TRANQUILIZER-EQUIPPED TRAPS AS AN AID TO FURBEARER CENSUS[1]

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INTRODUCTION

Population density is perhaps the primary characteristic to be determined in the study of any wild population. Although the term census denotes a complete count of all animals present on a given area, in common usage it carries the connotation of a sampling procedure. There are many census methods used for various wildlife species, but these are generally broken into four basic categories as follows: total counts, sample counts, indirect methods, and indices. The first two of these involve direct counting of animals present, either totally or in part. Indirect methods include pellet group counts, track counts, etc. Indices are based on counts of marked animals recovered from bag returns or during recapture procedures.

Since 1954, the University of Georgia has conducted an annual furbearer "census" on the Savannah River Project which comprises some 200,000 acres in portions of Aiken, Barnwell, and Allendale counties, South Carolina. This yearly operation is by no means a true census, as data obtained are not used for estimating numbers of animals. Results of the "census" are used as an indication of the population trends and species composition of the more important furbearers present on the SRP. The major species included are the gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), and red fox (*Vulpes fulva*). The "census" is conducted each November by trapping animals along ten permanent traplines located on the project. One hundred number two steel traps are used. These are placed ten to a line at intervals of two-tenths miles. These lines are run for seven nights, or 700 trap nights, with traps being checked and reset (where needed) once daily.

Despite their low cost, high degree of efficiency, and relative ease of handling, steel traps have the distinct disadvantage of frequently inflicting severe lesions and broken bones upon the animals caught. A recent development, reported by Balsar (1965) has alleviated much of the self-damage suffered by steel-trapped animals through the use of tranquilizers attached to one jaw of the trap. The tab containing the drug is chewed by the trapped animal in its anxiety to become free, and ataxia is induced. The primary purpose of this paper is to report the results of trapping wild animals using such tabs during the SRP furbearer "census" of November, 1965.

OBJECTIVES

1. To test the application of tranquilizer tabs under southeastern conditions.
2. To determine tab dosage.
3. To evaluate the effect of tabs on trapping success.
4. To determine the efficiency of tabs in preventing trap damage to wild animals.

METHODS

Tranimul[2] was chosen as the tranquilizing agent. An efficient method of delivering the tranquilizer into the digestive tracts of steel-trapped animals involves the use of homemade tablets (tabs) containing the tranquilizing agent. These were made from gauze, vaseline, cotton

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twine, steel wire, and household wax as follows: A piece of gauze 2 x 12 inches was folded in such a manner as to obtain a three-ply strip, four inches in length. Vaseline was then smeared evenly over one surface of the flat strip. This acted as a binding agent to hold the drug. The tranquilizer was then sprinkled evenly over the binding surface. The two edges of the strip along the long axis were folded inwardly until they met in the center, so as to completely inclose the drug within the gauze. The folded strip was rolled tightly along the long axis to form a solid cylindrical body. This was bound by a short length of cotton twine. A piece of 18-gauge steel wire, six inches in length, was inserted through the central axis of the tab, leaving equal lengths of wire on either side. The ends of the wire were twisted together for a distance of ½ inch below the tab. Enough wire was left below the twist for attachment to the trap. The tab was dipped three times in hot, liquified household wax, which acted as a waterproofing substance. Each tab was affixed to a separate No. 2 Victor steel trap, with the tab ½ to one inch above the closed jaws. All traps were secured to light drags, four or five feet in length. The set trap, attached tab, and drag chain were buried ¼ - ½ inch beneath the surface of the soil. Bobcat urine obtained from caged animals was used to scent the drag at the point of chain attachment.

After an apparent optimum dosage had been determined in preliminary studies, tabs containing this dose were prepared for use during the annual "census." The yearly operation was begun on November 15, 1965. One hundred No. 2 steel traps were set, ten to a line in roadside ditches along the ten permanent traplines. The distance between traps was two-tenths miles. The method of setting these traps was the same as previously described. Tabs were affixed to each odd numbered trap on each line to satisfy objectives three and four. Each morning during the census all traps were checked and rescented, reset, and retabbed wherever necessary. This procedure was followed until a total of 700 trap nights undisturbed by rain were recorded.

RESULTS

During preliminary trapping in September and October of 1965, a total of 12 animals was caught in tabbed traps. Three species, gray fox, raccoon, and bobcat, were trapped. These varied in distribution with each dose used. The tabs used were readily chewed by animals caught, with the exception of raccoons. Of the three raccoons trapped, one at 300 mg. and two at 100 mg., none chewed the tab. However, tabs were readily chewed by the eight gray foxes and one bobcat. This indicated that the tabs were workable, at least on two of the three species sampled.

