



Broadcast Use of Zinc Phosphide-based Rodenticides for the Control of the Richardson's Ground Squirrel on Rangeland, Pasture, and Cereal Crops

-----STOP-----

ALWAYS FOLLOW THE PESTICIDE LABEL. Read and understand the label **BEFORE** purchasing and using a pesticide. The following information is to assist in the proper use of zinc phosphide-based rodenticides for ground squirrels. But in no part does this document overrule the pesticide label. If you have questions, call the pesticide manufacturer, listed on the label, or the Montana Department of Agriculture, listed at the end of this document.

PRE-TESTING

- Pre-testing allows applicators to determine if ground squirrels will feed on grain. While some labels may not require pre-testing, the Vertebrate Pest Specialist recommends pre-testing whenever zinc phosphide-treated baits are under consideration.
- Select 20-30 active burrows, 30 feet apart from each other and apply 1 teaspoon of untreated grain (rolled or crimped to prevent germination) that matches the grain of the zinc phosphide-bait (ZP) you want to use. For example, if the ZP bait is made of wheat, use wheat in your pre-testing. Flag the locations and check in 1-2 days to see if ground squirrels have eaten the grain. You may see the kernels hulled. If no feeding took place, then do NOT apply pre-bait or toxic bait.

PRE-BAITING

- Pre-baiting is used to condition all the ground squirrels in the field to identify the bait as a source of food. Pre-baiting has been shown to increase acceptance of the toxic bait by ground squirrels. Just as with the pre-test bait, use crimped/rolled grain that matches the grain used in the ZP product you will be applying.
- Apply the pre-bait in the same manner that you will be applying the ZP bait, e.g., spot baiting or broadcast. Apply the toxic bait 2-3 days before applying the ZP. Do not apply bait unless tests with untreated oats show good acceptance of grains by ground squirrels in the areas to be treated.

BROADCAST APPLICATION RECOMMENDATIONS

- Do not apply ZP-treated baits when the weather forecast predicts that rain will hit the ZP in the next two days. ZP is sensitive to moisture, and its efficacy is reduced when it is exposed to moisture.
- Broadcast this product only after all ground squirrels have emerged from hibernation. This usually occurs within two weeks of first appearance of ground squirrels. The entire breeding population, including females, should be actively foraging at the time of application to obtain maximum efficacy.
- Ground squirrels readily travel up to 100 ft when foraging, therefore, a continuous bait

application is not necessary. Apply bait application in swaths alternating with 20 ft to 100 ft swaths of no bait application. This technique will provide effective treatment while reducing application cost and the amount of residual bait present post-treatment.

- Apply bait at 6 pounds per swath acre (net 3 pounds per acre) in alternate treated and untreated swath widths. Bait only areas where ground squirrel burrows and active ground squirrels are present.
- Use flags or GPS units to ensure proper swath width spacing and to broadcast bait on the same swaths that were pre-baited.
- Do not mix or apply rodent bait with fertilizers or other products.
- Clean broadcast equipment prior to use for broadcasting rodent bait. Residual chemical dust or odor could adversely affect bait acceptance by rodents.
- Use a constant application speed when calibrating and broadcasting to prevent over or under application. Recalibrate if a different application speed is desired.
- Do not apply pre-bait or bait in snowy, or wet weather conditions or if these conditions are expected shortly (24-48 hours) after application. Inclement weather reduces squirrel activity and zinc phosphide bait becomes less acceptable to squirrels after exposure to moisture.
- Keep human activity to a minimum for several days after pre-bait and bait application to ensure that rodents have undisturbed feeding access to the bait.
- Reduce the rate of reinvasion from squirrels occupying areas immediately adjacent to the treated area by treating a buffer area of 50 to 100 yards, if possible.

PRECAUTIONARY NON-TARGET STATEMENTS

- Do not broadcast bait in areas where waterfowl, pheasants, partridge, grouse, or other seed-eating birds congregate or feed. Use other recommended management methods if rodent control is necessary in these areas. If non-target animals are noticed in a field after treatment, then endeavor to frighten them from the field.
- Remove livestock from the area to be baited to reduce trampling of the bait and potential hazards to livestock. Keep them out of the treated area until the ZP-based bait has been consumed or for at least two weeks following application, whichever is longer.
- Keep dogs and other domestic animals out of treated fields until the ZP has been completely consumed or for two weeks whichever is longer.
- Removal or burying of dead carcasses seen above ground is good management practice for this product. Relative to other rodenticides, zinc phosphide has significantly lower secondary poisoning risk to non-target species, but the risk is not zero. Removal of carcasses further reduces the likelihood of secondary effects.
- Research suggests that ZP-bait applications receiving one-inch of rain or more are essentially neutralized.

ASSESSMENT OF APPLICATION

- Producers are strongly encouraged to assess the effectiveness of their ZP-based bait application. Records of timing, product (name, EPA Registration Number, date of manufacturer, storage information etc.), formulation (i.e., grain or pelleted), application rates, weather conditions, efficacy, and thoughts about what went well and what went wrong are essential for developing cost-effective practices on your ground. Do not rely on your memory. Only with detailed records taken over the years, can you develop a clear strategy for the best use of ZP-based bait applications.

RESEARCH QUESTIONS

The Vertebrate Pest Specialist welcomes feedback from producers and applicators who may have some experience and/or insight regarding the following questions. Your feedback can help crowdsource important information that would be useful for creating best application practices.

- **Soil pH.** Though opinions differ, some argue that acidic soils (i.e. pH of 6.0 or less) reduce the efficacy of ZP-based baits.
- **Formulation.** Are certain formulations of ZP-based baits more effective than others? For example, what efficacy did you have if you used a grain-based formulation or a pellet-based formulation? Does grain type make a difference, namely wheat versus oats?
- **Bait Age.** Is there a difference in efficacy between fresh bait and older bait? If so, what is the maximum age of the bait for the highest efficacy. For example, should bait be less than 6 months old, 9 months old, 12 months etc.?
- **Timing.** When during the ground squirrel life cycle are they most vulnerable to ZP-based bait applications?
- **Weather.** How well did an application control ground squirrels during dew, rain and/or snow conditions? How much precipitation was present? How long did the ground squirrels have access to the bait before moisture arrived? Does one formulation have better efficacy in moist conditions than another? [Note the goal here is not that applicators apply when the weather forecast suggests rain. The point is to learn from a less than ideal application if weather conditions changed unexpectedly. We know that ZP-based baits don't do well in moisture, however, if your weather forecast was wrong, we would love to learn how well (or not) your application did.

Technical Assistance or Questions:

Stephen M. Vantassel, ACE
Vertebrate Pest Specialist
Montana Department of Agriculture
625 NE Main St., Ste 3
Lewistown, MT
Phone: 406-431-7720
Publications: <https://agr.mt.gov/Vertebrate-Pests>
e-mail: svantassel@mt.gov