

PESTICIDE USE AND WILDLIFE

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A pesticide is a substance or mixture of substances used for preventing, controlling, or lessening the damage caused by a pest. Common uses for pesticides include controlling rodents, insects, and weeds. Although these chemical substances are easy to find and can be effective against pest species, they can also present human and environmental safety concerns. Specifically, some pesticides can be harmful to wildlife, especially when not used or stored correctly. There are some alternatives to pesticides that are effective and pose little or no danger to wildlife.

Risk to Wildlife

Pesticides and rodenticides are very useful for controlling mice and rat populations, termites and weeds, but can pose significant risks to wildlife. Animals like hawks, owls, squirrels, skunks, deer, coyotes, foxes, mountain lions, and bobcats can be killed by pesticides even though they are not the target. These non-target animals can be exposed directly, by eating bait products left out for pest species or ones not properly stored; or indirectly by eating prey that has pesticide in its body tissues. These chemicals not only can kill wild animals, but can also disrupt hormones in animals, affecting behavior and the ability to reproduce. Additionally, although most pesticides break down quickly, some pesticides break down slowly and stay in the environment for a long time. These are called persistent pesticides. Some persistent pesticides can build up in the bodies of animals, including humans. The natural enemies of pest insects can also be killed by pesticides. The natural way streams or ponds function can be changed by accidental spraying of ditches and waterways, runoff from sprayed fields, and careless container disposal.

Alternatives

To decrease chances of poisoning wildlife with pesticides, you can use alternatives to chemicals. Instead of using rodenticides to control mice and rats, you can decrease the



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Basil naturally repels tomato horn worms.

attractiveness of your property to rodents. Removing food sources, junk piles, and other rodent attractants from your property should be the first step for effective rodent control. Without habitat modification to make an area less attractive to rodents, even eradication will not prevent new individuals from coming into the area. See the Arizona Cooperative Extension publication *Potential Wildlife Conflicts* to learn more about how to reduce conflicts with animals by changing the configuration of your landscape.

Some plants possess the natural ability to repel certain types of insects. Companion planting is the practice of placing insect-repelling plants next to crops that will benefit from their natural properties. For example, planting garlic among vegetables helps fend off Japanese beetles, aphids, the vegetable weevil, and spider mites; basil planted near tomatoes repels tomato horn worms; and marigolds planted with cucurbits (e.g., zucchini, cucumbers, etc.) discourage cucumber beetles.

Another alternative to chemical pesticides are microbial pesticides. Also known as biopesticides, microbial pesticides are comprised of one-celled organisms (including types of bacteria, fungi, viruses, and protozoa) that can kill specific pests. They are produced and applied in similar formats to chemical pesticides (e.g., dusts, sprays, and granules) and are regulated by the Environmental Protection Agency (EPA). The most widely used microbial pesticides in the U.S. are strains of the bacterium, *Bacillus thuringiensis*, or Bt. Each strain produces a different toxin that kills different pest species or sets of species. Different Bt strains are toxic to a wide array of butterfly and moth larvae, larvae of mosquitoes and black flies, and other pests. Proper timing and application procedures must be followed carefully for effective use. Check the EPA website for more information on proper biopesticide use (www.epa.gov).

Another alternative that is related to biopesticides is biological control. Biological control means using natural enemies to control insect and weed pests. Natural enemies may include predators (e.g., lacewings, lady beetles) or parasitoids (e.g., parasitic wasps). Natural enemies are present in every healthy ecosystem, making the conservation of existing populations the most efficient way to implement biological control and maximize its effectiveness. Learn what different beneficial species occur in your area, what they look like, and what you can do to encourage their survival (e.g., provide shelter, overwintering sites, and alternative food sources). Remember that many chemical pesticides kill beneficial organisms as well as pests so if you must use pesticides, do so minimally and selectively.

Insecticidal soaps are another alternative to pesticides that are most effective against soft-bodied pests such as aphids, mites, whiteflies, thrips, caterpillars, and mealybugs. Soaps are less effective against pests that have harder bodies such as beetles and grasshoppers. Soap residues degrade rapidly, making them no more toxic than common household soaps and detergents. Because insecticidal soaps can kill soft-bodied stages (i.e., larval stages) of beneficial insects, care must be taken to apply to pest infestations only.



COURTESY OF THE CDC

Snap traps are a non-toxic method of controlling rodents.

