



Agricultural Commissioner
Sealer of Weights
& Measures

COUNTY OF IMPERIAL

Second Generation Anticoagulant Rodenticides

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Pesticide Use Enforcement

Road Map



- Background of Anticoagulant Rodenticides
- FGARs vs SGARs
- Unintended Consequences
- FAC 12978.7
- Prohibited Use of SGARs
- Allowed Use of SGARs
- Alternatives to SGARs

Background

- In the 1940s and 1950s, the first kind of anticoagulant rodenticides were developed
- Disrupt the normal blood clotting/coagulation process
- California Ecosystems Protection Act (AB1788) signed September 29, 2020 – prohibits use of SGARs while DPR reevaluates SGARs
- AB1298 signed October 4, 2021 – amends FAC 12978.7

Table 1. Active ingredients in rodenticides used in California.

Active Ingredient	Rodenticide class
Chlorophacinone Diphacinone Warfarin	1st-generation anticoagulant
Brodifacoum Bromadiolone Difenacoum Difethialone	2nd generation anticoagulant*
Bromethalin Cholecalciferol	Non-anticoagulant rodenticide

**All 2nd generation anticoagulants are considered restricted use pesticides and therefore can only be purchased and applied by a licensed applicator.*

How do anticoagulants work?

- Vitamin K is essential for production of active clotting factors.
- Livers make enzymes that allow the body to recycle Vitamin K.
- Anticoagulants prevent the formation of blood clots
- Anticoagulants bind to the enzyme that is essential to recycle Vitamin K
- Anticoagulants interfere with other steps in Vitamin K recycling.

FGARs vs. SGARs

First Generation Anticoagulants

- 1940s and 1950s
- Disrupt normal blood clotting process
- Require rodents to consume bait for several consecutive feedings
- Excreted rapidly by mammals
- Short half life

First-Generation Rodenticides	Types	Acute Oral Toxicity	Primary Poisoning Risk	Secondary Poisoning Risk
Chlorophacinone	Anticoagulant, multiple dose treatment	High	Low (birds and mammals)	Low (birds), High (mammals)
Diphacinone	Anticoagulant, multiple dose treatment	High	Low (birds and mammals)	Moderate (birds), High (mammals)
Warfarin	Anticoagulant, multiple dose treatment	Moderate to high	Low (birds), Moderate (mammals). Highly toxic to cats.	Moderate (birds and mammals)

FGARs vs. SGARs

Second Generation Anticoagulants

- SGARs are substantially more potent than 1ST Gen.
- more toxic because they bind more tightly to the enzyme
- Lethal dose can be ingested in a single feeding
- Not excreted easily
- Persist in organs –liver
- Longer half life
- Higher risk of severe poisoning
- More likely to poison predatory wildlife

Second-Generation Rodenticides	Types	Acute Oral Toxicity	Primary Poisoning Risk	Secondary Poisoning Risk
Brodifacoum	Anticoagulant, single dose treatment	High	High (birds and mammals)	High (birds and mammals)
Bromadiolone	Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds and mammals)
Difethialone	Anticoagulant, single dose treatment	High	High (birds), Moderate (mammals)	High (birds), Moderate (mammals)
Difenacoum	Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds), Data gap (mammals)

Unintended Consequences

Primary poisoning
Secondary poisoning



**TARGETED RAT
OR MOUSE EATS
RODENTICIDE**



**RAT OR MOUSE
BECOMES LETHARGIC
OR DIES, BUT POISON
STAYS IN THE BODY**



**PREDATORS FEED
ON POISONED
RATS OR MICE**



**NON-TARGETED
ANIMALS
BECOME SICK
OR DIE**



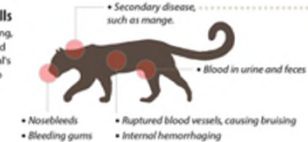
Lethal Dose: Rat Poison & Local Wildlife

Local residents may inadvertently be poisoning wildlife. National Park Service researchers have found a direct link between exposure to anticoagulant rodenticides, commonly known as rat poison, and the deaths of wildlife in and around the Santa Monica Mountains. How rodenticide works its way through the food chain:



How anticoagulant rodenticide kills

These compounds interrupt blood-clotting, which leads to uncontrolled bleeding and death. They may also suppress the animal's immune system, making it susceptible to other diseases. **Symptoms include:**



What is mange?

A microscopic mite that burrows into the skin and causes...

1. Extreme Itchiness and skin lesions.
2. Fluid and nutrient loss through the skin.
3. Infection, starvation, hypothermia or other complications, eventually leading to death.



