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FIELD EVALUATION OF PADDED JAW COYOTE TRAPS: EFFECTIVENESS AND FOOT INJURY

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ABSTRACT: A field study of unpadded and padded foothold coyote traps was undertaken in six western states in 1986-1987. Tests were designed to determine the capture efficiency and extent of foot injury caused by different trap modifications. Results were similar to an earlier study undertaken in 1984-85 that showed padded traps reduced foot injury but captured and held fewer animals than did unpadded traps. Both studies showed that unpadded long-spring traps used operationally by Federal Animal Damage Control specialists were the most effective (75-78% capture rate) but caused more foot injury. Padded long- spring traps were intermediate in efficacy (52-57%) and foot injury, while padded "Soft Catch"™ traps were the least effective (30-58%) but caused the least injury to captured coyotes.

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INTRODUCTION

Opposition to foothold traps for capturing furbearers has increased in recent years commensurate with urbanization, changing social values, and the proliferation of animal welfare and animal rights organizations (for example, Arthur 1981, Kellert 1981). These groups, as well as certain other factions of the public, seek to prohibit or restrict trapping for furs and as a wildlife management technique (Herscovici 1985, Linhart 1986, Gentile 1987). Such anti-trap pressures have resulted in research aimed at increasing the effectiveness of kill-type traps, and at reducing the trauma and physical injury to animals taken in foothold traps (Balser 1965, Manthorpe 1979, Berchielli and Tullar 1980, FPCHT 1981, Linhart et al. 1981, Novak 1981, Saunders and Rowsell 1984, Tullar 1984, Olsen et al. 1986).

In a 1984-85 field study, we found that Victor No. 3 Soft Catch™ (padded) traps[1] and Victor 3NR[1] traps affixed with similar pads reduced foot injury but were less efficient than were the unpadded 3 NM traps used by the Federal Animal Damage Control (ADC) program (Linhart et al. 1986, Olsen et al. 1986). The objectives of the present study were to further evaluate unpadded and padded traps with respect to (1) efficacy, or the percent of time they caught and held coyotes, (2) foot injury sustained by captured coyotes, (3) results of recent trap modifications made by the manufacturer (Woodstream Corp., Lititz, Pennsylvania), (4) the effects of differing chain lengths and points of attachment on foot injury, and (5) whether results differed from those reported in our earlier 1984-85 field study.

[1]Reference to commercial products in this paper is for purposes of identification and does not imply endorsement by the authors or their agencies.

METHODS

Trap-types

Two basic types of traps were tested in 1986-87. The first was a Victor No. 3 double-coil spring trap with padded jaws and a center-mounted 15-cm-long trap chain. A small (1.3 cm x 4.0 cm) coil spring was attached midway on the trap chain to absorb the shock of captured animals seeking to escape. This trap was sold as the "Soft Catch"™ by the Woodstream Corporation. The second type trap was a Victor No. 3 double long spring trap having either stamped (NR) or malleable (NM) jaws. The Victor No. 3 NM trap routinely used by the ADC program is equipped with a standard 90-cm-long kinkless trap chain swivel-mounted to one spring. The long-spring traps, also made by Woodstream, were modified in several ways; i.e., adding pads to jaws, altering chain length, and changing the point of chain attachment. Pads were affixed to the stamped jaws of a production model long-spring trap specifically for our test. Woodstream engineers stated that traps could be installed only on stamped jaws because the malleable jaws on the 3 NM trap were not suitable for drilling and tapping to accept the screws holding metal pad covers. All trap types and modifications thereof tested in 1984-85 (Linhart et al. 1986, Olsen et al. 1986) and in the present study are shown in Table 1. For reasons of economy, we did not test all combinations of trap types, unpadded and padded jaws, chain length, and chain attachment for both injury and efficacy effects during both test periods, nor was this deemed necessary to assess the results of modifying taps. Traps with and without pads were tested to determine both injury and efficacy, whereas chain length and point of attachment were evaluated solely for the purpose of determining this effect, if any, on the degree of injury sustained by captured animals.

Table 1. Victor No. 3 coyote traps with and without padded jaws tested for efficacy and foot injury during 1984-85 and 1986-87.

