

## STRYCHNINE BAITS FOR CONTROLLING GROUND SQUIRRELS AND PRAIRIE DOGS

George Matschke  
Research Wildlife Biologist  
Product Development Section  
Denver Wildlife Research Center  
Denver, CO

Field Rodent Symposium Sponsored by WRCC-95

DECEMBER 7 & 8, 1993  
RENO, NEVADA

### Abstract:

A literature search for studies of strychnine baits used to control ground squirrels and prairie dogs located two laboratory and five field studies.

In the first laboratory study, Marsh and O'Brien (1986) reported on both strychnine oats and strychnine cabbage baits for controlling Richardson's ground squirrels. This species was trapped in Nevada and tested in California. Richardson's ground squirrels refused the strychnine oat baits, with corresponding low mortality. Using strychnine concentrations of 0.2%, 0.3%, and 0.4%, ground squirrel mortality never exceeded 40% in any of the feeding trials, and overall, only 19 of 90 animals tested died. However, Richardson's ground squirrels readily consumed cabbage baits, as demonstrated during a four-day feeding trial with untreated cabbage. The ground squirrels' daily intake averaged 204 g (i.e. 66% of their body weight). Ground squirrel mortality was 100% (N = 60) when either 0.1% or 0.2% strychnine cabbage baits were fed *ad libitum*, with a challenge bait of either fresh alfalfa or untreated cabbage. Ground squirrel mortality was 95% when the 0.2% and 0.3% strychnine baits were restricted to either 5 or 10 g. The challenge bait was fresh alfalfa. Ground squirrel mortality was 90%, 60%, and 30% after feeding on 0.15%, 0.1%, and 0.05% strychnine cabbage baits, respectively. These baits were restricted to 5 g, with a challenge bait being fresh alfalfa. A simulated field test was conducted in an outdoor enclosure using alfalfa, laboratory chow, and 10 g of a 0.1% cabbage bait. After 24 h exposure to the bait, three of five ground squirrels died. One survivor consumed the entire 10 g, whereas the second survivor refused the bait.

The second laboratory test was conducted by Matschke et al. (1988). They evaluated the toxicity of three strychnine oat groat bait concentrations, 0.20%, 0.35%, and 0.50%, on eight species of ground squirrels. Significant species-specific differences were evident in the relative toxicity of strychnine in these tests. Their data suggested that three species, Franklin's (source North Dakota), Richardson's (source Colorado), and thirteen-lined (source South Dakota and Colorado) may be effectively controlled using strychnine bait concentrations at the 0.20% or lower strychnine concentrations. Four species Columbian, golden-mantled, Uinta (source Montana), and Townsend's (source Idaho) may be effectively controlled between 0.20% and 0.35%. The rock squirrel (source Colorado) may be effectively controlled with strychnine bait concentrations between 0.35% and 0.50%.

The earliest of the five field studies located using strychnine baits for controlling ground squirrels and prairie dogs was Hegdal and Gatz (1977). They evaluated an operational control program with a 0.5% strychnine oat bait for controlling Richardson's ground squirrels in Wyoming. Their results were inconsistent, as control ranged from 0 to 85%, with an overall mean of 32.8%. Although, Record (1978) reported that 0.5% strychnine steamed rolled oat groats reduced Columbian ground squirrels by 64%, and 68% and 81% when using crimped whole oats. These values are probably insufficient to control this species. For controlling Richardson's ground squirrels in Montana, Record (1978) reported 0.35% to 0.44% strychnine grain baits satisfactorily controlled this species. Broadcasting 6 or 10 lbs/swath acre, with 20 ft. between swaths, ground squirrel populations were reduced by 90% and 97%, respectively. Control was reduced when the same application rate was applied, but leaving 100 ft. between swaths. Ground squirrel reduction was 88% and 72%, respectively. Broadcasting 3 and 6 lb/acre reduced the ground squirrel populations by 87% and 60%, respectively. Handbaiting 6.2 g of strychnine grain bait per burrow entrance reduced a ground squirrel population by 94%.

Record (1978) reported 0.44% strychnine on whole oats reduced black-tailed prairie dogs by 57%. He also reported that prebaiting increased black-tailed prairie dog mortality following baiting with a 0.44% strychnine grain bait. Without prebaiting prairie dog mortality was 83.2%, 88.9%, and 73.0% compared to 95.7%, 96.3%, and 98.0% with prebaiting.

With strychnine-cabbage baits, Richardson's ground squirrels were effectively controlled (O'Brien 1985). After applying 0.1%, 0.2%, and 0.3% strychnine baits by hand at the rate of 14 g per active burrow system, ground squirrel populations were reduced 71%, 71%, and 88%, respectively. O'Brien (1978) reported Belding ground squirrels were effectively controlled by broadcast baiting of a 0.19% and 0.29% strychnine cabbage bait at the rate of 10 lb/acre. For the 0.29% bait, ground squirrel reduction was 86% for both active burrow count index and visual counts. For the 0.19% bait, ground squirrel reduction was 66% and 81% for the active burrow count index and visual counts, respectively.

Because of the injunction issued by the Minnesota District Court that prohibited the above-ground use of strychnine baits, Matschke and McCann (1993) applied strychnine-cabbage baits directly into the burrow systems. After applying 16 g of a 0.2% strychnine-cabbage bait directly into the burrow systems, ground squirrel counts declined from an average of 21.7 animals pretreatment to an average of 10.1 animals posttreatment. Differences between animal counts pre- and post-treatment were significant ( $P < 0.05$ ).