Check the label

Here are the most common anticoagulant compounds:

- Bromadiolone
- Brodifacoum
- Diphacinone
- Difethialone



SOURCES: Santa Monica Mountains National Recreation Area research, L.E.K. Services, UrbanCarnivores.com

CREDIT: National Park Service
nps.gov/samoa

Unintended Consequences

- Primary poisoning
- Secondary poisoning
- California Ecosystems Protection Act (AB1788) signed in 2020 to prohibit uses of SGARs due to threat to wildlife



Coagulopathy is common:

- **Wild canids (foxes and coyotes)**
- **Mountain lions**
- Bobcats
- Raptors
 - Hawks
 - Eagles
 - Owls
 - Falcons
 - Vultures



FAC 12978.7

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12978.7.

(a) For purposes of this section, the following terms have the following meanings:

(1) "Second generation anticoagulant rodenticide" means any pesticide product containing any of the following active ingredients:

- (A) Brodifacoum.
- (B) Bromadiolone.
- (C) Difenacoum.
- (D) Difethialone.

(2) "Wildlife habitat area" means any state park, state wildlife refuge, or state conservancy.

(b) Except as provided in subdivision (e), and notwithstanding subdivision (c), the use of any second generation anticoagulant rodenticide is prohibited in a wildlife habitat area.

(c) Except as provided in subdivision (e) or (f), the use of any second generation anticoagulant rodenticide is prohibited in this state until the director makes the certification described in subdivision (g).

(d) State agencies are directed to encourage federal agencies to comply with subdivisions (b) and (c).

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(e) This section does not apply to any of the following:

- (1) The use of second generation anticoagulant rodenticides by any governmental agency employee who complies with Section 106925 of the Health and Safety Code, who uses second generation anticoagulant rodenticides for public health activities.
- (2) The use of second generation anticoagulant rodenticides otherwise prohibited by this section when used by any governmental agency employee for the purposes of protecting water supply infrastructure and facilities in a manner that is consistent with all otherwise applicable federal and state laws and regulations.
- (3) The use of second generation anticoagulant rodenticides by a mosquito or vector control district formed under Chapter 1 (commencing with Section 2000) of Division 3 or Chapter 8 (commencing with Section 2800) of Division 3 of the Health and Safety Code to protect the public health.
- (4) The use of any second generation anticoagulant rodenticides for the eradication of nonnative invasive species inhabiting or found to be present on offshore islands in a manner that is consistent with all otherwise applicable federal and state laws and regulations.
- (5) The use of any second generation anticoagulant rodenticide that the Department of Fish and Wildlife determines is required to control or eradicate an invasive rodent population for the protection of threatened or endangered species or their habitats.

FAC 12978.7

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(6) The use of any second generation anticoagulant rodenticide to **control an actual or potential rodent infestation associated with a public health need**, as determined by a supporting declaration from the State Public Health Officer or a local public health officer. For purposes of this section, a public health need is an urgent, nonroutine situation posing a significant risk to human health in which it is documented that other rodent control alternatives, including nonchemical alternatives, are inadequate to control the rodent infestation.

(7) The use of any second generation anticoagulant rodenticide for **research purposes related to the reevaluation** described in paragraph (1) of subdivision (g). Before using a second generation anticoagulant in the manner described in this paragraph, a written authorization for research shall be obtained from the director. The director may specify the conditions in the authorization for research under which the research shall be conducted. The director may terminate, amend, or refuse to issue an authorization for research if the director determines any of the following:

(A) The research may involve a hazard to the environment.

(B) The research may be used for purposes unrelated to pesticide data development.

(C) A violation of the authorization for research, prior authorization for research, or Division 6 (commencing with Section 11401) or this division, or a regulation adopted pursuant to either or both of those divisions, has occurred in connection with the research.

FAC 12978.7

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(f)(1) This section does not apply to the use of second generation anticoagulant rodenticides in either of the following locations:

(A) A [medical waste generator](#), as defined in Section 117705 of the Health and Safety Code.

(B) A facility registered annually and subject to inspection under Section 510 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. Sec. 360 et seq.) and compliant with the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 et seq.).

(2) This section does not apply to the use of second generation anticoagulant rodenticides for agricultural activities, as defined in Section 564.

(3) For purposes of paragraph (2), "[agricultural activities](#)" include activities conducted in any of the following locations:

(A) A warehouse used to store foods for human or animal consumption.

(B) An agricultural food production site, including, but not limited to, a slaughterhouse or cannery.

(C) A factory, brewery, or winery.

(D) An agricultural production site housing water storage and conveyance facilities.

(E) An agricultural production site housing rights-of-way and other transportation infrastructure.

(g) After the director determines that both of the following conditions have occurred, the director shall certify to the Secretary of State of that determination:

- (1) The department has **completed the reevaluation** of second generation anticoagulant rodenticides, as **commenced by the department on March 12, 2019**, pursuant to California Notice 2019-03 "(Notice of Final Decision to Begin Reevaluation of Second Generation Anticoagulant Rodenticides)."
- (2) Consistent with the requirements of this division and regulations adopted pursuant to this division, the **department has adopted any additional restrictions necessary** to ensure that continued use of second generation anticoagulant rodenticides is not reasonably expected to result in **significant adverse effects to nontarget wildlife** and those restrictions are operative. Any restrictions described in this paragraph shall be developed in consultation with the Department of Fish and Wildlife.