There are several other non-toxic methods of controlling pests. For instance, live traps work well if you have a single pack rat that you can relocate. Snap traps in and around the home are also better than chemicals because they target the species you are interested in getting rid of without being dangerous to other species. Rodents caught in snap traps can be buried or simply thrown in the trash. Sticky traps are a great way to control insects because they are confined to a single area. Also, keep lights away from doors, windows or seating areas to keep from attracting insects to these areas. Boiling water poured on weeds or in ant colonies is a nontoxic method of controlling these pests. For small areas, you can physically pull weeds or take insects off of a plant and drop them in soapy water. These methods are best employed before pests become established. In this case, an ounce of prevention is worth a pound of cure.

Safety

Pesticides are regulated by the EPA for home use or commercial applicators. Using most chemicals sold for home use shouldn't be a problem, but it is very important to follow all use and safety directions on the label. There are also other things to keep in mind, such as whenever a granular product is spilled it needs to be cleaned up and any remaining granules worked into the soil. Ingestion of just a few granules of some types of insecticides can kill a small bird, for one example. Most importantly, follow the product's directions. This can help to ensure that the product works to your satisfaction and is safe for you, your pets, and wildlife.

Precautions must be taken even when using herbicides because some are toxic to fish and aquatic invertebrates. It is important to take care to keep herbicides out of water. More care is required when using insecticides. Insecticides can be safely used by homeowners when applied at the labeled rate. If not used properly, insecticides will not have the desired effect. Improper application may tempt you to re-apply or over-apply the product.

Following safety precautions and using common sense can prevent harm from pesticides. Here are the minimum safety steps you should take.

- Before buying a pesticide read the label to make sure it is recommended for the pest you want to control. If there is a choice of several, choose the least hazardous product.
- Before purchase, read the label of the pesticide you intend to buy to ensure that the host plant (and pest) is listed on the label.
- Before applying the pesticide read the label again. Be sure of proper application and safety measures, including protective clothing and special equipment needed, the specific warning and precautions, with what it can be mixed, mixing instructions, application period, crops to which it can or cannot be applied, and other special instructions.



Read all labels before you buy to ensure you are buying the right chemical.

- Gardeners should give special consideration to protecting insect pollinators, such as bees, from insecticide poisoning. Bees are not active in late evening and early morning. Do not apply insecticides when temperatures are unusually low because residues will remain toxic much longer.

Finally, read the label again to find out the proper way to store the pesticide. Wild animals and even your pets can be harmed by improperly stored chemicals. The best plan is to purchase just enough pesticide to finish the job at hand. That way you won't need to store opened pesticide containers. If you do need to store chemicals of any kind, keep them in the original container with the label so you always know what you've got and keep them locked up and away from pets, pet food, and kids. NEVER store leftover sprays after you've mixed them. The risk of accidental poisoning or environmental contamination is too high. Always only mix what you need. If you have any left, dispose of the excess properly.

To safely dispose of chemical pesticides:

- Check the label on the container for disposal instructions. The label may describe special guidelines for your pesticide.
- Triple rinse the application equipment and apply the rinsate to the site on the label.
- Call your household solid waste service or landfill for disposal instructions. Your community may forbid disposal of pesticide products or containers with regular household trash.
- NEVER pour unwanted pesticide on the ground or into storm sewers. You might contaminate drinking water or kill wildlife.
- DO NOT flush unwanted pesticides down toilets or any drains. Many products are harmful to septic tanks and sewage treatment plants.

Products packaged for the commercial grower may appear to be less expensive, but consumers should not be tempted to use them. In the case of commercial products, a state license is required. In fact, commercial products are generally more toxic than those for home use and require special protective clothing and equipment for application. These products are more concentrated and in larger containers than the consumer could expect to use or safely store. A few products that are extremely toxic to humans or the environment are classified by the EPA as restricted use pesticides (RuP). A license from the Arizona Department of Agriculture is required by law for purchase and use of restricted use pesticides. For more information regarding pesticides, safe alternatives, and proper storage and disposal, see the resources listed below.

UA Cooperative Extension
 Reduced Risk Pesticide Alternatives
<http://ag.arizona.edu/crop/pesticides/pesticidealts.html>

National Audubon Society
http://www.audubon.org/bird/at_home/IPM_Alternatives.html

Environmental Protection Agency
<http://www.epa.gov/ebtpages/pesticides.html>

Potential Wildlife Conflicts
<http://cals.arizona.edu/pubs/natresources/az1481c.pdf>



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This information has been reviewed by university faculty.
cals.arizona.edu/pubs/natresources/az1481i.pdf

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, James A. Christenson, Director, Cooperative Extension, College of Agriculture & Life Sciences, The University of Arizona.

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