Performance of the Paws-I-Trip™ pan tension device on 3 types of traps

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Pan tension device found to reduce capture of nontarget animals without reducing traps' effectiveness in capturing coyotes

Accidental capture of nontarget animals in traps has decreased in recent years with development and increased use of pan tension devices (PTD). Turkowski et al. (1984, *J. Wildl. Manage.* 48:700–708) concluded that 3 PTD's tested reduced nontarget captures but also reduced the efficiency of the traps for capturing coyotes (*Canis latrans*). The pan tension concept developed further after 1984. Since November 1989, U.S. Department of Agriculture (USDA) Animal Damage Control (ADC) policy has mandated use of PTD on foothold traps in all ADC operations.

We evaluated the relative selectivity and efficacy of the Paws-I-Trip™ (PIT) pan tension system (M-Y Enterprises, Homer City, Pa.) for 3 types of traps commonly used by ADC personnel for coyote depredation problems. Mention of trade names is for identification purposes only and does not constitute endorsement by the USDA or the authors.

Methods

Fifteen Animal Damage Control Specialists (ADCS) in 8 western states (California, Idaho, Montana, Nevada, North Dakota, Oklahoma, Oregon, and Texas) from the U.S. Department of Agriculture's (USDA) ADC program participated in this study. Each ADCS was provided with 36 PIT pan tension kits to modify traps in his inventory and a force gauge (Rocky Mountain Wildlife Products, Laporte, Colo.) to determine pan tension. Traps equipped with PIT kits were used by participants during routine duties in responding to coyote depredation complaints.

The PIT system has 2 major components: the pan and the dog (Fig. 1.). The system uses the set trap's static force to create pan tension. Foothold traps are set by compressing the levers or springs which allow the trap jaws to open. The dog latched to the pan holds the jaws in place. The pan functions as the triggering mechanism when a specified force is applied. Pan tension can be regulated by bending the dog up or down; a 5° upward or downward bend 1.7 cm from the end of the dog will increase or decrease pan

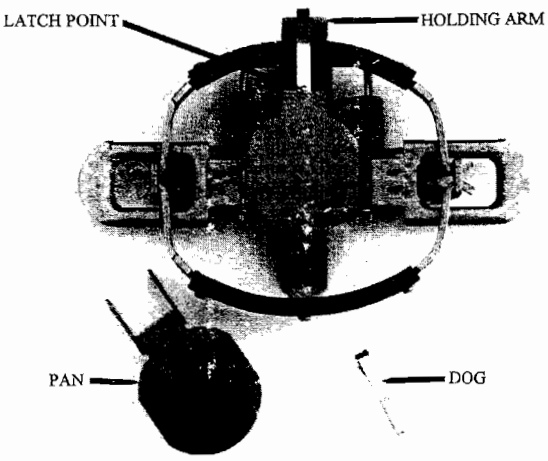

Fig. 1. No. 3 Soft Catch® trap equipped with a Paws-I-Trip™ pan tension system.

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tension by approximately 227 g, respectively. Therefore, by changing dog length and by bending the holding arm to level the pan, specific pan tension can be achieved.

We evaluated 3 types of coyote traps: the No. 3 Victor Soft Catch®, Victor 3NM®, and No. 4 Newhouse® (Fig. 2). All trap types were manufactured by Woodstream Corp., Lititz, Pa. Soft Catch traps were used by participants in California; Newhouses in Oklahoma and Texas, and 3NM's in Idaho, Montana, Nevada, North Dakota, and Oregon. Each participant was provided with a device to measure pan tension and instructed to set the tension on the test traps at 1.4–1.8 kg. Traps were checked according to ADC policy and state wildlife agency regulations.

