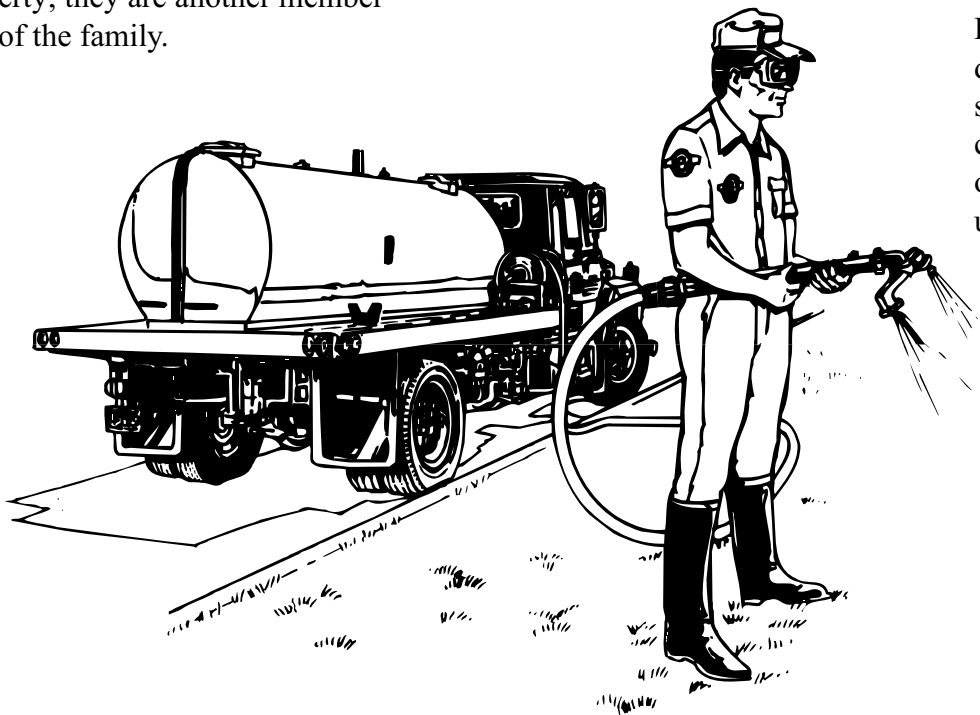
More than 30 million Americans live with one or more dogs (Marks, 1999). Dog owners often use pesticides in and around their homes to control pests. Although many pesticides are beneficial, poor planning or improper use of a pesticide product can be very toxic to dogs. Of course the best way to avoid toxicity is to avoid using chemical products. However, if these chemicals must be used be sure to read the labels, use the products properly, and be extremely careful. Remember that dogs are not just property; they are another member of the family.

Pesticides

A pesticide is any substance used to kill, repel, or otherwise control a pest. These include insecticides, herbicides, fungicides, rodenticides, and disinfectants. Apartments and houses are often hosts to common pests like cockroaches, ants, fungus, termites, and rats. Weeds, grubs, and aphids can get into lawns, flowers, and vegetable gardens. Because pesticides are designed to be toxic, they can pose a risk not only to children and adults but also to pets. Dogs are exposed to pesticides when they

inhale, ingest, or absorb the product through the skin. Animal studies have shown that some pesticides can cause cancer, reproductive problems, birth defects, central nervous system disturbances, liver and kidney damage, and skin irritation. The following compounds are some of the pesticides used in homes and gardens:

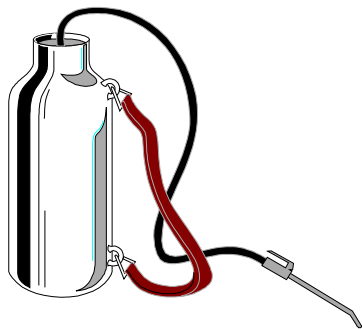
- **2,4-Dichlorophenoxyacetic acid (2,4-D).** This pesticide is a chlorophenoxy compound that functions as a systemic herbicide and is used to control many types of broadleaf weeds. Classified as a General Use Pesticide (GUP), 2,4-D's diethylamine salt is a slightly toxic category III chemical when ingested orally. However, this product is classified as a highly toxic category I chemical when exposed to the eyes. Pesticides containing 2,4-D bear the signal words "danger – poison". Used in many commercial products, 2,4-D may be found in emulsion form, in aqueous solutions (salts), and as a dry compound. Although its carcinogenic status is



not clear, canine malignant lymphoma has been associated with exposure to 2,4-D (Hayes et al., 1991).

