

FAQ

FREQUENTLY ASKED QUESTIONS about rodents and rodenticides

Department of Pesticide Regulation, Pest Management & Licensing Branch

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CONSUMERS

THE REGULATIONS

Has DPR banned rodenticides?

DPR has not banned rodenticides. On July 1, 2014, DPR adopted new regulations that restrict the purchase, possession, and use of rodenticide baits that contain the active ingredients **brodifacoum**, **bromodialone**, **difenacoum**, and **difethialone**. (These are known as 2nd-generation anticoagulant rodenticides or SGARs.)

The regulations limit purchase, possession, and use of SGARs to certified pesticide applicators and those under their direct supervision. DPR adopted these regulations due to overwhelming evidence of wildlife weakened or killed by SGARs. Other categories of rodenticides—the 1st-generation anticoagulants, acute toxicants, and certain burrow fumigants—are still available to consumers.

What exactly are restricted materials?

Pesticides regulated as restricted materials may be purchased and used only by or under the supervision of a **certified pesticide applicator** who’s been issued a permit by the county agricultural commissioner. Those who have licenses under the Structural Pest Control Board do not need a permit. California requires permits for restricted materials so that the local commissioner can determine in advance potential effects of the proposed application on health and the environment. The commissioner may deny permits or require other options be used.

What triggered the decision to restrict use of 2nd-generation anticoagulant rodenticides?

DPR adopted these regulations due to evidence of wildlife weakened or killed by 2nd-generation anticoagulant rodenticides.

Now that 2nd-generation anticoagulant rodenticides (SGARs) are restricted materials in California, what does that mean?

As of July 1, 2014, only retailers who are licensed Pest Control Dealers may sell products that contain the four SGAR active ingredients, **brodifacoum**, **bromodialone**, **difenacoum**, and **difethialone** (Table 1). Licensed Pest Control Dealers are usually farm supply stores, not retailers visited by the public such as nurseries, hardware stores, or home improvement centers.

SGARs may only be purchased, possessed, and used in California by **certified pesticide applicators** or **trained employees under direct supervision** of a certified applicator.

Won't 2nd-generation anticoagulant rodenticides (SGARs) still pose a problem even if they're used by certified applicators?

DPR expects that trained certified applicators will exercise caution and fulfill their professional responsibilities when using SGARs and use them only when necessary. Once applicators are certified, they're required to take continuing education courses that include instruction about using rodenticides safely and only when necessary. If DPR continues to receive reports of nontarget wildlife being adversely impacted by SGARs, further regulatory action may be considered.

With the loss of the 2nd-generation anticoagulant rodenticides, will we be overrun by mice and rats?

Mice and rats infesting houses, garages, or other structures present a public health concern, but rodenticides do not eradicate rodents and may not reduce their numbers for long. *If there's an area-wide population, rodents from the edges move into the available space vacated by the poisoned rodents.* Rodent numbers surge when we leave unpicked fruit on trees and pet food outside. Rodents find shelter when we ignore clutter and overgrown vines and allow access inside houses and garages. The best way to reduce rodent populations is to eliminate factors that allow rodents to reproduce and thrive.

I see a lot of rats in my neighborhood. Should I use the rodenticides that aren't restricted? Any other suggestions?

You can help reduce rodents outdoors by limiting available food: pick ripe fruit off of trees, keep compost piles sealed, and keep garbage in covered containers. You can also catch rodents with snap traps or electrocution devices. Other rodenticides sold with either refillable or disposable bait stations are still available to consumers and second-generation rodenticides are still available through pest control businesses.

Aren't all rodenticides toxic to wildlife? Why single out just 2nd-generation anticoagulant rodenticides (SGARs)?

It's true that *all* rodenticides are toxic to wildlife and should not be placed in areas where nontarget wildlife have access to them. What's unique about SGARs is that rodents frequently eat more than a single dose of them, and the effects of that dose are often delayed for a few days. Meanwhile, the rodents may continue to eat more poison, resulting in a super-lethal dose that builds up in their tissues. When predators such as hawks or foxes eat these weakened or dead rodents, the dose may also be deadly to the predators. Incident reports conclude that SGAR products pose significant risks to nontarget wildlife and that these risks are greater than those posed by other rodenticide active ingredients.