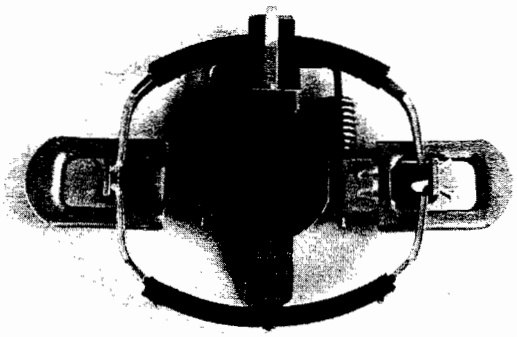
Each participant recorded the following data from May 1993 to August 1994 when they checked traps: (1) species captured, (2) animal tracks on the pan, (3) species springing trap, and (4) soil type and condition. A visit was defined as an incident in which an animal stepped on or within the margin of the pan and was either captured or excluded. An incident in which an animal stepped on the pan but did not spring the trap was designated an exclusion.

Designated nontarget species included swift (*Vulpes velox*) and kit (*V. macrotis*) foxes, gray foxes (*Urocyon cinereoargenteus*), striped skunks (*Mephitis mephitis*), Virginia opossums (*Didelphus virginiana*), jackrabbits (*Lepus* spp.), cottontail rabbits (*Sylvilagus* spp.), nine-banded armadillos (*Dasypus novemcinctus*), rodents, and small birds. We expected that larger animals that weighed approximately as much as coyotes such as raccoons (*Procyon lotor*), bobcats (*Lynx rufus*), porcupines (*Erethizon dorsatum*), and red foxes (*Vulpes vulpes*) would also be caught.

Exclusion rate for each species was calculated by dividing the number of animals that were excluded by the number that stepped on the pan. Capture rate was the number of coyotes caught and held divided by the number that stepped on the pan. Pearson's chi-square and Fisher's exact test were used to compare capture and exclusion rates among different trap types by species or groups of species. This study followed a protocol approved by the Denver Wildlife Research Center's Animal Care and Use Committee.

Results

Eight hundred twenty-six designated nontarget animals and 902 coyotes visited PIT-equipped traps resulting in the capture of 22 nontargets and 771 coyotes. Mean overall exclusion rate for combined non-



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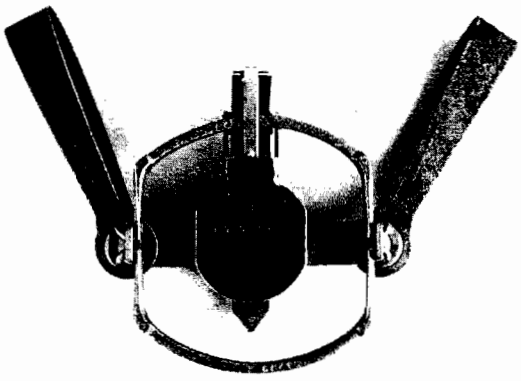

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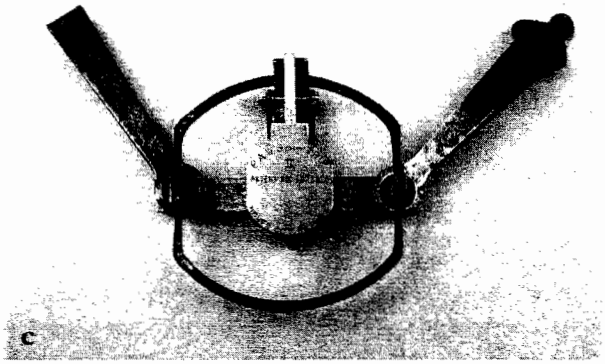

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Fig. 2. Three types of traps used for testing Paws-I-Trip™ pan tension device: (a) No. 3 Soft Catch®, (b) Victor 3NM®, and (c) No. 4 Newhouse®.

Table 1. Comparison of visits (*N*) and exclusion rates (%) of designated nontarget animals for 3 types of coyote traps equipped with Paws-I-Trip™ pan tension devices in 8 western states of the United States, 1993–1994.