NOTE: If pesticide chemicals fall into the least toxic category, manufacturers no longer have to print signal words on the labels as of February 12, 2002.

- **Avermectin B1 (Abamectin).** This compound functions as an insecticide/miticide and is used by homeowners for the control of fire ants. Abamectin is classified as a GUP, practically nontoxic category IV chemical, which has no precautionary statement on its label.

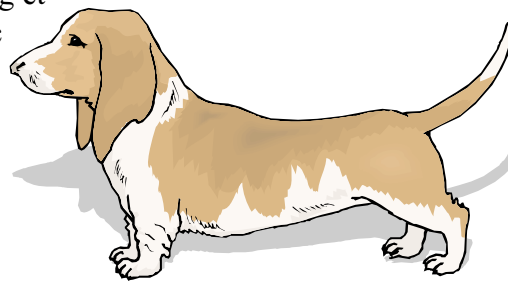


Abamectin contains about 80% avermectin B1a and 20% avermectin B1b compounds derived from the soil bacterium *Streptomyces avermitilis*. Research indicates that chronic abamectin toxicity can affect the nervous system of dogs and cause symptoms such as pupil dilation, lethargy, and tremors (Lankas and Gordon, 1989).

- **Allethrin.** This pesticide was the first of the pyrethroids widely produced as

an insecticide (Vijverberg et al., 1990). This synthetic compound is used almost exclusively in homes and gardens for control of flies and mosquitoes. Pesticides containing allethrin are slightly toxic category III chemicals and bear the signal word "caution" on the product label. However, containers of technical grade D-trans-allethrin bear the signal word "warning". Allethrin is used in many commercial products and is available as mosquito coils, mats, oil formulations, and as an aerosol spray. Research has indicated that dogs exposed continuously to D-allethrin were diagnosed with liver problems (World Health Organization, 1989).

- **Bendiocarb.** This compound is an insecticidal carbamate that is used to control mosquitoes, flies, wasps, ants, cockroaches, fleas, ticks, and other pests in homes. Most formulations of bendiocarb are classified as GUP, but a few formulations are classified as Restricted Use Pesticides (RUP), which may be purchased and used only by certified applicators. Bendiocarb is a moderately toxic category II chemical and carries the signal word "warning". Commercial pesticides containing bendiocarb are formulated as dusts, granules, ultra-low



volume sprays, and as wettable powders. Bendiocarb is absorbed through all the normal routes of exposure, but it is generally excreted rapidly and does not accumulate in mammalian tissue. Signs associated with acute toxicity of carbamates in mammals are excessive salivation, chest discomfort, muscle tremors, and rarely death. Like other carbamate insecticides, bendiocarb is a reversible inhibitor of cholinesterase, an enzyme found in the liver, pancreas, heart, serum, and the white matter of brain. True cholinesterase catalyzes the hydrolysis of acetylcholine (a neurotransmitter) to choline (an amino alcohol) and acetate.

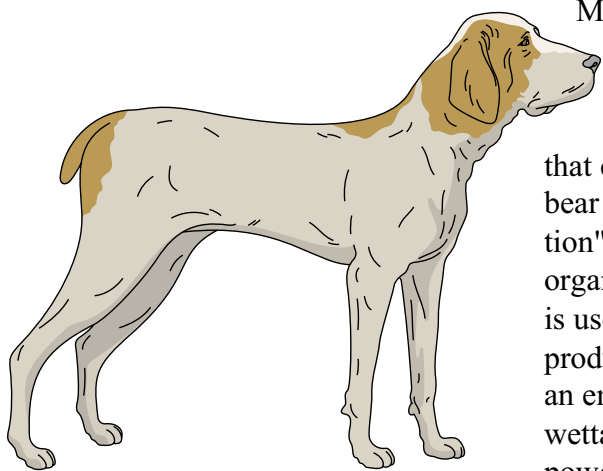
- **DCPA.** This phthalate compound, also called chlorthal or chlorthal-dimethyl, is a pre-emergent herbicide used on annual grasses and annual broad-



leaf weeds in vegetable crops. About 20% of the use of this compound in

the United States is for homes and gardens. DCPA is classified as a GUP and is practically a nontoxic category IV chemical that bears the signal word "caution". Commercial products containing DCPA may be formulated as wettable powders, granules, or as suspension concentrates. Although the compound has a very low toxicity to mammals, research has indicated that dogs exposed continuously to DCPA experienced adverse effects in the liver (United States Environmental Protection Agency (EPA), 1988).

