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Nocturnal Mammals: Techniques for Study

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REMOTE TRIP CAMERAS AS A MEANS FOR SURVEYING FOR NOCTURNAL FELIDS.

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ABSTRACT

Initial work (1981-84) on endangered ocelots (*Felis pardalis*) in south Texas demanded access to the animals for placement of radio collars, collecting of blood samples, fecal samples and vaginal smears, and taking of body measurements. However, the current phase of our work requires exploration for cat presence in different habitats over a large geographical area. Since actual handling of the animals for this purpose is not necessary, we have had 15 remote-trip cameras built to "catch" animals on film. The systems used are one of two types; one activated by an infrared sensor, the other by breaking an infrared beam. Each trip device is attached to a fixed focus (1.3 m to infinity), auto-wind, auto-flash disc camera in a water-resistant housing. Price of the units is 3-5 times that of a walk-in trap set, but unlike a trap, the units do not have to be set, checked, closed, or even visited daily. These camera units are efficient in terms of man-hours saved, and effective in providing excellent documentation for terrestrial mammals. Furthermore, they are non-disruptive to the animals being studied, and therefore, especially useful for work with endangered species.

INTRODUCTION

The need to document the presence and/or activities of an animal in an area without disturbing it is becoming more important in wildlife research (Hill and Clayton 1985). Work with endangered species is especially significant in this regard where heightened public awareness has also awakened concerns that even vital, basic research programs may incur more problems for the species than benefits.

Various types of remote-trip devices provide techniques for obtaining non-disruptive documentation for a wide variety of animal species in virtually any habitat type. Use of these instruments is not new. Cameras attached to microswitches have been used for three decades to obtain data on food use and visitation frequency in studies of cavity-nesting birds (Lack 1966). Intervalometers that expose a frame of movie film at set time intervals have been used for a number of different projects (Folse and Arnold 1974, Capen 1978, Montalbano et al. 1985), and more recently, photographic equipment has been attached to a pressure pad to obtain leopard (*Panthera pardus*) photos (Plage and Plage 1985) and photos of rain forest species in South Africa (Seydack 1984).

The technology involved is becoming increasingly sophisticated, requiring less and less of the animal. In this paper we report on 2 types of remote-trip devices that were designed to provide habitat survey data on ocelots and jaguarundis in south Texas, and on endangered mammals in general in a rain forest preserve in southern Veracruz, Mexico.

METHODS

The 2 types of sets developed were a "sensor" type and a "beam-breaker" type. The sensor unit (Fig. 1A) consists of a single, water-resistant, plastic box, 27 cm tall x 16 cm wide x 9 cm deep. The box contains: 1) a Kodak Disc camera, 2) a heat sensor, 3) a solenoid, and 4) 8 "D" cell batteries. The heat sensor will send an electrical impulse to the solenoid when any item with a temperature more than 2° C above that of ambient temperature occurs in the detection field. The solenoid transforms the electrical impulse into a mechanical impulse that trips the camera shutter. For some camera types, a direct link between the camera and sensor can be made. The detection field is an arc 60° in width in front of the unit and to a distance of 9 m. There are 2 switches on the side of the unit; one that turns on the sensor, and another that turns on the solenoid. The whole unit weighs 3.4 kg. It costs $500 and was constructed according to our specifications by Dan Stoneburner of Custom Telemetry, Inc. (Athens, Georgia USA). We ordered 8 of the units and used them in field trials in south Texas and southern Veracruz.

The beam-breaker unit (Fig. 1B) consists of 2 water-resistant, plastic boxes. The first box is 11 cm tall x 18 cm wide x 9 cm deep and weighs 1.2 kg. It contains: 1) a Kodak Disc camera, 2) an infrared receiver, and 3) four "D" cell batteries. The second box is 15 cm tall x 8 cm wide x 8 cm deep and weighs 0.8 kg. It contains an infrared transmitter and a 6-volt lantern battery. In an operating mode, the 2 units are lined up facing each other, 1-5 m apart. Two switches on the side of the large box control the camera and the receiver respectively. A red light on the front of the camera box comes on when the transmitter and receiver portals are aligned. The unit fires when the infrared beam between the 2 units is "broken" by a passing animal. The beam breaker units cost $300, and were made by Custom Telemetry, Inc. We ordered 9 of these units and have used them in field trials in south Texas.

Field trials consisted of placing the units out in 3 different localities: Laguna Atascosa National Wildlife Refuge, Cameron County, Texas (18 Jan-2 Feb 1985); Tres Corales Ranch, Hidalgo County, Texas (19-26 April 1985); and Vocan Santa Martha, Tuxtla Mountains, Veracruz, Mexico (7-18 Mar 1985). In all instances, the units were "baited" with cat scent (Burnham Bros., Marble

Falls, Texas USA). The Texas habitat in which the units were placed is low, dense chaparrel dominated by spiny hackberry (*Celtis spinosa*), mesquite (*Prosopis glandulosa*), and snake eyes (*Phaulothamnus spinescens*). The Veracruz habitat is a "subformation of rain forest" according to Andrle (1964); "selva alta perennifolia" of Pennington and Sarukhan (1968).

