

Morphological Characteristics and Effects of Telazol on American Badgers in South Texas

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ABSTRACT

Five North American badgers were trapped on the Chaparral Wildlife Management Area located in Texas counties Dimmit and LaSalle Texas in 2002. Mean male badger weight was 6.29 ± 0.76 kg and weight for a female badger was 5.44 ± 0.00 kg. Weights resulted in a mean dosage of 0.75 ± 0.24 cc of Telazol® with a workable time of 7.25 minutes. We concluded that badgers can be safely immobilized under field conditions using Telazol.

KEY WORDS: badger, *Taxidea taxus*, morphological characteristics, Telazol, South Texas

INTRODUCTION

A common solitary carnivore west of the Mississippi River, the North American badger (*Taxidea taxus*) has a range extending from northern Alberta, Canada to central Mexico and eastward from the Pacific coast to a line running from east Texas to the central Great Lakes, and is represented by four subspecies (Long 1973). Badger populations have not been widely studied (Hein and Andelt 1995). Generally, badgers are associated with treeless regions, prairies, parkland, and cold desert areas (Lindzey 1982), with previous research locations in the Intermountain west and Great Plains. Badgers have many unique physical characteristics making them readily identifiable: depressed body, short, stout legs, loose skin, long, recurved front claws, and short, shovel-like hind claws (Lindzey 1982). Typically, reported morphological measurements (i.e., total length, tail length, body length, and hind foot length) are similar between sexes. Long (1973) reported total length to be 60-73 cm; tail length 10.5-13.5 cm; hind foot length 9.5-12.8 cm for both sexes respectively, while Messick (1981) found morphological

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measurements for male and female badgers were: total length 73.9 cm and 70.8 cm; body length 59.9 cm and 57.8 cm; hind foot length 10.7 cm and 10.3 cm, respectively. Adult male badgers weigh an average of 26% more than adult female badgers (Wright 1966) with average weights of 8.4 kg and 6.4 kg, respectively in South Dakota (Wright 1969) and 8.7 kg and 7.1 kg respectively in northern Utah and southern Idaho (Lindzey 1971). Ruiz-Campos et al. (2002) in Baja California, Mexico reported morphological measurements of two male badgers as: body mass 4.1 kg and 9.3 kg, total length 58.7 cm and 84.9 cm, and hind foot length 10.9 cm and 12.3 cm. Although records in the southern portion of the badger range seem to indicate a wide range of morphological measurements, little information exists about badger morphological measurements of the southernmost subspecies of the North American badger (*T. t. berlandieri*), in southern Texas.

To generate accurate in-field morphological data, rapid immobilization by intramuscular injection of anesthetic (Bigler and Hoff 1974) is necessary. Four immobilizing agents (phencyclidine hydrochloride, acepromazine maleate, chlorpromazine hydrochloride, and succinyl-choline chloride) have been used on North American badgers (Fitzgerald 1973). However, little information is available on immobilizing badgers under field conditions using Telazol® (A.H. Robins, Richmond, VA 23220) (Bailey 1971). Telazol has been used to immobilize mustelids such as American martens (*Martes americana*) (Bull et al. 1996), striped skunks (*Mephitis mephitis*) (Lariviere and Messier 1996), river otters (*Lutra canadensis*) (Serfass et al. 1993), and fishers (*Martes pennanti*) (Mitcheltree et al. 1999) under field conditions. It is a non-opid, non-barbiturate, injectable anesthetic widely used in anesthetizing wildlife (Schobert 1987; Lin et al. 1993; Lariviere and Messier 1996). Rapid induction time, good muscle relaxation, maintenance of swallowing reflex, and minimal effect on respiration (Lin et al. 1993) allow Telazol to have a wide safety margin, making it especially useful when the body mass of animals is only roughly estimated (Lariviere and Messier 1996). Telazol also provides a gradual and predictable recovery, making it safe to use with potentially dangerous species (Stirling et al. 1989). Because of these reasons, Telazol has become a useful management tool when capture and marking are required. The objectives of this research were to report and compare morphological measurements of a North American badger population in its southern range, and to evaluate the effectiveness of Telazol for immobilizing badgers under field conditions.

Study Area. The study was conducted during 2002 on the Chaparral Wildlife Management Area (CWMA), Dimmit and LaSalle Counties, which lies within the western South Texas Plains (Correl & Johnston 1979; Hatch et al. 1990) and the Tamulipan Biotic Province (Blair 1950). Climate is characterized by hot summers and mild winters with an average annual precipitation accumulation of 53 cm. The elevation ranges from 144-148 m and soils are primarily sandy. Precipitation patterns are bimodal with peaks occurring in late spring (May to June) and early fall (September to October). Typical vegetation includes mesquite (*Prosopis glandulosa*), blackbrush (*Acacia rigidula*), granjeno (*Celtis pallida*), huisache (*Acacia minuta*), and cacti (Taylor et al. 1997) which characterize the two-phase pattern of shrub clusters scattered throughout a grassland/savanna (Whittaker et al. 1979; Archer et al. 1988).