- **Diazinon.** This product is a nonsystemic organophosphate insecticide used to control fleas, ants, and cockroaches in residential buildings, and sucking and leaf-eating insects on home gardens. Diazinon is classified as a RUP, which may be purchased and used only by a professional pest control operator. Depending on the formulation, it is a



moderately toxic category II or slightly toxic category III chemical. Pesticides containing diazinon bear the signal word "warning" or "caution". This insecticidal organophosphate compound is used in many commercial products and is available in dust, granules, seed dressings, wettable powder, and emulsifiable solution formulations. In mammals, diazinon is metabolized and excreted through the urine and feces very rapidly. The toxic effects of the compound are due to the inhibition of acetylcholinesterase, an essential nervous system enzyme.

- **Malathion.** This compound is a nonsystemic, wide-spectrum organophosphate insecticide suited for the control of sucking and chewing insects on fruits and vegetables. Malathion is also used to control mosquitoes, flies, household insects, and animal ectoparasites.



Malathion is classified as a GUP and is a slightly toxic category III chemical. Pesticides that contain this chemical bear the signal word "caution". This insecticidal organophosphate compound is used in many commercial products and is available in an emulsifiable concentrate, wettable powder, dustable powder, and ultra-low

volume liquid formulations. Malathion has been shown to depress cholinesterase activity in animals, and can affect the central nervous and immune systems, adrenal glands, liver, and blood. Available evidence suggests that this chemical product is not carcinogenic, yet current data is inconclusive.

- **Rotenone.** This pesticide is a selective, non-specific botanical compound used in home gardens for insect control and on pets for lice and tick control. Rotenone is classified as a GUP, and, depending on the formulation, is classified as a highly toxic category I or a slightly toxic category III compound. Rotenone formulations that are highly toxic bear the signal word "danger," but "caution" in slightly toxic forms. This rotenoid plant extract is used in many commercial products, and it is available in crystalline preparations, emulsified solutions, and dusts. Research revealed that dogs exposed continuously to rotenone experienced vomiting, had reduced food consumption, and hence reduced weight gain (National Research Council, 1983).
- **Warfarin.** This compound is an anticoagulant rodenticide used for controlling mice and rats in and around homes and animal premises.



This odorless and tasteless pesticide is only slightly dangerous to domestic animals when used as directed. Warfarin, classified as a GUP, bears the signal word "danger" for technical and high concentrations or the signal word "caution" for low concentrations and ready-to-use baits. Warfarin is found in a variety of commercial rodenticides and comes in water soluble, ready-to-use bait, concentrate, powder, liquid concentrate, nylon pouch, coated talc, and dust formulations. Signs and symptoms of animal exposure such as rapid breathing, weakness, pale mucous membranes, and hemorrhage are caused by the rodenticide's anti-clotting properties. The prothrombin content of the blood is reduced, and internal bleeding is induced. Prothrombin or factor II is a vitamin K-dependent single-polypeptide-chain glycoprotein involved in blood clotting--a mechanism that prevents blood loss at the site of an injury. Animals killed by warfarin exhibit extreme pallor of the skin, muscle, and viscera.

Although the previously discussed chemical compounds are assigned a registration

number from the EPA, the EPA is re-evaluating pesticides in light of the Food Quality Protection Act of 1996. The EPA is currently engaged in a reregistration process in which some chemical pesticides might end up off the market. Already, the manufacturers of bendiocarb voluntarily cancelled the product, and diazinon registration will (expire) be cancelled with no provisions for existing stocks on December 31, 2004.