Swainson's hawk hunting for rodents along the American River near downtown Sacramento. Photo by Kathy Kayner.

RODENTICIDES

Table 1: Categories of rodenticides for consumer use.

Always read the product label to make sure your target pest is listed.

RODENTICIDE CATEGORY	ACTIVE INGREDIENT	TARGET PESTS ON LABEL ¹ [Some consumer use; check label]
2ND-GENERATION ANTICOAGULANTS <i>[No consumer use; California-restricted materials]</i>	brodifacoum	No consumer use
	bromadiolone	
	difenacoum	
	difethialone	
1ST-GENERATION ANTICOAGULANTS	warfarin	moles
	chlorophacinone	house mice, Norway rats, roof rats, gophers
	diphacinone	house mice, Norway rats, roof rats, ground squirrels, gophers
ACUTE TOXICANTS	bromethalin	house mice, Norway rats, roof rats, moles
	cholecalciferol	No consumer use
	strychnine ³	gophers
	zinc phosphide ³	gophers

¹Products are registered for uses against specific rodents (or moles, which are insectivores, not rodents). For example, not every product that contains chlorophacinone is registered for use against mice and rats. **Always read the product label before using any pesticide.**

³Some products are federally and California restricted use; always check the label

How are 1st-generation and 2nd-generation anticoagulants different from each other and how did they get their names?

Both 2nd-generation (**brodifacoum**, **bromodialone**, **difenacoum** and **difethialone**) and 1st-generation anticoagulants (**warfarin**, **chlorophacinone**, and **diphacinone**) work by preventing blood clotting. Animals that eat these rodenticides die from internal hemorrhaging (bleeding) within a few days. While all anticoagulants work in a similar way, 2nd-generation products are more toxic and persistent in the bodies of rodents than 1st-generation ones and pose a greater threat to nontarget wildlife and pets.

The 1st-generation anticoagulants were developed in the 1940s. Development of the second wave of rodenticides began in the 1980s, which explains the distinction between 1st- and 2nd-generation anticoagulants.

What about the third category of rodenticide baits, the acute toxicants? How do they work?

The acute toxicants **bromethalin**, **zinc phosphide**, and **strychnine** kill rodents after one feeding, often within a few hours (Table 2). Formulated as baits, they are highly toxic to people, pets, and wildlife. **Cholecalciferol**, another acute toxicant, usually requires multiple feedings to kill rodents. The regulations do not affect use of any of these rodenticides.

Is the acute toxicant bromethalin used for rodents besides mice and rats? Is it true that it's very toxic to cats and dogs?

Some **bromethalin** products are used for mice and rats; others are formulated to kill moles (which are insectivores, not rodents). Bromethalin affects the nervous system and causes symptoms such as lack of coordination, tremors, seizures, and paralysis, and often death within 2 to 4 days. Antidotes to bromethalin do not exist. Cats are more sensitive to bromethalin poisoning than dogs. Treatment includes intravenous fluids and drugs to decrease brain swelling.

Currently, all consumer-sized bromethalin products registered for use on mice and rats in California must be sold with a bait station. The bait station must be tamper resistant if used in outdoor areas accessible to children, pets, or nontarget wildlife.

Are any rodenticides approved for use around organic farms and storage areas?

Baits containing the acute toxicant **cholecalciferol** (Vitamin D) can be used by professional applicators (but not consumers) for commensal rodents associated with organic production facilities such as warehouses, food storage buildings, and animal production areas.

High doses of cholecalciferol raise blood calcium levels and cause heart and kidney failure in rodents. It takes 3 to 4 days to die after eating a lethal dose. Secondary poisoning cases are less frequent than those for other rodenticides.

Can the acute toxicant strychnine be used for mice and rats?