RESULTS AND DISCUSSION

A total of 138 camera-days (where one camera-day equals one camera unit in field operation for one 24 h period) were accumulated at Laguna Atascosa, 63 camera-days at Tres Corrales Ranch, and 70 camera-days at Vocan Santa Martha. We recorded a total of 20 different species at the 3 localities in 271 camera-days (Table 1). To the best of our knowledge, there is no trapping system that could yield positive survey data (as opposed to sight records) on such a wide variety of species in such a short period of time.

Since these units were essentially prototypes, the field trials were designed primarily to determine the capabilites of the 2 units and the kinds of modifications that would be needed to make the units economical and effective. We found that the sensor units had a number misfires. After studying the problem, we found that most misfires were due to sun dappling in the detection field. The extreme heat in south Texas produces temperature differentials between sun and shade that are sufficient to cause the sensor to fire. We had no problems of this sort in the shaded rain forest sites. We plan to avoid this misfire problem in the future by attaching a daylight switch that will turn the unit off automatically during daylight hours. Since we are most interested in nocturnal animals, this should alleviate the problem with a minimal loss of data.

A second problem that we encounted was that of "curious" species. For some animals (e.g., opossum, *Didelphis marsupialis*, and raccoon, *Procyon lotor*) the camera flash and/or click stimulated interest. As a result, an entire roll of film of one animal is sometimes photographed. To avoid this difficulty, we are attaching a firing delay switch to cause a 5 minute delay period between firings.

A third problem that we encountered were differences in sensor sensitivity and flash area coverage. The sensor will fire at an animal up to 9 m from the unit. This works during the day, but at night the flash on the disc camera will illuminate only to 5 m. We plan to add a more powerful strobe to the units to correct this problem.

Kodak disc cameras were chosen because they have auto flash, auto advance, and fixed focus capabilities in a light, relatively inexpensive package (about $45). However, the film is expensive both to buy and develop, and the camera has limited capability for interchanging lenses. We plan to have some new units designed with inexpensive 35 mm cameras that use black and white film and different lenses.

The main advantage of a remote-trip system for our purposes is that it requires little effort by the animal. It must simply pass in front of the sensor unit at a distance of 1-9 m to be recorded. The sensor unit, despite the aforementioned problems, meets our needs for obtaining records of jaguarundi and ocelot in south Texas. We have been able to obtain some records from trapping for the ocelot, but have had no success with the jaguarundi, despite the occurrence of numerous historical records for the region, and a number of recent sightings.

The sensor units are light and less bulky than walk-in traps of the type used to capture ocelots. They do not require constant supervision by the researcher as traps do, and the risk of disturbance or injury to the target animals is minimal. Although initial costs are somewhat high when multiple units are purchased, the savings in time and manpower are considerable.

LITERATURE CITED

Andrle, R. F. 1964. A biogeographical investigation of the Sierra de Tuxtla in Veracruz, Mexico. Ph.D. disseration, Louisiana State University, Baton Rouge.

Capen, D. E. 1978. Time-lapse photography and computer analysis of behavior of nesting white-faced ibises. Pages 41-43 *in* A. Sprunt IV, J. C. Ogden, and S. Winckler (editors) Wading birds. National Audubon Society, New York.

Folse, L. J., and K. A. Arnold. 1978. Population ecology of roadrunners (*Geococcyx californianus*) in south Texas. Southwest. Natur. 23:1-28.

Hill, S. B., and D. H. Clayton. 1985. Wildlife after dark: a review of nocturnal observation techniques. Bell Museum of Natural History, Occas. Pap. 17, Minneapolis, Minnesota. 23pp.

Lack, D. 1966. Population studies of birds. Oxford Univ. Press, London.

Montalbano, F., III, P. W. Glanz, M. W. Olinde, and L. S. Perrin. 1985. A solar-powered time-lapse camera to record wildlife activity. Wildl. Soc. Bull. 13:178-182.

Pennington, T. D., and J. Sarukhan. 1968. Arboles tropicales de Mexico. Inst. Nac. Invest. Forestales, Mexico.

Plage, D., and M. Plage. 1985. In the shadow of Krakatau. Natl. Geogr. 167:750-771.

Seydack, A. H. W. 1984. Application of a photo-recording device in the census of larger rain-forest mammals. S. Afr. J. Wildl. Res. 14:9-14.