Of the nine animals which chewed the tabs, four were gray foxes caught at 100 mg. Three were gray foxes at 200 mg. One was a bobcat at 200 mg., and one was a gray fox at 300 mg. Data obtained indicated that the apparent optimum tab dosage was 200 mg. tranimul. All animals chewing tabs containing this dose were taken into deep ataxia, while animals ingesting the 100 mg. tabs showed little or no effects from the drug. The only animal which chewed a 300 mg. tab was killed by dogs before it could be removed from the trap. Minimum recovery times of animals chewing 100 mg. doses were 11 and 10 hours, with an average of 10.5 hours. At 200 mg., minimum recovery times were 36, 41, and 36 hours. The average was 36 hours (Tables 1-2).

Data also indicated that the effects of temperature, moisture, etc., were nil. Some of the tabbed traps remained in the field from September 7 to October 22, periodically being closed and reopened. After six weeks of exposure, these tabs were still effective.

The annual "census" was terminated on November 22, 1965. At the end of seven nights' trapping, a total of 71 animals had been caught during 700 trapnights undisturbed by rain. Six species were sampled: gray fox, raccoon, opossum (*Didelphis virginianus*), bobcat, red fox, and feral dog (*Canis familiaris*). The proportion of each species in the sample was similar to that reported by Wood and Odum (1964) for nine years'

trapping data on the SRP. Of the 71 animals caught, 41 or 57.7% were captured in odd-numbered (tabbed) traps. This indicated that the tabs had no detrimental effect on trapping success; 38 of 41 animals (92.7%) caught in tabbed traps ingested the tab (Table 3).

Only nine of the 41 animals (21.9%) caught in tabbed traps during the "census" suffered severe injury, while 17 or 56.7% of the 30 animals caught without the tab showed severe injury. All animals caught during the yearly "census" were classified as to severe or slight injury. A chi square test as described by Moroney (1956) applied to the raw data indicated that the use of tabs significantly reduced severe trap damage at the .5% level (Table 4).

TABLE I

Date	Species	Sex	Wt. (lbs.)	Dosage	Remarks
9- 7-65	bobcat	F	12	200 mg	deep ataxia—36 hr.*
9- 8-65	raccoon	F	3	100 mg	tab not chewed
9-10-65	raccoon	M	14	100 mg	tab not chewed
9-11-65	raccoon	F	12	300 mg	tab not chewed
9-14-65	gray fox	F	9	200 mg	deep ataxia—31 hr.*
9-28-65	gray fox	F	9	100 mg	slight ataxia—11 hr.*
10-10-65	gray fox	M	10	300 mg	Killed by dogs
10-11-65	gray fox	M	10	100 mg	slight ataxia—10 hr.*
10-21-65	gray fox	M	9	100 mg	No effect
10-21-65	gray fox	F	9	200 mg	deep ataxia—41 hr.*
10-21-65	gray fox	M	8	100 mg	No effect
10-22-65	gray fox	F	9	200 mg	deep ataxia—36 hr.*

* Minimum recovery time

TABLE II

Dosage	Species	Observations	Tab efficiency	Avg. time to recover
100 mg	raccoon	2	00%	— —
100 mg	bobcat	0	—	— —
100 mg	gray fox	4	50%	10.5 hrs.
200 mg	raccoon	0	—	— —
200 mg	bobcat	1	100%	36 hrs.
200 mg	gray fox	3	100%	36 hrs.
300 mg	raccoon	1	00%	— —
300 mg	bobcat	0	—	— —
300 mg	gray fox	1	—	— —

TABLE 3

Species	Tot. No. caught	No. caught in tabbed traps	Number ingesting tabs
gray fox	41	22 (53.7%)	19 (86.4%)
raccoon	18	11 (61.1%)	11 (100.0%)
opossum	6	5 (83.3%)	5 (100.0%)
bobcat	3	2 (66.7%)	2 (100.0%)
red fox	2	1 (50.0%)	1 (100.0%)
feral dog	1	0 (00.0%)	— — —
TOTALS:	71	41 (57.7%)	38 (92.7%)

TABLE 4

	Severe damage	Slight damage	Totals
Treated	(a) 9	(c) 32	(e) 41
Untreated	(b) 17	(d) 13	(f) 30
Totals	(g) 26	(h) 45	(k) 71

$$X^2 = \frac{(bc-ad)^2 k}{efgh}$$

$$X^2 = 8.99$$

Tabular value $X^2 = 7.88$, df $= 1$, at .5% level

DISCUSSION

The severity of trap injuries suffered by animals trapped during the study was based on the authors' judgment, and a brief description of "severe" and "slight" injuries as used in the classification of animals caught is necessary. Severe injuries were considered to be deep lesions extending to the bone, broken bones, or a combination of the two. Slight injuries consisted of shallow cuts, broken skin, or no noticeable damage.