No, **strychnine** can only be used below ground for pocket gophers (**Table 1**). Derived from seeds of plants in the genus *Strychnos*, it causes nerve cells to fire rapidly, which causes severe muscle spasms and leads to death. Several recent losses of nontarget wildlife have been caused by improper use of strychnine, so always read the label to make sure you're using the product for the correct target pest. Some strychnine-containing bait products are labeled for consumer use in California and others are restricted materials.

Can all brands of the acute toxicant zinc phosphide be used for mice and rats? How does zinc phosphide kill rodents?

Most brands are used for pocket gophers (consumer or professional applicator use); few brands are labeled for use against mice and rats and these can only be used by professional applicators (**Table 1**). The U.S. EPA includes moles on zinc phosphide labels, but in California, zinc phosphide is not registered for use on moles because of poor efficacy.

When rodents feed on bait containing **zinc phosphide**, they die quickly because their stomach acid reacts with phosphide to produce toxic phosphine gas. Zinc phosphide is not stored in muscle or other tissues of poisoned animals, so under ideal conditions, secondary poisoning doesn't happen. However, the bait often remains toxic for several days in the gut of a dead rodent. Predators and scavengers can be poisoned if they eat enough of the gut content of animals recently killed with zinc phosphide. Zinc phosphide is toxic to birds, fish, and other wildlife.

Table 2. ACUTE TOXICANTS

BAITS (for commensal rodents or gophers)

Bromethalin [some products for moles]

Cholecalciferol [no consumer products]

Zinc phosphide

Strychnine

BURROW FUMIGANTS (for gophers)

Aluminum phosphide (tablet)

Magnesium phosphide (tablet)

Sodium nitrate (cartridge)

Potassium nitrate (cartridge)

Now that 2nd-generation anticoagulants are restricted materials, what if rodenticides such as chlorophacinone or bromethalin are found to sicken or kill wildlife or pets? Will those rodenticides be restricted, too?

DPR may take regulatory action if it determines that use of these or other rodenticide products pose a hazard to wildlife or pets.

I have a gopher problem in my backyard. Which rodenticide options will I have now that I can't use 2nd-generation anticoagulant rodenticides (SGARs)?

SGARs are only registered for use on commensal rodents—house mice, Norway rats, and roof rats. This means *they've never been okay to use for pocket gophers*. Always read and follow the label to make sure you're using a product intended for use on a specific pest.

You can still use smoke bomb burrow fumigants. These are sodium nitrate or potassium nitrate mixed with sulfur and charcoal formulated as tablets or in gas form. You place them in the burrow, ignite them, and as they burn, they'll fill the burrow with smoke and suffocate the gophers. Before using smoke bombs, be sure gophers actually live in the burrow.

Other products registered for home use contain acute toxicants and must be placed underground within the gopher tunnel to keep them away from nontarget species and improve effectiveness (**Table 2**).

If you want to learn about using gopher traps, see UC IPM's Pest Note about [pocket gophers](#), where you'll find videos on setting and placing Macabee traps, how to prevent gophers from devouring your plants, and how to attract predators that may eliminate your gopher problem.

I live in a rural area and sometimes notice deer mice outdoors. I'm concerned that the mice will get into our house and expose us to hantavirus. Can I use a rodenticide to protect my family from getting this disease?

Before considering the use of a rodenticide, make sure you pest-proof your house by sealing cracks, plugging holes, and installing door sweeps. Keep wood and brush piles away from your house. By preventing deer mice from nesting in your house, you'll greatly reduce the possibility of exposure to hantavirus.

If deer mice take up residence in your house, garage, or storage shed, consider hiring a professional who can trap the mice and disinfect areas where mice were found. For more information, see UC IPM's Pest Note about [deer mice](#).

WILDLIFE AND PETS

How do rodent baits harm wildlife and pets?

It's possible for wildlife and pets to consume the poison directly, but even more common for some animals to receive a secondary exposure through poison that accumulates in the target rodent's body. This happens when wildlife or pets eat dead or dying rodents that have eaten the rodent bait. Wildlife affected by secondary poisoning include owls, hawks, eagles, and mammals such as raccoons, foxes, bobcats, mountain lions, and coyotes.

