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Robert T. Jefferson Jr.
Iowa State University

William L. Franklin
Iowa State University

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Behavioral Considerations in the Live Capture of Guanacos with Spring-activated Foot Snares[1]

ROBERT T. JEFFERSON, JR., and WILLIAM L. FRANKLIN
Dept. of Animal Ecology, 124 Science II, Iowa State University, Ames, IA 50011

Due to the potential repugnancy and laws preventing the use of kill-snares for large mammals, live-snaring is rarely used by field biologists for capturing ungulates. In a study of the socioecology of the South American guanaco (Lama guanicöe), spring-activated snares were tested and proved to be a successful technique for safely capturing juvenile animals because of a knowledge of individual and social behavior, especially the predictable daily use of such social attractants as preferred foraging sites and dust baths. Live capture with foot snares has potential application to other ungulates if behavioral considerations are taken into account.
INDEX DESCRIPTORS: Capture, spring-activated foot snares, behavior, *Lama guanicöe*

A variety of methods has been used for capturing ungulates, including box traps (Clover 1956), corrals (Pimlott and Canberry 1958), cannon nets (Hawkins et al. 1968), chemical restraint (Harthoorn 1965, Fowler 1978), and snares (Aschcraft and Reese 1957, Mossman et. al 1963). Because kill-snaring of large mammals is illegal in most countries due to the numbers of maimed animals and the repugnancy of the method (Riney 1982), live-snaring of ungulates is rarely used by field biologists. The technique, however, has high potential if correctly applied.

In a study of the socioecology of the South American guanaco (*Lama guanicöe*) on Tierra del Fuego, Chile, animal capture was necessary for marking individuals. Immobilization proved unsuccessful because of a narrow safety index with the drug succinylcholine chloride (see Raedeke 1976), unpredictability of projectile syringe darts in a high-wind environment, and the excessive time required for stalking and hunting. This paper reports our results on field tests with spring-activated foot snares, based upon a knowledge of guanaco individual and social behavior.

METHODS

Aldrich (P.O. Box 244, Clallam Bay, Washington 98326) spring-activated animal snares were originally designed for bears (*Ursus sp.*), coyotes (*Canis latrans*), and red foxes (*Vulpes vulpes*); however, wild horses (*Equus caballo*) and elk (*Cervus canadensis*) also have been caught by this technique (Aldrich Company, pers. commun.), but proved ineffective for red deer (*Cervus elaphus*) in Chile (Goetz Schurholz, pers. commun.).

We used the black-bear-sized snare with a 3/16" cable. Each snare weighed approximately 0.5 kg, enabling one person to backpack at least a dozen snares, wooden stakes, and other related equipment into the field. Two modifications were made: 1) the snare loop was shortened 15 cm, and 2) a piece of wood (7 × 7 × 1 cm) was attached to the trigger to increase the surface area for easier trap release. The snare was set off when an animal stepped on the trigger, releasing the trap spring, causing a looped cable to be thrown up around the animal's leg.

South American camelids use dung piles for spatial orientation and for marking year-round defended feeding territories (Franklin 1980). Because of the importance of scent to guanaco, great care had to be taken to minimize the introduction of foreign odors within their territories. Snares were descented by boiling in guanaco dung and water. Leather gloves (descented in the same manner) were used for handling snares, and dung-water solution was poured over our boots before entering the trap area. Feces used for descenting were from dung piles within the same territory where the traps were to be set.

Snares were set within guanaco family group territories, in the middle or at the edge of dung piles, in dust bowls, and trails in open meadows and in closed beech forest (*Nothofagus antarctica*). Ten to 12 snares were set in one territory during each trapping period to maximize trapping success. Dust bowls were traditional sites, approximately 1 m in diameter and 10-50 cm deep, where animals regularly dusted themselves. Both dust bowls and dung piles were smelled by animals before using them. Snares also were set within a family group's territory on an open meadow after they had left the area and entered a nearby forest to sleep for the night.

Snares were placed in a 10 to 15-cm-deep rectangular hole and covered with loose soil or a thin layer of sod. The cable attached to the snare was secured to a nearby tree or a 1-m-long wooden stake pounded below the surface. A 30-cm-long cut was made in the sod parallelling the trigger mechanism to allow for trap release. For snares set at dung piles, dried fecal pellets from the pile were placed in the hole with the snare before it was covered. Extreme care was taken to disturb the trap area as little as possible.

Traps were set when they could be continously watched and attended from 100 to 500 m away. The observer was simultaneously collecting behavioral information on several guanaco family groups to minimize loss of time. When an animal was captured, it was allowed to remain in the snare for 15 minutes before being approached in hopes, although it did not occur, of capturing other family group members that frequently investigated the snared animal. Captured guanacos were ear-tagged, measured, and released.

RESULTS AND DISCUSSIONS

Nine animals were captured over a 41 day period: 2 adult females and 6 juveniles adjacent to dust bowls, and 1 juvenile next to a dung pile (Table 1). All juveniles captured were successfully marked and released. One adult female pulled the snare-securing cable from the anchor stake and escaped (the snare shortly thereafter fell off). The second adult, when approached for marking, snapped the snare cable and also escaped before being marked. Animals were snared at the metatarsal joint or above, but always below the knee.

