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## EFFICIENCY OF PADDED FOOTHOLD TRAPS FOR CAPTURING TERRESTRIAL FURBEARERS

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In recent years trapping of furbearers has been criticized as being inhumane, and numerous attempts have been made to abolish trapping in the United States (Gentile 1987). One reaction in the wildlife profession has been to encourage and support the development and use of more humane traps. The Soft-Catch® trap (Woodstream Corp., Lititz, Pa.) is designed to reduce injuries while maintaining acceptable capture efficiency (reference to trade names or companies does not imply endorsement). The Fur Resources Committee of the International Association of Fish and Wildlife Agencies designed and implemented a study, which was conducted in 9 states, to evaluate the efficiency of the Soft-Catch trap. We report on a comparison of capture efficiency between padded-jaw foothold traps and standard steel-jaw traps.

#### METHODS

We compared Victor "fox" and "coyote" Soft-Catch padded traps and Nos. 1½ and 3 Victor coil spring

traps. Minor modifications to the standard traps included moving the side-mounted chain to the center and replacing the square jaws with rounded jaws on the No. 3 traps.

Furbearer biologists in each state were responsible for selecting trappers and supervising record keeping. Fifty-one trappers participated in the study during 1984-1985. Each trapper was supplied with 12 Soft-Catch traps and 12 standard traps, which were alternated along traplines. Trapping procedures (lures and type of set) varied among trappers and even along a trapline, but care was taken to insure that equal numbers of both trap types were used with each technique. All traps were set on dry ground and staked securely. Each trapper was assigned a quota for each trap type for 1 species and was instructed to continue trapping with both types of traps until the quota was reached. This requirement insured that both trap types were used in about equal numbers for all weather conditions encountered.

We pooled results where statistical tests indicated that no differences could be detected between states. Georgia, Louisiana, Minnesota, Mississippi, New York, and Texas (partial) composed Region 1. Region 2 was defined as Arizona, Kansas, and Texas (partial); and Region 3 included only Idaho.

Region 1 alternated the No. 1½ standard and "fox" padded traps for the capture of bobcats (*Felis rufus*), red foxes (*Vulpes vulpes*), gray foxes (*Urocyon cinereoargenteus*), and raccoons (*Procyon lotor*). Trappers in

Table 1. Trapping success for 6 species of furbearers using padded and standard foothold traps in 8 states, 1984–1985.

Region	Trap type	No. captured <sup>a</sup>	No. missed <sup>b</sup>	No. escaped <sup>b</sup>	Potential captures <sup>c</sup>	Catch rate <sup>d</sup>
1	Padded	450	84	64	598	75.2
	Standard	551	42	28	621	88.7
2	Padded	170	25	24	219	77.6
	Standard	204	6	9	219	93.2

<sup>a</sup> Bobcats, coyotes, gray foxes, red foxes, raccoons, opossums, and skunks.

<sup>b</sup> Includes some unidentified species.

<sup>c</sup> Potential captures = No. captured + No. missed + No. escaped.

<sup>d</sup> Catch rate = No. captured/potential captures.

regions 2 and 3 used No. 3 standard types and the “coyote” padded traps to capture bobcats and coyotes (*Canis latrans*).

We defined potential captures as the sum of all animals captured, plus those that sprung traps but were not captured, and those that were temporarily caught but escaped. Capture rate was then defined as the number captured divided by the potential captures. We tested capture efficiency with the Chi-square statistic using either contingency tests or goodness-of-fit tests.

## RESULTS

A total of 10,586 trap-nights with the smaller traps used in Region 1 yielded 2,216 visits to traps with no evidence to suggest that visitation rates were different between padded and standard traps ( $P = 0.92$ ). The larger traps used in Region 2 resulted in 6,411 trap-nights with 730 visits and again no evidence to suggest a difference in visitation between trap types ( $P = 0.68$ ). On the other hand, Region 3, with 2,650 trap-nights, had 128 visits, 58% of which were to the standard trap ( $P = 0.035$ ).

The padded traps were more likely to spring without being visited by an animal than were standard traps, for both sizes of traps ( $P < 0.01$ ). However, only 1.5% of the “fox” padded traps were found sprung spontaneously, compared to 1.0% of the No. 1½ standard traps. With the larger “coyote” padded traps, 1.1% were sprung versus 0.5% of the No. 3 standard traps.