What pesticides are considered SGARs?

- Brodifacoum
- Bromadiolone
- Difenacoum
- Difethialone

Second-Generation Rodenticides	Types	Acute Oral Toxicity	Primary Poisoning Risk	Secondary Poisoning Risk
Brodifacoum	Anticoagulant, single dose treatment	High	High (birds and mammals)	High (birds and mammals)
Bromadiolone	Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds and mammals)
Difethialone	Anticoagulant, single dose treatment	High	High (birds), Moderate (mammals)	High (birds), Moderate (mammals)
Difenacoum	Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds), Data gap (mammals)

Prohibited Uses

- Residential uses
- Many non-production agricultural uses
 - Around man-made structures at cemeteries, golf courses, and parks
- Most industrial uses
 - Ships, trains, aircrafts
 - Ports and terminal buildings
 - Shipyards
 - Timber yards
- Most institutional uses
 - Schools
 - Shopping malls



Where can SGARs be used today?

FAC 12978.7 subsections (e) and (f)

User exemptions:

- Vector control district or other government agency
- Government agency employees protecting water supply infrastructure and facilities (e.g. wells, pipes, aqueducts).

Use exemptions:

- For eradication of nonnative invasive species on offshore islands;
- To control an actual or potential infestation associated with an urgent, non-routine public health need declared by the State Public Health Officer or local public health officer;
- For research authorized by DPR to provide information to DPR's reevaluation of SGARs;
- At medical waste generators as defined by Health and Safety code section 117705, such as the following examples:
 - Medical, dental and veterinary offices, clinics, hospitals, surgery centers;
 - Pet shops; and
 - Trauma scene waste management practitioners;

Where can SGARs be used today? (cont.)

FAC 12978.7 subsections (e) and (f)



Use exemptions:

- At FDA-registered and inspected facilities involved in commercial manufacture, preparation, compounding, etc. of drugs;
- On agricultural sites producing any horticultural, viticultural, aquacultural, forestry, dairy, livestock, poultry, bee, or farm product; and
- At other noted sites, specifically:
 - A warehouse used to store foods for human or animal consumption;
 - A food manufacturing or processing plant, such as a slaughterhouse or cannery;
 - A factory, brewery, or winery;
 - On-farm water storage and conveyance (e.g. tanks and pipes); and
 - On-farm storage housing rights-of-way and other transportation infrastructure materials.

On-Farm Uses

- FAC 1278.7 (f) (3) (D) should be interpreted to protect on-farm water supply systems, facilities, and related infrastructure. These include:
 - Waterways, irrigation canals, levies, dams, ponds, reservoirs, wells, water tanks, irrigation pumps and pump houses, drip tape or other irrigation lines outside of farm fields
- FAC 1278.7 (f) (3) (E) is meant to protect on-farm transportation infrastructure. This includes:
 - On-farm areas such as driveways (including driveways to barns and houses), farm or ranch roads (such as along farm fields), and bridge or culvert embankments

How does this law affect structural pest control Branch 2 SGAR uses?

Q: How does this law affect structural pest control Branch 2 SGAR uses?

A: Registered Branch 2 companies practicing structural pest control are prohibited from using SGARs with certain limited exemptions allowed under the law (such as medical waste generators, slaughterhouses, factories, and certain warehouses) provided the use site is listed on the product labeling. As noted above, all other SGAR uses (like residential uses) are prohibited starting January 1, 2021.



Branch 2 SGAR use

- Vector Control Exemption: FAC 12979.7 subsection (e)(3) “should be applied to any vector control district should they need to contract out with a third party...” It is NOT a violation for pest control business licensed w/DPR or SPCB under contract with a vector control district to apply SGARs under the direct
- If State Public Health Officer or local public health officer declares a public health need where there is an urgent, non-routine situation posing significant risk to human health... a pest control business could potentially conduct limited SGAR applications within the scope and duration of the declaration.



Branch 2 SGAR use - FAQ

Q: Does this law affect SGAR applications on federal property?

A: Other than certain "pollution control standards," federal agencies and their employees are not subject to California pesticide laws and regulations. The amended law instructs state agencies to encourage federal agencies to comply with the law's requirements. However, pest control businesses licensed by DPR or registered with the Structural Pest Control Board conducting pest control on federal property are still subject to California laws and regulations.



Alternatives to SGARs



No pesticides:

- Exclusion
- Trapping

Non-anticoagulant rodenticides:

- Bromethalin
- Cholecalciferol
- Zinc Phosphide

First Generation Anticoagulant Rodenticides (FGARs):

- Chlorophacione
- Diphacione
- Warfarin



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