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A SMALL CARNIVORE SURVEY TECHNIQUE

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Abstract.— A track station survey method for small, nocturnal mammalian carnivores is described. The method has been field tested under a wide variety of conditions. Stations were visited by rodents, mustelids, and canids, as well as insects and birds.

Small carnivores, because they often range relatively widely, occur at low densities, and tend to be solitary and nocturnal, are one of the more difficult mammal groups to study. Five basic categories of carnivore survey and census methods were described by Linhart and Knowlton (1975): (1) direct counts or capture-recapture, (2) counts of sign (dens, tracks, or droppings), (3) questionnaires and bounty payments, (4) catch per unit of effort (trap-nights), and (5) elicited responses to man-made stimuli (frequency of visitations to scent stations, howl responses to sirens). These methods vary in their effectiveness by species and habitat type.

We used a track recording method employing two varieties of lures (olfactory and acoustic) to elicit small carnivore responses between 1978 and 1982. Field-use determined: (1) efficacy, (2) ease and thrift of construction and setup, and (3) durability and amount of maintenance required. Elicited responses sought included: (1) deposition of tracks and scats at stations and (2) drawing animals to these stations to make them more visible during spotlight surveys. Our track-recording technique was a combination and modification of methods used by Mayer (1957) and Justice (1961) to determine small mammal presence and by Linhart and Knowlton (1975) to index coyote populations. We also compared our track stations according to the above objectives with Linhart and Knowlton's (1975) station design. We were particularly interested in small carnivores on prairie dog colonies, and therefore placed track stations of both types on white-tailed (*Cynomys leucurus*), Gunnison's (*C. gunnisoni*), and black-tailed prairie dog (*C. ludovicianus*) colonies, although they could be placed anywhere.

Track Stations

Our track station consisted of track-sensitive smoked kymograph paper covering a base of 4 mm thick plywood (0.6 m^2) (Fig. 1). The kymograph paper was smoked in the field by burning kerosene-soaked cotton inside an aluminum can which had a long, 1 cm wide slit cut in one side. Track impressions were preserved by spraying with quick drying shellac.

Scent and bait attractants were placed on a stake in the center of each track station (Fig. 1). Scents consisted of a variety of commercial mustelid and other lures (i.e., weasels *Mustela frenata*, mink *M. vison*, marten *Martes americana*, fisher *M. pennanti*, badger *Taxidea taxus*, wolverine *Gulo gulo*, and black bear *Ursus americanus*. Baits consisted of an aged liver and sardine mixture.

The acoustic attractant, a modified electronic bird call producing a "chirping" sound, was used in association with track stations. This call was developed by the U.S. Fish and Wildlife Service (electronic schematic available from the authors). The call was capable of functioning for a couple of weeks on a single 6-volt battery. The call was placed inside a camouflaged paint can (one-pint, 0.5 liters) with holes in the lid to emit the sounds.

Location of track stations was determined in the field to minimize wind damage and to

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Fig. 1. Photograph of kymograph-smoked track station used by a prairie dog. Scent stake is coated with liver/sardines.

maximize dispersal of odors and sounds. Each station was checked early each morning for nocturnal tracks and again in evenings for diurnal tracks for several consecutive days. Baits, scents, and kymograph paper were replaced and soil resifted as needed.

Linhart and Knowlton's (1975) track stations consisted of a 1-m diameter circle of freshly sifted fine dirt 1 cm deep and scented and baited with specially prepared tabs or our lures.

RESULTS

We accumulated 264 kymograph and 112 sifted dirt track stations days (1 track station day was 1 track station in operation for 24 hrs) on 24 different prairie dog colonies. A variety of animals left track impressions on both kinds of stations; they were: long-tailed weasels, skunks (*Mephitis mephitis*), kit foxes (*Vulpes velox*), coyotes (*Canis latrans*), badgers, mice (*Peromyscus* sp., *Dipodomys* sp., *Onychomys* sp.), ground squirrels (*Spermophilus* sp.), prairie dogs, unidentified passerine birds, and numerous insects.

As a substitute for the rarest carnivore on prairie dog towns, the black-footed ferret (*Mustela nigripes*), we presented kymograph track stations to Steppe ferrets (*M. eversmanni*) in laboratory conditions and they locomoted on them.

DISCUSSION

The utility of the kymograph and sifted dirt track stations depended on the target species sampled, the quality and permanence of visitation record sought, and field conditions encountered. Kymograph stations required about 4 minutes each to prepare, in a sheltered location, and about 5 minutes to set out. This type of station was most effective in low humidity and low to moderate winds—where stations might be effective 3–5 days before needing new smoked paper. Concerns that the kerosene odor and unfamiliar substrate texture might deter all wild species was not substantiated.

The sifted dirt stations required less time and equipment to establish and were easier

to replace, but tracks were sometimes indefinite and harder to positively identify than with kymograph tracks. Photography was the only method to permanently record these tracks.

No scats or urinations were found within the track station areas. We never observed a carnivore at a track station during nearly continuous nighttime surveys, even though tracks indicated their visitations.

We think our track station method has utility in surveying site-specific areas, especially if camera monitoring of animal visits as described by Dodge and Synder (1960) and Loveless et al. (1963) were added to our system. Our technique, as suggested by Clark (1977, 1978) and Clark and Campbell (1980), may offer a valuable addition to traditional survey methods for some rare species like the black-footed ferret. Since its efficacy has been demonstrated, needed now are follow-up quantitative experimental studies on the value of the kymograph track station.

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