How can I protect wildlife and pets, but still manage rodent pests?

The safest and most effective ways to solve rodent problems are through exclusion and sanitation. For example, seal off any rodent entrances to your home, remove debris from your yard, and make pet food inaccessible to rodents. Traps can also help reduce rodent numbers. When you use rodent bait in a bait station, follow label directions carefully and immediately dispose of any rodent carcasses.

I only use rodenticides indoors. How is this a threat to wildlife if I never use them outdoors?

Rodents poisoned indoors may go outdoors to die. Anticoagulant rodenticides take several days to kill rodents. During this time, the rodent may feed on the rodenticide several times and be particularly toxic to nontarget predators. Before dying, it may leave the structure the same way it got in. If you have rodents indoors, the best strategy is trapping them with snap traps or electrocution devices.

What kind of rodenticide is legal to use for moles?

Consumers may only use some **warfarin**-containing products against moles. *Check the label first to make sure the target pest is listed.*

Why are 2nd-generation anticoagulant rodenticides dangerous to wildlife and pets?

Brodifacoum, **bromodialone**, **difenacoum**, and **difethialone** are toxic to rodents after a single feeding. However, the rodent doesn't die until several days after feeding and may actually continue to eat more poison. A super-lethal amount of the poison is then available to a predator or scavenger that eats the rodent. Occasionally a poisoned rodent will simply survive and the poison will persist in its body for several months. A predator that eats a surviving rodent will ingest the poison.

How do you know rodent baits are poisoning wildlife?

Since 1994, the Wildlife Investigation Laboratory of the California Department of Fish & Wildlife has confirmed at least 300 cases of wildlife poisoning from anticoagulant rodent baits. **Brodifacoum** was the poison most frequently detected. Animals harmed include coyotes, foxes, fishers, raccoons, fox squirrels, bobcats, mountain lions, black bears, kangaroo rats, eagles, owls, hawks, and turkey vultures.

Since animals typically retreat to their dens, burrows, or other hiding places in the final stages of anticoagulant poisoning, we don't know the exact number of nontarget wildlife killed. Field monitoring of wild populations of bobcats, mountain lions, coyotes, foxes, fishers, hawks, and owls confirm widespread exposure to predatory and scavenging wildlife.

I found a dead raccoon, skunk, or other small wild animal in my yard. What should I do?

First, don't touch it bare-handed. Wildlife can carry diseases and parasites, so always wear protective clothing—especially gloves—before handling dead or dying animals of any kind. If you're in an urban or suburban area, you can call your city or county animal control office with information about the animal's appearance and condition. Even if they don't have the staff to retrieve it, they can advise you on the next steps.

If you find an injured animal, you can contact a wildlife rehabilitation organization closest to you by searching online. Use a search engine such as Google or Yahoo and enter keywords such as *injured + wildlife + rescue + [your location]* in the search box.

If I think my pet has been poisoned, what should I do?

If your pet is having seizures, is unconscious or losing consciousness, or is having difficulty breathing, phone ahead and take your pet immediately to your local veterinarian or emergency veterinary clinic. If you know of any rodenticide that your pet has had access to, bring this information with you—especially the name of the product and active ingredients—as it will help the veterinarian effectively treat your pet.

RODENT (AND MOLE) MANAGEMENT

Can you repel mice with ammonia or cat urine?

Peppermint oil, ammonia, cat urine, mothballs, and other smelly substances do not repel mice or rats. Rodents are accustomed to living among odors we might think are disgusting. Spraying a repellent around your attic will not convince them to leave your comfortable house and venture outdoors.

Can I manage rodent pests without using poison baits?

Yes. The most effective rodent management program uses *pest-proofing* to keep mice and rats out of buildings, and *sanitation* (removing rodent habitat such as ivy or wood piles). Trap rodents if you have an active infestation using snap traps or electrocution devices. For more information on managing mice, rats, and other rodents, see [UC IPM's Pest Notes](#).