The frequency with which severe injuries occurred was much less in traps with affixed tabs. However, a considerable proportion (21.9%) of the animals caught in tabbed traps suffered injuries described as severe. A possible explanation for this is the fact that some severe injuries can be inflicted upon animals by the trap as the jaws spring shut. Also, several minutes pass between ingesting of the drug and onset of ataxia.

Tabs were ingested by all species caught in tabbed traps during the census. The only animals which had the opportunity to chew tabs and did not were three of the 22 gray foxes caught in treated traps. All raccoons sampled in such traps readily chewed the drugged tab. This was contrary to less complete observations made during preliminary studies.

The 200 mg tranimul dosage used during the "census" was appreciably lower than 500 mg diazepam suggested for foxes by Balsar (1965). However, the 200 mg dose which seemed to be optimum during trapping operations in September and October appeared to be somewhat light during the November "census." Six of the 38 animals (15.8%) ingesting tabs showed no external symptoms of being "drugged." Many which ingested the tabs showed only slight ataxia. This was believed to be caused by the wide variation in the amount of tranimul actually entering the digestive tract. Also, temperatures were somewhat lower during the November trapping than those experienced in preliminary investigations in September and October. Data on recovery times of animals ingesting tabs during the "census" were not obtained.

Although the tranquilizer tabs did not work to full expectations, they did accomplish significant reduction in trap damage suffered by steel-trapped furbearers. Also, the use of tabs enables trapped animals to be handled a good deal easier.

CONCLUSION

Steel traps have long been used as a means of collecting animals for biological purposes. However, such traps have the distinct disadvantage of inflicting severe damage, either directly or indirectly, upon the animals caught. The major portion of such damage seems to occur as the trapped animal struggles to become free.

As a means of reducing self-inflicted injury to steel-trapped animals, tranquilizer tabs were constructed for use on steel traps. After an apparent optimum dosage of 200 mg tranimul was determined for fox, bobcat, and raccoon, tabs were affixed to 50 of the 100 steel traps used during the 1965 SRP furbearer "census." A total of 350 trapnights

each was recorded for tabbed and untabbed traps in November of 1965. The tabs apparently had no ill effect on trapping success, as 41 of the 71 animals caught were captured in treated traps; 92.7% of all animals caught in tabbed traps ingested the affixed capsule. Tabs were also shown to be relatively weather-proof during preliminary investigations.

Results of a chi square test applied to data gathered during the 1965 "census" indicated that the use of such tabs significantly reduced trap damage (0.5% confidence level) suffered by steel-trapped animals, and thus should contribute to more efficient recapture census data.

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PROGRESS IN CAPTURING TURKEYS WITH DRUGS APPLIED TO BAITS[1]

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A recent article (Williams 1966) reported results of field trials in Florida during late 1964 and early 1965 to develop a technique for capturing wild turkeys (*Meleagris gallopavo*) with alpha-chloralose administered on bait. About 260 turkeys had been captured with alpha-chloralose at the time of that report. Since then 573 more have been captured with alpha-chloralose and 83 with another drug.

Chloralose is a relatively tasteless, white powder of low solubility in water. It is related chemically to chloral. The alpha isomer is responsible for the compound's sleep-inducing qualities (Borg 1955: 118). Alpha-chloralose can be purchased from Fisher Scientific Company, 690 Miami Circle, N. E., Atlanta, Georgia 30319; Nutritional Biochemicals Corporation, 21010 Miles Avenue, Cleveland, Ohio 44128; or British Drug Houses, Canada Ltd., Barclay Avenue, Toronto 18, Ontario.

Information about the drug's history, chemical nature, and effects on some species of animals is available from Lumb (1963), Murton, *et al.* (1963), Borg (1955), and in the references listed by them. Its use for capturing Canada geese is reported by Crider and McDaniel elsewhere in these proceedings.

Through personal communications we have learned that alpha-chloralose is being used experimentally on turkeys and other species elsewhere in the United States, but we have not attempted to learn how widely the technique is being employed at this time.

After anesthetizing nearly 1,000 wild turkeys with orally administered drugs during the past two years, we are able to suggest some important considerations for the successful use of alpha-chloralose and similar compounds to capture wildlife. We will describe the current capturing technique; suggest caution against some of its drawbacks; present some preliminary information on a new and possibly better drug called methoxymol; and suggest a few facets which need further investigation.

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