Trap	Jaw type	Trap description	Chain length (cm) and where attached[a]
A	padded	Soft Catch™ with No. 3 size double coil springs	15--center mount
B	padded	Soft Catch™ with No. 1.75 size double coil springs[b]	15--center mount
C	padded	NR double long spring	90--center mount
D	padded	NR double long spring	15--center mount
E	unpadded stamped	NR double long spring	90--center mount
F	unpadded malleable	NM double long spring	15--center mount
G	unpadded malleable	NM double long spring[c]	90--spring mount

[a]All 15-cm chains were affixed with the Woodstream shock-absorbing spring.
[b]Production model Soft Catch™ Trap.
[c]Standard ADC Program trap used in all western states except Texas and Oklahoma.

Results of the 1984-85 field test dictated, in part, the trap modifications we evaluated in the current study. Subsequent to the 1984-85 test, Woodstream made two changes to their Soft Catch™ system to correct problems that were believed responsible for the lessened efficacy of their padded traps. First, pad durometer and other unspecified pad composition changes were made and a quality control check of pads was initiated prior to installation. Second, a problem of upward trap pan "creep" was reportedly resolved by repositioning the fulcrum point of the pan shank on the Soft Catch™ trap. In response to suggestions from ADC Program field personnel, we also asked Woodstream to provide us with a Soft Catch™ trap having stronger coil springs (Trap A) than those on the Soft Catch™ being sold commercially at the time of our tests (Trap B).

Procedure

Assessment of foot injury was made in the same manner as that reported earlier by Olsen et al. (1986). Briefly, traps were set out by two of us (Blom and Dasch) on trap lines located in south Texas during December 1986 and January and February 1987. Traps were set along ranch roads at likely locations and checked daily; however, animals were removed from traps only every other day to simulate a 48-hr trap check law. Trapping continued until a minimum of 20 coyotes per trap type were caught. Animals were shot and both front legs removed by dissecting between the scapula and rib cage. Legs were tagged, frozen and later x-rayed and necropsied at the Louisiana State University, School of Veterinary Medicine, Baton Rouge. At least 20 coyote legs per trap type and 20 legs for the control group (i.e., from a sample of the same animals but not held by traps) were scored for injury according to the numerical system developed by V.F. Nettles and modified by Olsen et al. (1986). The number of points assigned to each leg was dependent on the type and severity of injury; for example, a normal or uninjured leg received a "0" point score and a compound fracture or amputation received 200 or 400 points, respectively. Thus, the higher the score the greater the injury (see Olsen et al. 1986 for details).

Capture efficacy tests were conducted using methods described by Linhart et al. (1986). We again used six trappers (four were the same individuals as in 1984-85) located in California, Colorado, New Mexico, Nevada, Oklahoma, and Texas. The identical three unpadded and padded traps tested in 1984-85 were again tested (trap types B, D, and G), as well as a fourth (trap type A) that differed only from trap B by having stronger (size 3) coil springs. The test was conducted from October 1986 to January 1987, depending upon when conditions were suitable for ADC field personnel to set traps and run trap lines. Each trapper used his preferred trap sets, odor lures, or baits, and staked and set traps at the most likely trap locations. The four trap types were alternated along the trap line and thus equal numbers of each type were set by each trapper. Traps were checked daily and captured coyotes were removed. Each trapper completed a daily field data sheet and recorded information that included four variables: unsprung traps with coyote tracks on the trap pan, traps sprung by coyotes, traps holding coyotes that escaped prior to check, and coyotes caught and held. As in 1984-85, we combined the data for the two types of unpadded ADC traps used operationally (trap G used in California, Colorado, New Mexico, and Nevada and the No. 4 Newhouse used in Oklahoma and Texas) since the catch rates for both types were similar.

The Kruskal-Wallis test, a nonparametric analog of the one-way ANOVA, was run on injury scores for the seven trap types and the two control groups for both 1984-85 and 1986-87. Given a significant result for that test, nonparametric multiple comparisons among the 9 treatments were run at an experiment-wise error rate of .05 to indicate where differences existed among the treatments.