Table 1. Location and trapping success of spring-activated foot snares for guanacos.

Location of Trap	Number of Days	Number of Traps Released	Captures	Percent Success
Forest Trails	6	60	0	0
Meadow Trails	3	25	0	0
Dung Piles	10	65	1 Juvenile	2
Dust Bowls	22	208	2 Ad. Females 6 Juveniles	4
Total	41	358	9	3

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Overall trapping success was lowered by the initial time it took to develop and apply spring-activated snares to ungulate capture. Other large mammal trapping techniques which also require knowledge of individual or social behavior have similar trapping success rates, e.g. 1 to 4% for white-tailed deer (*Odocoileus virginianus*) with Clover box traps and 0.7 to 1.5% (Todd Fuller, pers. commun.) and 0.25 to 3.0% (Ballenberghe et. al 1975) for gray wolves (*Canis lupus*) with leg-hold traps in northern Minnesota.

Adult males had the potential for being selectively trapped by setting snares at dung piles because other sex or age classes rarely used dung piles, but they proved impossible to capture. Four to 5 snares usually were set around a single dung pile. An adult male approaching such a setup seemed aware of the disturbance. He cautiously walked within 10 m of the dung pile with his head low and outstretched. If a portion of the dung pile was free of snares, the male would walk between the snares and use the dung pile. If snares were tightly clustered, the male would walk away from the dung pile after circling the dung pile several times in an investigative manner. Whether adult males were responding to a foreign odor or to ground disturbance at the dung pile is unknown. The adult males continued to attempt to use dung piles at which there were snares. In one instance, 11 snares were set at one dung pile for 5 consecutive days. Several times each day, the adult male approached the dung pile, but always retreated. Thereafter, he avoided the dung pile for 6 days. Despite careful attempts to camouflage and deodorize snares, adult territorial males usually avoided trap sites. Adult males triggered 5 snares, but none were caught.

The greatest trapping success was with snares set at dust bowls. Eight of the 9 animals captured were at dust bowls. Each day guanaco family groups moved from the forest to the meadow to feed on a preferred vegetaton type (Jefferson 1980), and used dust bowls located there. Because juveniles were the first to arrive at dust bowls in the morning and they showed less response to human odor and/or the snare sets, nearly all animals captured there were juveniles. For example, on 13 March 1978, a male juvenile triggered two snares in a dust bowl, but was not caught. He smelled the released snares and unexcitedly walked away.

Dust bowls were ideal trapping sites since the soil already was disturbed from the animal's rolling behavior. A number of snares could be set in or adjacent to dust bowls, thus increasing the probability of capture. After an individual had been captured, family group members avoided that site for several days to as long as 2 weeks. If snares were triggered but no animals caught, animals returned to the same dust bowl the same or next day.

When a guanaco was caught, it struggled to free itself, pulling and running in circles. After 4 to 5 minutes of struggling, juveniles would frequently lie down. Snared animals smelled, but did not bite at the cable on their leg. At first, group members retreated 10-20 m in a tight cluster staring back at the captured animal. Other juveniles in the group and the mother of a captured juvenile were first to come forward and investigate. The mother would move to the juvenile's side, smelling and touching, but made no attempt to free the juvenile. Untrapped juveniles often initiated play behavior with the captured juvenile. After 4 to 5 minutes, the entire family group gathered around the captured individual to investigate, then slowly moved away while feeding over the next 10 minutes. The mother, however, continued standing next to her offspring.

When humans approached the captured animal, the mother moved 100 to 200 m away and stood watching. Other group members escaped 400 to 600 m away to the edge of the forest. Anchored by the snare-securing cable, the captured individual again ran in circles while attempting to escape. Typical response by trapped juveniles was loud bleating and urinating. Upon release of the captured juvenile, it ran to its mother, and they both retreated into the forest. No evident injury or lameness was caused by the snares.

A disadvantage of foot snares was the 30 minutes required to set each trap. A constant watch also had to be maintained whenever guanacos were in the vicinity of the snares. If allowed to remain in a snare too long, a captured animal could well injure itself or escape. Sedation of captured adults before handling is recommended. The addition of a heavy-duty elastic or spring attached to the anchor cable for elasticity might have prevented loss of the adult females and would help minimize possible animal injury.

Guanacos are highly social, existing in both family and all-male groups, which show a highly predictable daily pattern of movements (Franklin 1982). Foot snares were effectively used in this study because a knowledge of the guanaco family group social behavior and daily activity patterns made it possible to set traps where animals would be predictably found. No baiting was required because natural social attractants (dust bowls and dung piles) already were present. In this study, juveniles could be selectively caught because of regular use of dust bowls and less fear of the trap site. Prolonged waiting periods were eliminated because the animals visited the dust bowls and dung piles on a daily basis. Behavioral observations of family groups could still be conducted simultaneously while the set snares were being watched. Snares also allowed capture of animals with minimal disturbance of family group activities and without injury to captured animals. Snares also are relatively inexpensive, reusable, and easily transported.

Live capture with foot snares has potential application to other ungulates, especially if one already has an understanding of predictable daily behavioral patterns of a given population. A knowledge of natural and localized social attractants would be important, such as mineral licks, watering sites, scent rubs and scrapes, dung piles, preferred feeding sites, and bedding locations.

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