

# THE COLORADO EXPERIMENT STATION

## FORT COLLINS

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### PRELIMINARY NOTES ON THE ACTION OF STRYCHNINE ON THE WYOMING GROUND SQUIRREL (*Citellus elegans elegans*)

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This is a brief preliminary report on some experimental work to determine the reaction of the Wyoming Ground Squirrel to strychnine when applied to oats by means of Colorado Formula Number 46.

We are endeavoring especially to answer the following questions:

- (1) Does the Wyoming Ground Squirrel possess a marked resistance to strychnine?
- (2) Does resistance to strychnine vary greatly in different individuals?
- (3) Can an additional tolerance be built up by periodically feeding the poisoned oats in less than lethal doses?
- (4) Does strychnine act as an accumulative poison when fed in less than lethal doses?
- (5) Does the strychnine, when applied to oats by Colorado Formula No. 46, have any tendency to prevent the squirrels from partaking freely of this grain, either in single or in repeated doses?

In our experimental work with the Wyoming Ground Squirrel we have fed the poisoned grain to 37 caged individuals, consisting of adults, sub-adults and young but in this paper only a few of the cases are cited. By sub-adults we mean the late young of the previous season that entered hibernation before they were fully developed. The young were all about two-thirds grown.

In this group of 37 squirrels, we selected 8 adults—4 males and 4 females—all of which were fed 10 kernels of the poisoned oats the first day, and 10 kernels each day thereafter until they were killed. One of the these squirrels died the fifth day, one the sixth, one the

eighth, one the ninth, one the twelfth, one the twenty-third, one the twenty-eighth, and one the forty-eighth. The variation in the total number of kernels of poisoned oats eaten was from 50 to 475. These results suggest a widely varying inherent individual tolerance for strychnine, a tendency to build up a tolerance for the drug, which also varies much in different individuals, and a gradual accumulation of the poison in the squirrel's system. The squirrel killed on the forty-eighth day only ate 5 of the 10 kernels given on that day. Those killed the sixth, ninth, twenty-third and twenty-eighth days were males. Those killed on the fifth, eighth, twelfth and forty-eighth days were females.

One adult female, not included in this lot of 8, was killed with 10 kernels of the poisoned grain the first time she was fed.

Four other squirrels were started with 10 kernels of the poisoned oats the first day, and then 1 was fed the same amount every second day, 1 every third day, 1 every fourth day, and 1 every fifth day. The 1 fed every second day was killed at the fifth feeding; the one fed every third day was killed at the sixth feeding; the 1 fed every fourth day was killed at the eighth feeding, and the 1 fed every fifth day was killed at the ninth feeding.

An adult female squirrel was fed the poisoned grain every day, starting with 8 kernels and increasing 2 kernels at a feeding. This squirrel lived 17 days, ate 40 kernels the last day, and a total of 408 kernels during the 17 days.

This leads one to think there is a wide variation in individual tolerance and a tendency to build a tolerance which may be overtaken by repeating doses more rapidly than the poison is eliminated from the body.

Another adult female was trapped early in the morning of July 10, and was fed 15 kernels of the poisoned grain at 10:00 a. m., and an additional 15 kernels at 3:00 p.m., without ill effect. She was not again fed the poison until July 21. Then she was started with 15 kernels and was fed every second day, with an increase of 1 kernel each time, until 20 kernels at a feeding were reached. She was then given 20 kernels at each feeding for 6 days, when she died, with a total of 205 kernels taken in 11 days.

In our experiments the squirrels were fed the poisoned grain the first thing in the morning in every case. We fed them green food but once a day and that was in the morning at the same time we fed the poisoned oats which they always ate first. The green food consisted largely of dandelion, which they ate especially well. As soon as the

poisoned grain was put into the cages, and we were out of sight, the squirrels would come out of their nests and clean up the grain at once.

We have no data that even suggest that grain prepared according to Colorado Formula No. 46, is in any way distasteful to the squirrels. Two of the squirrels had slight convulsions several days before they were killed, but the next morning they were as eager as ever for their feed of the poisoned oats.

In a cage with one of the squirrels, we had two feeding dishes about 6 inches apart. In one we fed unpoisoned oats every day and in the other, poisoned oats every other day. On the days when the poisoned oats were fed, we also fed the unpoisoned ones at the same time and the squirrel would always eat the poisoned oats first. We had exactly the same experience with a Zuni prairie dog in 1925. See page 15, State Entomologist Circular No. 49, "The Zuni Prairie Dog in Montezuma Co., Colo."

The poison was applied to the oats in a manner to give as even a coating on each kernel as was mechanically possible. It hardly seems possible that the poison was so unevenly distributed on the oats as to be a dominant factor in the individual differences in the results that were obtained.

We recognize the fact, however, that in all these experiments the squirrels got the strychnine from the husks on the kernels which they quickly removed with their teeth but did not eat. The apparent variations in individual tolerance may be due, in part, to individual differences in performing this operation.

#### PRACTICAL CONCLUSIONS

Important conclusions having a bearing on the practical use of Colorado Formula No. 46, for the destruction of the Wyoming ground squirrel:

- 1.—The poisoned oats are as freely eaten as the unpoisoned oats, whether at the first or at subsequent feedings, up to the point of taking a fatal dose.
- 2.—For economic killing of ground squirrels, a sufficient quantity of the poison should be given the first time to insure their getting a fatal dose.