

Rodenticides: How do they fit into your IPM program?

Rodent control is a multi-layer process and baiting for rats is just one part of the IPM process. However, using rodent baits is a question most School IPM Coordinators have concern over since they do work around children, food handling areas and non-target animal populations. The information below is some general information on rodenticides for use with the house mouse, roof rat, and Norway rats.



So what's the difference between a rodenticide and rodent bait? A rodenticide is a pesticide or other agent used to kill rats and other rodents or to prevent them from damaging food, crops, or forage. The term 'rodent bait' is something pest management technicians refer to as the product they place into the rodent bait stations. However for

further clarification, this bait can be toxic (rodenticide) or non-toxic in which it is bait that tells the PMP if the rodents are in the area and should be fed toxic bait.

Both [U.S. EPA](#) and [U.S. FDA](#) both have regulations that require the use of tamper-resistant containers when using rodenticides around food handling areas, children, pets, and other non-target wildlife. Specifically EPA requires that rodent baits must be in block, paste, or pelleted forms and require use of tamper-resistant bait stations:

- If bait is to be placed in any indoor or outdoor location to which children under six years-of-age, pets or non-target wildlife have access.
- For all applications made outdoors and above ground. (citation)
- Baiting of burrows outdoors is *permitted only for pelleted baits* that are placed **at least six inches down** active rat burrows.

In 2008, EPA reviewed rodenticides and in 2010 they released changes that restricted the use of certain types of rodenticides for consumers (buy at the local store) and also how pest management professionals and agricultural operations can purchase and use these products as well. As such, there has been confusion over what products are still 'legal' and 'how do I service this school account'.

First generation anticoagulants kill by preventing blood from clotting and it does take multiple feedings to gain success. The problem with this class of product is that when it was on the market for the public (consumer), children and animals could pick up the poison and ingest it, resulting in injury or death. Now the only way first generation anticoagulants can be

used in the consumer market are ready-to-use bait stations that contain and/or are packaged with rodenticide bait that is in block or paste form. This means if you were to go to your local hardware store, you would find this product in one large container and there is no easy way for children or pets to tamper with it. For PMPs to use this product they must place inside tamper resistant container within 100 feet of buildings and other structure and must purchase the rodenticide in containers of **4 pounds or more**.

Whereas the first generation anticoagulants take multiple feedings, the **second generation of anticoagulants** was created so that rodents who had become resistant to the first gen products would have an alternative permanent solution. Second generation anticoagulants are much faster acting; in some cases a single night feeding can result in death. However, this is dangerous when it comes to children and pets under the Risk Mitigation Decision. EPA took this class of rodenticide off the consumer market and these products can only be purchased for commercial pest control and structural pest control markets. Products containing second generation anticoagulants must be sold in containers holding **at least 16 pounds** of bait if they are labeled for use by **professional applicators** and at least **8 pounds** of bait if labeled for use **in or near agricultural** structures. In TX, you must have a license with the TX Dept of Ag in the SPCS Pest category or 1D vertebrate pest control for agricultural pest control in order for you to use this category of rodenticides. These registered baits are for use by professional applicators to control rats and/or mice in or within 100 feet of buildings and other structures or for use in and near agricultural buildings and man-made agricultural structures. One item of note is that Vitamin K is considered to be an effective antidote to this type of rodenticide.

There are a couple of **non-anticoagulants** that require mentioning. **Bromethalin** is a single dose rodenticide that stops the cells in the nervous system from producing energy. You must be licensed to purchase this product. **Cholecalciferol** works at producing too much vitamin D; rats must eat several doses to kill them but this can be dangerous to humans and non-target animals if they are exposed as well. **Zinc phosphide** is an inorganic compound that combines phosphorus with zinc. When an animal eats the bait, the acid in the animal's stomach turns the zinc phosphide into phosphine. Phosphine gas blocks cells from making energy which means the heart, brain, kidney and liver fail to work. Products with cholecalciferol and zinc phosphide are classified as

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restricted-use by U.S. EPA. **Restricted-use products** have the potential to cause unreasonable adverse effects to the environment and injury to applicators or bystanders without added restrictions. The "Restricted Use" classification restricts a product, or its uses, to use by a certified applicator or someone under the certified applicator's direct supervision. Simply put these products are dangerous; in TX they are considered Red Category on school campuses and should be considered as a last resort.

For more information about rodent control check out this IPM Action Plan <http://articles.extension.org/pages/63911/ipm-action-plan-for-rodents>

For more information about rodenticides check out the NPIC website <http://npic.orst.edu/ingred/ptype/rodenticide.html>

Below is a chart that you can use to help you learn active ingredients, how they work and what type of risk they pose to birds and mammals.

Active Ingredient	What it does	Acute Oral Toxicity	Primary Poisoning Risk	Secondary Poisoning Risk
Chlorophacinone	1st Gen: Anticoagulant, multiple dose treatment	High	Low (birds and mammals)	Low (birds), High (mammals)
Diphacinone	1st Gen: Anticoagulant, multiple dose treatment	High	Low (birds and mammals)	Moderate (birds), High (mammals)
Warfarin	1st Gen: Anticoagulant, multiple dose treatment	Moderate to high	Low (birds), Moderate (mammals). Highly toxic to cats.	Moderate (birds and mammals)
Brodifacoum	2nd Gen: Anticoagulant, single dose treatment	High	High (birds and mammals)	High (birds and mammals)
Bromadiolone	2nd Gen Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds and mammals)
Difethialone	2nd Gen: Anticoagulant, single dose treatment	High	High (birds), Moderate (mammals)	High (birds), Moderate (mammals)
Difenacoum	2nd Gen: Anticoagulant, single dose treatment	High	Moderate (birds), High (mammals)	Moderate (birds), Data gap (mammals)
Bromethalin	Non-anticoagulant, single dose treatment	High	Low (birds and mammals)	Low (birds and mammals)
Cholecalciferol	Non-anticoagulant, multiple or single dose treatment	High	Low to moderate (birds and mammals)	Low (birds and mammals)
Zinc Phosphide	Non-anticoagulant, single dose treatment	High	High (birds and mammals)	Low (birds and mammals)

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