What's the best way to deal with moles? Will repellents keep them off of my property?

Trapping is considered the most effective way to reduce mole populations. See UC IPM's Pest Note on [moles](#) to read about types of traps and how to use them. Moles live in underground, interconnecting tunnels that ignore property lines, so think of trapping as an areawide project. Repellents such as mothballs, human hair balls, and ultrasonic devices will not drive moles away from your yard.

What are glue boards and are they a good way to catch mice and rats?

Glue boards are sticky traps that catch rodents and are not an effective way to catch mice or rats. Once caught, mice die slowly of dehydration and must be drowned or hit on the head with a hard object. Rats usually avoid glue traps, but when caught, often struggle and drag the trap as they try to escape. When used indoors, cats, dogs, and even children may investigate the trap and track the glue around the house; outdoors, glue traps often snare nontarget animals such as lizards and birds.

I don't want rats around my house, but I'm looking for a humane option to reduce their numbers. Is it okay to use live traps to capture the rats, then release them at the river a few miles away?

According to a law in California, if you trap a mouse, rat, or other nongame, furbearing animal that's legal to trap, you must either release it where you caught it or kill it. Although you're trying to humanely relocate the rodent, it may be infected with a disease and moving it can spread the disease to animals in the new location. Also, when you trap and release rodents along streams and rivers or in parks or forests you're probably transferring it to a new ecosystem where it won't survive. As long as the attracting food, water, and shelter remain in the original location, other rodents will move in from the edges. Removing these attractants is the solution, not trying to relocate live rodents.

Do ultrasonic rodent repellents work? Can you get rodents to leave your house by blasting high-pitched sounds or playing heavy metal music?

Studies of ultrasonic devices show some repellent activity in the immediate area, but rodents return after a few minutes to a few days. Other studies have shown that for effective rodent repellency, devices would require sound waves that would disturb both us and our pets. The sounds emitted don't penetrate walls where rodents often nest. Even if rodents sometimes run away from the high-pitched, grating sounds, using these devices avoids addressing the real problem—that rodents have access to your house or garage.

Do electrocution traps work?

Yes. These battery-operated, shoebox-sized traps electrocute the rodent as it crawls in. They're ideal when rodents are loose inside houses, garages, or barns. You place nuts or dried fruit in the back of the trap, press a toggle switch, and go away. The trap has a light that blinks once the rodent has been electrocuted. Although electrocution traps are more expensive than simple snap traps, they're more cost-effective in the long run since they can be reused indefinitely and are simple to use. Rats are wary of new objects and situations and will avoid traps at first, so it's best to place some of their favorite food just inside the trap for one or two days before setting it.



We've read that a family of barn owls can eat more than 3,000 rodents per year. We've had them nesting in our neighborhood before. How can we get them to nest in our tree?

First make sure that none of your neighbors use rodenticides. You can purchase owl nesting boxes or make your own. Based in Marin County, the [Hungry Owl Project](#) has plans for constructing your own boxes on its web site. The group also advises on installation and management programs for vineyards, ranches, neighborhoods, and schools.



Barn owlets nesting in a Canary Island date palm near downtown Sacramento. Photo by Robert Sewell.

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CERTIFICATE AND LICENSE HOLDERS

What exactly is a certified private applicator and how do I become one?

A **certified private applicator** is someone who uses a pesticide or supervises its use to produce an agricultural commodity on their own property, including the production of livestock, poultry, and fish. When these commodities are associated with a structure and infested by commensal rodents (for example, rats invading a chicken coop), a certified private applicator could use 2nd-generation rodenticides.

County agricultural commissioners are responsible for testing and certifying private applicators, and can direct you to study material. For more details, contact your county commissioner [here](#).

I have a structural pest control license. Can I still use 2nd-generation anticoagulant rodenticides (SGARs)? Since they're now restricted materials, how do I get permission to purchase and use them?