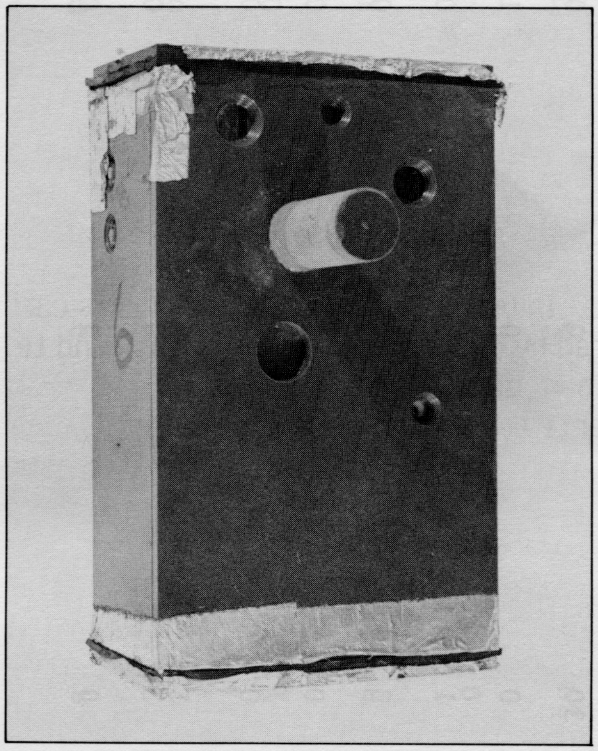
Table 1. List of species and number of individuals captured on film by locality.

Species	Laguna Atascosa Cameron Co., Tx.	Tres Corrales Hidalgo Co., Tx.	Santa Martha Veracruz, Mexico
Plain Chachalaca (*Ortalis vetula*)	0	1	0
White-tipped Dove (*Leptotila verreauxi*)	4	0	0
Roadrunner (*Geococcyx californianus*)	8	0	0
Mockingbird (*Mimus polyglottos*)	2	0	0
Long-billed Thrasher (*Toxostoma longirostre*)	1	2	0
Opossum (*Didelphis marsupialis*)	3	0	1
Nine-banded Armadillo (*Dasypus novemcinctus*)	0	2	0
Eastern Cottontail (*Sylvilagus floridanus*)	29	6	0
Southern Plains Wood Rat (*Neotoma micropus*)	2	0	0
Paca (*Agouti paca*)	0	0	1
Agouti (*Dasyprocta mexicana*)	0	0	1

Table 1. List of species and number of individuals captured on film by locality. (Continued)

Species	Laguna Atascosa Cameron Co., Tx.	Tres Corrales Hidalgo Co., Tx.	Santa Martha Veracruz, Mexico
Coyote (*Canis latrans*)	9	0	0
Raccoon (*Procyon lotor*)	30	0	0
Tayra (*Eira barbara*)	0	0	1
Ocelot (*Felis pardalis*)	1	0	0
Bobcat (*Lynx rufus*)	3	0	0
Horse (*Equus caballus*)	0	6	0
Collared Peccary (*Tayassu tajacu*)	0	2	0
White-tailed Deer (*Odocoileus virginianus*)	3	0	0
Cow (*Bos taurus*)	0	2	0

Figure 1. A) Remote-trip camera unit triggered by an infrared sensor; B) Remote-trip camera system composed of an infrared transmitter (lower box) and receiver-camera unit (upper box). The camera is triggered by anything that breaks the infrared beam between the two boxes.



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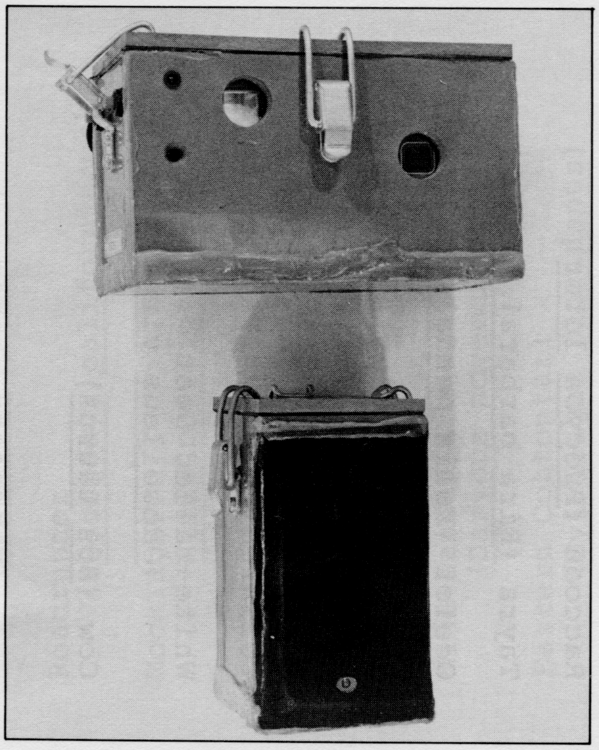

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