	N (%)								
Trap type	Gray fox	Swift and kit fox	Striped skunk	Opossum	Rabbit[a]	Armadillo	Rodents	Birds	All nontargets
No. 3 Victor Soft Catch®	4 (75.0)	11 (100)	34 (100)	2 (100)	361 (99.2)		11 (100)	1 (100)	424 (99.1)
Victor® 3NM		2 (100)	13 (69.2)		186 (99.5)		1 (100)	57 (100)	259 (98.1)
No. 4 Newhouse®	4 (75.0)	2 (100)	35 (91.4)	20 (75)	35 (97.1)	16 (87.5)	23 (100)	8 (87.5)	143 (91.0)

[a] Includes cottontails and jackrabbits.

target species in the No. 3 Soft Catch, Victor 3NM, and No. 4 Newhouse were 99.1, 98.1, and 91%, respectively (Table 1). Rabbits and hares accounted for the greatest number of visits (582), and this group was excluded from capture 98.6% of the time. Exclusion rates were lower for heavier animals such as the nine-banded armadillo, gray fox, opossums, and skunks (Table 1). Nontarget exclusion rates were the same among trap types except for skunks, where the Soft Catch excluded more animals than the 3NM ($P = 0.004$).

Coyote capture rate for the 3NM was higher than that of the Soft Catch ($P = 0.0009$, Table 2). Capture rates reported are similar to those reported in other studies where pan tension devices were not used (S. Linhart and G. Dasch, *Wildl. Soc. Bull.* 20:63–66, 1992) and higher than those reported where shear-pin and leaf spring pan tension devices were used on 3NM traps (Turkowski et al. 1984 cited previously). Coyote escape rates (pull-outs) were similar for all trap types (Table 2).

Discussion

PIT pan tension devices used on 3 types of coyote traps effectively reduced nontarget captures without adversely affecting performance of the traps for capturing coyotes. Because of a high rate of exclusion of nontargets, more traps were functional for coyotes and the trapline efficiency increased. Pan tension devices are required in parts of 2 states (California and Colorado) for excluding kit and swift foxes from traps set for coyotes. In our evaluation, traps equipped with PIT's eliminated capture of kit and swift foxes in all 15 recorded visits. PIT's would also be useful for removing coyotes in black-footed ferret (*Mustela nigripes*) reintroduction areas.

Table 2. Comparison of coyote capture rates for 3 types of traps equipped with Paws-I-Trip™ pan tension devices used in 8 western states of the United States, 1993–1994.

Trap type	Stepped on pan (*N*)	Capture rate (%)	Escape rate (%)
No. 3 Victor Soft Catch®	473	81.8	5.7
Victor® 3NM	257	91.0	2.7
No. 4 Newhouse®	172	87.2	4.7

Participants using Soft Catch traps in California achieved the highest nontarget exclusion rates for all species; however, they also reported the lowest coyote capture rate (81.8%). Much of the trapping in California was done in areas occupied by the endangered San Joaquin kit fox (*Vulpes macrotis mutica*). To assure exclusion of this species, pans are set so they will be triggered by >1.8 kg. This tension setting excludes all kit foxes but allows some smaller coyotes to step on trap pans without springing the trap. Participants using 3NM's and Newhouse traps did not trap in areas occupied by an endangered species and most likely set their traps so that they will be triggered by >1.4 kg. Reduced pan tension would most likely result in higher coyote capture rates for the 3NM and Newhouse traps. Thus, there is a trade off between exclusion and coyote capture efficiency.

The PIT device has advantages when compared with other pan tension devices such as leaf springs, steel tape, shear pins, sponges, wires, and sticks. PIT kits can modify a variety of foothold traps, and when installed, become a permanent part of the trap. Once the desired pan tension is set, there is little need for further adjustments unless the trap dog is bent.

PIT kits cost approximately $3/unit and are easily installed on many types of coyote traps. Cost may be lower for high volume purchases and different pan sizes are available.

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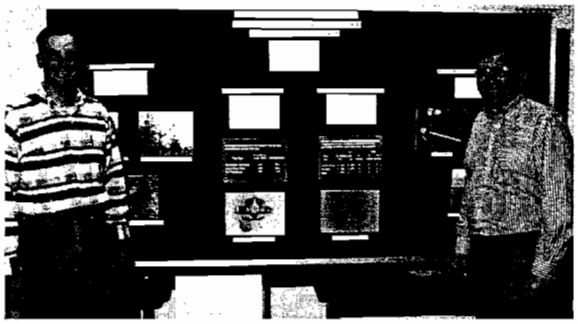

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