You can possess or use SGARs if you hold a valid operator or field representative license for Branch 2 Pest Control issued by the Structural Pest Control Board. If you're a structural **applicator**, you must use SGARs under direct supervision by an operator or field representative who is licensed for Branch 2 Pest Control.

I have a Qualified Applicator Certificate. Can I use 2nd-generation anticoagulant rodenticides (SGARs) now that they're restricted materials?

Yes. Whether you have a QAC or QAL, you can purchase and use SGARs to manage commensal rodents within 50 feet of buildings and other structures in a residential, industrial, or institutional setting, or in production agriculture. You must be certified or licensed in category A or D, depending on the use setting, and obtain a permit from your county agricultural commissioner to use SGARs.

Who can sell 2nd-generation anticoagulant rodenticides (SGARs)?

As of July 1, 2014, only retailers who are licensed Pest Control Dealers may sell products that contain the four SGAR active ingredients, **brodifacoum**, **bromodialone**, **difenacoum**, and **difethialone**. Products containing the four SGAR active ingredients are now California-restricted. There are no exceptions for small quantities or low concentrations as there are for certain other restricted active ingredients.

Only licensed Pest Control Dealers (e.g., farm and tractor supply stores) may sell restricted materials (FAC 12101). Find dealers in DPR's database of businesses. Copy and paste the following into your browser: www.cdpr.ca.gov/docs/license/currlic.htm and then open the Excel file, **Businesses.csv**. Look for the abbreviation *PDM* in column A, which is the license type that corresponds to Pest Control Dealers.

What happens when a rat infestation extends further than 50 feet from a man-made structure?

Since SGARs are intended to protect the structure from rodent invasions, in most cases, baiting within 50 feet of the man-made structure should adequately protect the structure. The new regulations prohibit placing above-ground SGAR baits more than 50 feet from a man-made structure unless there's a feature associated with the site that's harboring or attracting the pest species listed on the label between the 50-foot limit and the placement limit on the label (which is up to 100 feet on some SGAR labels). Examples of man-made structures are listed on product labels.

As a certified private applicator, which rodenticide products can I use?

Table 3 below shows the categories of rodenticides, active ingredients (AI), and possible target pests you'll find on the product label. You can search DPR's [product label database](#) by AI to find registered products. (Go to www.cdpr.ca.gov and select "product/label database" in the database tab.) Next, you'll need to search online or contact distributors for product labels so you can note target pests and conditions of use.

Table 3: Categories of rodenticides for consumer and certified applicator use.

Always read the product label to make sure your target pest is listed.

RODENTICIDE CATEGORY	ACTIVE INGREDIENT	TARGET PESTS ON LABEL ¹ <i>italics = not labeled for consumer use</i> bold = some consumer use
2ND-GENERATION ANTICOAGULANTS² <i>[No consumer use; all are California-restricted materials]</i>	brodifacoum	<i>house mice, Norway rats, roof rats</i>
	bromadiolone	
	difenacoum	
	difethialone	
1ST-GENERATION ANTICOAGULANTS <i>[Products listed in italics and labeled for field use are federally restricted.]</i>	warfarin	<i>house mice, rats, voles, deer mice, moles</i>
	chlorophacinone	house mice, Norway rats, roof rats, gophers, <i>voles, deer mice, ground squirrels</i>
	diphacinone	house mice, Norway rats, roof rats, ground squirrels, gophers, <i>deer mice</i>
ACUTE TOXICANTS	bromethalin	house mice, Norway rats, roof rats, moles
	cholecalciferol	<i>house mice, Norway rats, roof rats</i>
	strychnine ³	gophers
	zinc phosphide ³	<i>mice, rats, gophers, ground squirrels</i>

¹Products are registered for uses against specific rodents (or moles, which are insectivores, not rodents).

For example, not every product that contains chlorophacinone is registered for use against mice and rats. **Always read the product label before using any pesticide.**

²2nd-generation anticoagulant products are restricted materials and are *only* registered for commensal rodents—house mice, Norway rats, and roof rats—never for use in field situations or against ground squirrels, voles, or pocket gophers.

³Some products are federally and California restricted use