The potential captures were approximately the same for both types of traps in Region 1 ( $P = 0.49$ ) (Table 1). Identical numbers of po-

Table 2. Numbers of furbearers captured in padded and standard foothold traps tested in 6 eastern states (Region 1), 1984–1985.

Trap type	Bobcat	Gray fox	Raccoon	Opossum	Trap-nights
Padded	10	53	153	148	5,356
Standard	29	55	186	138	5,230
$P^a$	0.01	0.75	0.05	0.70	

<sup>a</sup> Probability that the catch per trap-night is the same for each type of trap.

tential captures were found in Region 2. For both size traps, the number of furbearers caught was lower for the padded traps, and the misses and escapes were higher ( $P < 0.01$ ). In Region 1, raccoons, opossums (*Didelphis virginiana*), and skunks (Mephitinae) composed 72% of the total captures, which weighted the results toward these species. In Region 2, these species composed only 37% of the captures.

The “fox” padded trap caught fewer bobcats ( $P < 0.01$ ) and raccoons ( $P = 0.05$ ) than the No. 1½ standard trap (Table 2). However, data from trappers who were setting primarily for foxes and bobcats indicated no difference in raccoon captures (63 in padded, 62 in standard) with the 2 trap types ( $P = 0.92$ ). No difference was found between the numbers of gray foxes or opossums caught in different trap types ( $P > 0.70$ ). However, capture of red foxes with the 2 trap types was statistically different in the 2 northern states (13 in padded, 23 in standard;  $P = 0.06$ ), but not different in the 3 southern states (30 in padded, 32 in standard;  $P = 0.79$ ). Trappers using the “coyote” padded traps in Region 2 caught 27 bobcats compared to 35 with standard traps ( $P = 0.23$ ). The number of coyotes captured was lower with padded traps (47) than No. 3 standard traps (78) ( $P < 0.01$ ). The difference in the number of coyotes captured can be attributed to more animals being missed with the padded traps (13 vs. 4) and more escaping (21 vs. 3) after temporary capture.

In Region 3 the number of coyotes captured with padded traps (6) was significantly lower than with standard traps (22) ( $P < 0.01$ ).

## DISCUSSION

During the first month of trapping, the investigators became aware that a quality control problem with the rubber pads had occurred, and that an unknown proportion of the traps had improperly cured pads. Woodstream Corporation officials suggested that these improperly cured pads may have allowed animals to escape, especially likely with coyotes. The pan creep problem described by Linhart et al. (1986) was detected in the "coyote" padded traps we used and could explain the low capture rates. According to Woodstream, the "coyote" padded trap has been redesigned to eliminate pan creep, and measures have been taken to ensure better quality control in manufacture of the pads.

Similar visitation rates in Regions 1 and 2 indicated that trap site selection was comparable for both trap types. No evidence was found to indicate that animals avoided padded traps in the 2 regions. However, differential visitation rates in Region 3 suggested that either trap site selection was not comparable or the padded traps were more readily detectable.

This study was based on the assumption that experienced trappers could set standard and padded traps with equal expertise. This may not be a valid assumption. Differences in the amount of soil used to cover the traps and adjustment of pan tension might influence capture rate. Because padded traps close slower than standard traps (Linhart et al. 1986), setting technique would be important in the capture of some species. Undoubtedly, a learning process is involved when using any new trapping system. All trappers in this study had much more experience with standard traps.

Other biases may have been present. This was indicated by analyzing the raccoon data first as a whole (most of the samples coming from raccoon trappers), then analyzing the raccoon captures coming only from trappers setting primarily for foxes and bobcats. This

incidental catch, which indicated no difference in the trap types, is believed to be the least biased and probably the most accurate comparison of the traps.

With the sample of approximately 100 for each species of fox, we could have detected differences in capture rate of about 30%. The difference in the performance of the padded trap for these 2 species remains unexplained. Linhart et al. (1986) reported catching 44 coyotes with standard traps and 34 with padded traps, which is nearly the same ratio we found, and suggests that padded traps might be expected to catch about 66% (81/122) of the coyotes that could be captured with standard traps. However, as trappers learn to set new traps properly and with modifications to improve the traps, we expect this difference to decrease. Preliminary analysis of data from Alberta indicates that the "coyote" padded and the standard No. 3 traps performed similarly in capturing coyotes (Arlen Todd, Alta. Fish and Wildl. Div., pers. commun.).

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