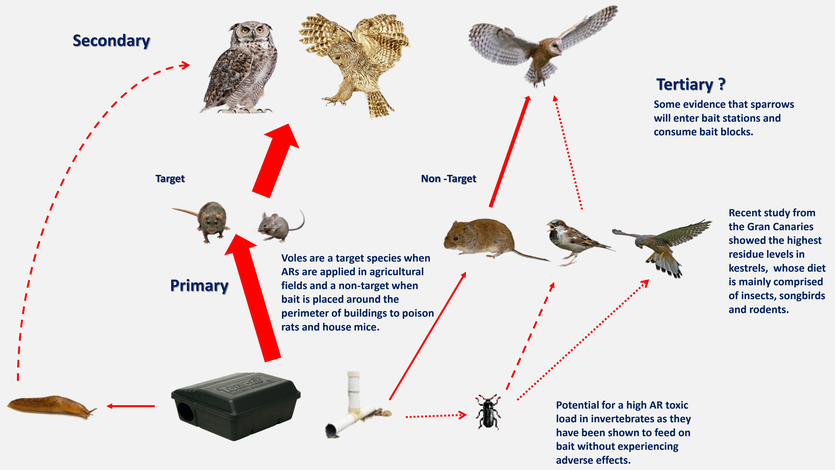
Introduction: what are anticoagulant rodenticides?

Rodents are one group of agricultural pests that cause extensive damages to crops, stored grain and farm structures. In the US, rodents are responsible for causing an estimated $19 billion dollars in economic damages annually through the consumption and contamination of stored grains. The primary method for controlling rat infestations worldwide, including within the agricultural sector is through the use of anticoagulant rodenticides (ARs) . The first generation anticoagulant rodenticides (FGARs: warfarin, diphacinone, and chlorophacinone) were introduced commercially in the 1940s, and since then, their widespread use has led to genetic resistance in some rodent populations . In the 1970s, second generation anticoagulant rodenticides (SGARs: brodifacoum, bromadiolone and difethialone) became available and today these are the most widely used compounds, especially by professional rodent control operators and farmers.

By design, second generation anticoagulant rodenticides are highly toxic compounds intended to kill after a single feed. They are slow reacting, to avoid bait resistance in target species, and have a long biological half-life in the liver (i.e. Brodifacoum mouse liver half-life = 307 days). These traits have led these compounds to bio-accumulate in the food chain.

Raptor species in many different regions and habitats across the globe are increasingly testing positive for both first and second generation anticoagulant rodenticides. Long-term monitoring of Barn Owls, Great-Horned Owls and Barred Owls in British Columbia Canada has shown that the proportion of the population being affected by anticoagulant rodenticides and the overall concentration in individual raptors is increasing.

Potential pathways of anticoagulant rodenticides to non-target predators



Secondary anticoagulant rodenticide exposure route mainly through the consumption of rats. However non-target primary and secondary exposure is increasingly being documented.

Barn Owls as rodent control candidates

Barn Owls are excellent rodent hunters, especially field voles, and they can be part of an Integrated Pest Management Program (IPM)

- **A nesting Barn Owl pair and their chicks eat 1200 or more small mammals per year.**
- **Barn Owls will hunt within a 1 km radius when food is abundant. They are not territorial so nest boxes need only be 100 meters apart.**
- **Farmers have reported reduced rat and vole problems on their farms after a breeding Barn Owl pair has taken residence on their farm.**

Three owlets ready to leave the nest soon: The owlets will start to learn how to fly when they are around 60 days old.

Agricultural Fields

First generation ARs are applied in berry fields and orchards to control field voles

Field voles can cause damage to blueberry fields when they either purposely or inadvertently chew on the roots of berry bushes. Berry farmers can control field voles in areas where damage is occurring by using rodenticide products containing either chlorophacinone or diphacinone placed inside securely fastened bait stations.

Securely fastened PVC tube with AR bait

Voles are a key prey item for many raptors, including Barn Owls.

Rodenticide products containing the second generation anticoagulant rodenticides Brodifacoum or Difethialone are the most toxic for humans and wildlife and should only be used as a last resort, indoors in tamper resistant bait stations.

Products containing Brodifacoum and Difethialone indoor use only:

Hombre Rodenticide©
Talon Rodenticide©
Final Rodenticide©
Ratak Rodenticide©
Jaguar 50 Rodenticide©
Havoc Rodenticide©

Which AR products can be used in fields and farmyards?

What products can be used in fields and in farm yards for the control of rats and mice?
The following table provides general information on registered use areas are for commercial class rodenticides.

Active Ingredient	Bait Form	Use Areas: Farm buildings and Yard – Indoor only	Use Areas: Farm buildings and Yard – Outdoor*	Use Areas: Field Uses	PCP Registration Number	Product Name
Bromethalin	*solid*	✓				
Zinc Phosphide	*solid*	✓	✓	✓	*21838*	*Rodent Pellets*
					16122	*Rodent Bait*
					14240	*ZP Rodent Bait*
					8024	*Bartlett Waxed Mouse Bait*
Warfarin	*solid*	✓	✓			
Chlorophacinone	*solid*	✓	✓	✓	*13729*	*Rozol Parafinized Pellets*
					22608	*Poulin's Gopher Doom*
					20239	*GoundForce Parafinized Pellets Rodenticide*
Diphacinone	*solid*	✓	✓	✓	*11670*	*Ramik Brown*
					11669	*Ramik Green*
	liquid	✓				
Brodifacoum	*solid*	✓				
Bromadiolone	*solid*	✓	✓			
Difethialone	*solid*	✓				

*Within 15 meters of buildings/structures or up to 100 meters from buildings if bait is in a tamper resistant bait station and secured to a fence line.

Note that for any specific active ingredient, registered use areas may vary among product labels. You are responsible for reading and following all label directions on these and other pest control products.

AR products containing either Zinc Phosphide, Chlorophacinone or Diphacinone (solid) can be applied in berry fields in fastened bait stations.

For more information, please contact the Pest Management Information Service at 1-800-267-6315 or visit our web site.

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Farm Buildings

Preventive measures to discourage pests on your property

To the extent possible, avoid the use of anticoagulant rodenticides. Consider preventive measures such as removal of potential food sources, and blocking access to the inside of structures. Anticoagulant rodenticides should only be used as a last resort and application should carefully follow the instructions on the product label.

- **Removal of open food sources for pests**
- **Safe storage of food products and or waste management**
- **Block possible access to the inside of structures**
- **Keep pet food for pets indoors**
- **Keep grass short within 1m surrounding barn**
- **Removal of debris**

To learn more about options for Barn Owl nest box installations and how to farm with Barn Owls visit:
http://www.barnowlsbc.ca/