Trap efficacy was defined as the number of captures for a trap type divided by the number of capture opportunities (equal to the sum of the number of coyotes that stepped on trap pans, sprung traps, were caught but escaped, or were caught and held). Capture efficacies for each trap type from each trapper were analyzed in randomized block ANOVA's where each trapper formed a block. Duncan's multiple range tests were used to locate the differences among capture efficacies for the 3 trap types tested in 1984-85 and the 4 trap types tested in 1986-87.

RESULTS AND DISCUSSION

Mean injury scores for both 1984-85 and 1986-87 are shown in Table 2. All nine mean scores for both the seven different trap types and for the two control groups were significantly different from each other. Although not held in traps, control legs received minor injuries (x scores = 1.3 and 3.0) because trapped coyotes may injure themselves on vegetation and obstructions adjacent to the trap site. The extent of injury sustained will vary depending upon habitat and terrain. Coyotes taken in padded traps, regardless of type, sustained less injury than those taken in unpadded traps. For reasons unknown, the Soft Catch™ trap with the stronger size 3 springs (Trap A) had a significantly lower injury score than the same trap with the smaller 1.75 size coil springs (Trap B). Both Soft Catch™ traps caused less injury than padded long-spring traps (Traps C and D). The padded long-spring trap with a longer (90 cm) center-mounted chain (Trap C) resulted in less injury than padded long spring traps with a shorter (15 cm) center-mounted chain with shock spring (Trap D). The 3 NM trap with unpadded malleable jaws (Trap F) caused less injury than the unpadded 3 NR having stamped jaws (Trap E), although differing chain lengths may also have caused some or all the difference in injury. Unpadded 3 NM traps with the 15-cm center-mounted chain (Trap F) caused less injury (more than 50%) than the same trap with the 90-cm long-spring-mounted chain (Trap G). Thus, the data for traps F and G contradict earlier information that suggested shortened chains on unpadded traps had no effect on injury rates (Linhart et al. 1981).

Table 2. Foot injury scores and mean capture efficacy for coyotes taken in unpadded and padded traps in 1984-85 and 1986-87.

Trap type	$\bar{x}$ injury scores[a] 1984-85	$\bar{x}$ injury scores[a] 1986-87	$\bar{x}$ capture efficacy[b] 1984-85	$\bar{x}$ capture efficacy[b] 1986-87
A	--	17.1 (21)	--	37%
B	28.6 (21)	--	58%	30%
C	40.0 (20)	--	--	--
D	50.2 (21)	--	52%	57%
E	96.9 (21)	--	--	--
F	--	73.3 (20)	--	--
G	--	152.7 (22)	75%	78%
Controls	3.0 (20)	1.3 (20)	--	--

[a]Sample sizes are shown in parentheses.
[b]Mean capture efficacy was calculated by averaging the efficacies from each trapper for each of 6 states.

The capture efficacy field test resulted in a total of 186 coyote visits to the four trap types (range = 43-51 visits per type); 100 coyotes were captured and held. The Duncan's multiple range tests indicated that in both 1984-85 and 1986-87 Soft Catch™ traps (A and B) had significantly lower capture rates than the unpadded 3 NM (Trap G) used by ADC Program personnel. The padded long-spring 3 NR trap (D) performed better than the Soft Catch™ trap, but not as well as the unpadded 3 NM trap (G). Obviously, the differences in trap performance shown in Table 2 would result in greatly reduced efficacy for taking individual coyotes which are killing livestock.

Our data clearly show that use of the padded traps developed to date, at least for coyotes, would result in lowered capture efficacy. Linscombe and Wright (unpubl. data) have also shown that padded traps were less efficient for taking coyotes[2]. However, in some instances (in the southeast, for example) where valued fox or raccoon hunting dogs are allowed to roam unattended, padded traps may be a recourse for taking depredating coyotes. Further, it should be noted that for some other furbearers capture efficacy is the same whether traps are padded or not (Linscombe and Wright, unpubl. data) with padded traps significantly reducing injury to captured animals (Olsen et al., unpubl. data). Thus, each field situation should be reviewed as to the types of capture devices required to manage furbearers.

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[2]Subsequent to both of these field tests, the Woodstream Corporation shortened the levers on their Soft Catch™ trap to increase the closing speed. No published data on the capture efficacy of this most recent model are currently available.

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