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The Role of Toxicants in Forest Management

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BY WENDY M. ARJO

Although the emphasis of the Olympia Field Station is on the development of non-lethal methods to control pest species, sometimes lethal methods are necessary. Toxicants can be an effective means of quickly reducing high populations of some problem animals or maintaining acceptable population densities. Depending on their mode of action, toxicants are classified into three categories: fumigants, acute toxicants and chronic toxicants.

Fumigants are lethal gases that are injected into the burrows of target species. Operational use of fumigants is usually more expensive and hazards exist to non-target species that also inhabit burrow systems of the targeted animal. In addition, at least with pocket gophers, fumigants are not successful because gophers are able to plug burrows to prevent penetration of the gases.

Acute toxicants, like strychnine, are often lethal after a single dose. Although rather inexpensive because single doses are effective, bait-shyness may occur with sublethal doses, rendering the population reduction program ineffective. Bait shyness is condition avoidance and when an animal eats a food, then becomes sick and subsequently refuses to eat the food associated with the illness.

Chronic toxicants, such as anticoagulants, require the animal to ingest multiple doses to produce mortality. Anticoagulants effectively block the enzyme necessary for the recycling of vitamin K. Without sufficient incoming vitamin K, the ability to produce clotting factors is inhibited and hemorrhaging occurs. Unlike the acute toxicants, anticoagulants do not induce bait-shyness.

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At present time, there is not a registered toxicant to control mountain beavers. Thus, they are managed by trapping.

The most reliable method to control mountain beaver populations immediately before seedling plantation has been the use of Conibear 110 traps. This type of lethal control is becoming politically less popular, as indicated by the passage of Initiative 713 in 2000, which banned the use of all body gripping traps in the state of Washington. A similar measure did not succeed in Oregon.

Therefore, alternative tools to Conibear traps for reducing mountain beaver populations may be desirable. At present there is no toxicant registered for use to control mountain beaver. However, four products are registered for belowground application to protect agriculture crops: 0.5 percent strychnine, 2.0 percent zinc phosphide, 0.005 percent chlorophacinone and 0.005 percent diphacinone.

Scientists at the Olympia Field Station conducted a series of tests to assess mountain beaver acceptance and subsequent fate when offered bait containing these four toxicants. We found that zinc phosphide and strychnine were not effective because animals became bait-shy after initial exposure. Diphacinone and chlorophacinone were readily consumed by the mountain beaver, although diet played a role in efficacy. Diets high in vitamin K, the antidote for anticoagulants, decreased efficacy, where as efficacy increased when animals were limited to natural vegetation. Daily baiting is not practical for managers, so we also investigated the efficacy of a single large baiting with chlorophacinone. All animals succumbed to chlorophacinone baiting after 21 days. Chlorophacinone appears to be the only registered bait to pursue for possible mountain beaver control registration. ◆

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