Guidelines

As mentioned previously, the best way to avoid toxicity is to avoid using chemical pesticides altogether. An integrated pest management program may be the most effective strategy for controlling pests. This approach employs physical, mechanical, cultural, and biological strategies to keep pest numbers low. Least-toxic chemical pest control methods are used only as a last resort. The following pest control methods do not involve chemical pesticides:

- **Physical and Mechanical Controls.**
 - Use mulch to reduce weed growth.
 - Use a hoe to cut up weeds.
 - Manually remove weeds from your lawn and insects from your plants.
 - Use a hose to wash out aphid populations.

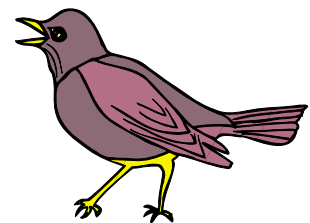
- Use shears to trim out caterpillars.
- Use traps or barriers (caulk, screen, net) to control mice, rats, and some insects.

- **Cultural Controls.**

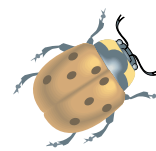
- Use compatible plants for the landscape.
- Avoid monocultures.
- Correct watering and fertilizing procedures.

- **Biological Controls.**

- Attract and keep beneficial predators. Insect pests may be eaten by birds such as the purple



martin and by predatory insects such as the ladybug. Contact your county Cooperative Extension office or local nursery for more information on how to attract and keep beneficial predators.



- Use parasitoids and pathogens. Parasitoids lay eggs in or on an insect host. Once the eggs hatch, the offspring kill the insect host by consuming its organs or body fluids. A common example is the mini-

wasp, which lays its eggs on pest larvae. Microscopic pathogens such as bacteria, viruses, and fungi invade pests and cause diseases. A disease often weakens and kills the pest. For example, the milky spore disease is known to attack Japanese beetles.

If you decide that the best solution to your pest problem is to use chemical pesticides, then be aware that these products can be hazardous to you and your dog, especially when handled, applied, stored, or disposed of improperly. The following are some basic steps to avoid risking the health of your dog:

- Choose the pesticide that is least toxic.
- Every time you use the pesticide, read and follow all label directions.
- Keep your dog in a safe place while you mix or apply pesticides.
- Always keep the pesticides in the original container.
- Store pesticides in a ventilated, dry and cool place, preferably where your dog cannot gain access.



- Wrap empty, rinsed containers in newspaper and dispose of them in your trash can. However, any unused pesticide product that can no longer be used should be taken to the local household hazardous waste disposal facility.
- Keep your dog away from treated areas until the pesticide is completely dry. Always read the pesticide label for specific instructions as to how long to keep the dog out of the treated area.
- Place ready-to-use baits in areas where your dog cannot reach them.
- Use care when treating your dog with pesticides. Follow the label carefully, and be aware that over-treating can poison your dog. Pesticides designed for adult dogs should never be used on puppies, unless the label states that the chemical product may be used on younger animals.

If after a recent pesticide application your dog starts to act strangely, salivate, vomit, stumble, appear lethargic, or have muscle tremors or convulsions, immediately contact a veterinarian or the National Animal Poison Control Center of the American Society for the Prevention of Cruelty to

Animals (ASPCA) (1-800-548-2423). Make sure to have in hand the chemical product your dog may have been exposed to earlier.

Summary

For years, dogs have alleviated the physical hardship and loneliness of humans. Today, dog companionship has taken on a new meaning as Americans increasingly consider their dogs another member of the family rather than just property. However, owners must understand that choosing to share their homes and lives with one or more dogs means that certain things must be done to secure a happy and healthy animal. Regular veterinary checkups, optimal nutrition, and protection against injuries and toxic chemicals are extremely important.

Dog owners should become aware of the identity and toxic nature of pesticides (insecticides, herbicides, fungicides, rodenticides, and disinfectants) that may be applied in or around their homes. Owners must realize that these chemical products can be as deadly to their dogs as they are to pests. Therefore, reading the label carefully and using pesticides properly is key to the safety of their dogs. Furthermore, educational programs in the area of pesticide use are essential for the protection of owner and dog health.



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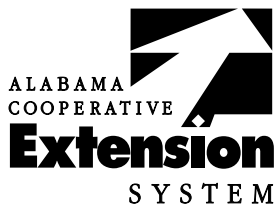
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