MATERIALS AND METHODS

Presumed active badger burrows were identified and had a pair of No. 3 coil spring traps (Duke Company, West Point, MS) placed at the mouth of the burrow (Collins 2004) for capture. Once captured, the weight of the individual badger was estimated to the nearest kg, then individuals were immobilized with Tiletamine/Zolazepam (Telazol®, Fort Dodge, Iowa) mixed 1:1 (250 mg of each) and reconstituted with 5 ml of sterile diluent (i.e., 100 mg/cc). Dosages (i.e., Estimated Body Weight x Dosage / Drug Concentration) were based on the estimated weights of the captured animals and adjusted accordingly. However, dosage varied because of a tendency to overestimate weight and length of time needed to process individuals. The drug was given intramuscularly with a 1-cc syringe fitted with a 16-gauge needle. Initial dosage, time of first effect, time tractable, and release time were all monitored and recorded in the field. Individuals sex and age (i.e., canine wear) were determined and morphological measurements were taken: total body mass (g), head length (cm), total body length (cm), tail length (cm), and canine length (mm) using a Macro-Line Pesola® spring scale (20 kg capacity), measuring tape, and metric dial calipers.

RESULTS

A total of 1,430 trap-nights resulted in the capture of five badgers (two adult males, two juvenile males, and one adult female) and 12 individuals of five non-target species (Table 1).

Table 1. Location, trapping effort, and number of badgers and non-target species captured on the Chaparral Wildlife Management Area, Dimmit and LaSalle County, Texas, 2002.

Pasture	Trap Nights	Species					
		<i>Taxidea taxus</i>	<i>Lynx rufus</i>	<i>Procyon lotor</i>	<i>Didelphis virginiana</i>	<i>Mephitis mephitis</i>	<i>Pecari tajacu</i>
West Blocker	542	1	1	1	1	4	--
West Guajalote	12	--	--	--	--	--	--
Mare	30	--	--	--	--	--	--
Long	22	--	--	2	2	--	--
Mustang	73	2	--	--	--	--	--
Hogue	74	--	--	--	--	--	--
North Jay	330	1	--	--	--	--	1
South Jay	134	--	--	--	--	--	--
East Guajalote	12.5	--	--	--	--	--	--
Rosindo	88	1	--	--	--	--	--
Total	1430	5	1	3	3	4	1

Overall trap success for all captures was 1.4% and 0.03% for badgers. Mean male badger weight was 6.29 ± 0.76 kg and the lone female badger weighed 5.44 ± 0.00 kg. Total length for all badgers ranged from 70.20 cm to 77.00 cm, with a mean total length of 73.69 ± 3.03 cm. Mean head length was 12.88 ± 4.32 cm, while mean tail length was 11.77 ± 1.33 cm for both sexes respectively (Table 2).

Table 2. Morphological measurements of badgers captured on the Chaparral Wildlife Management Area, Dimmit and LaSalle County, Texas, 2002.

Capture Date	Sex	Age	ID	Total Length (cm)	Head Length (cm)	Tail length (cm)	Weight (kg)	Canine (mm)	
								Upper	Lower
8-Mar	Female	Adult	FB1	70.2	5.5	10.1	5.44	1.7	1.7
14-Mar	Male	Adult	MB1	70.25	10.48	10.45	5.67	1.4	1.6
30-May	Male	Juvenile	MB2	77	15.2	13.6	7.25	1.77	1.83
12-Jun	Male	Juvenile	MB3	74	16.4	12.8	6.57	1.86	1.8
25-Jul	Male	Adult	MB4	77	16.8	11.9	5.67	1.57	1.45
Mean				73.69	12.88	11.77	6.12	1.66	1.68

Five individual doses of Telazol® were administered. On average, badgers were administered 0.75 ± 0.24 cc of Telazol® and were tractable within 7.25 minutes (Table 3).

Table 3. Average dosages of Telazol® administered and time badgers were tractable after capture on the Chaparral Wildlife Management Area, Dimmit and LaSalle County, Texas, 2002.

ID	Dose (cc)	Time 1st effect (A.M.)	Time Tractable (A.M.)	Arousal Time (A.M.)	Release Time
FB1	1.50	8:34:00	8:38:52	11:45:26	12:15:00
MB1	1.00	8:48:00	8:49:20	11:06:15	11:36:00
MB2	0.50	8:19:00	8:22:52	10:11:34	10:41:00
MB3	0.35	10:00:00	10:25:42	11:42:10	12:15:00
MB4	0.40	9:09:24	9:11:06	10:36:54	11:05:00
Mean	0.75				

Typically, this dosage kept the badger tractable for approximately two hours with a standard release time of 30 minutes after the first sign of arousal. All badgers were released back into the burrow in which they were trapped to allow for further recovery. Telazol® does have some side effects such as: excessive salivation, possible chronic seizures, and an irregular respiratory rate (Schobert 1987). However, our study animals did not exhibit any visible signs of these effects.

DISCUSSION

Wright (1969) reported average weights of males and females as 8.4 kg and 6.4 kg, respectively, in South Dakota, while Lindzey (1971) found weights of males and females to be closer to 8.7 kg and 7.1 kg, respectively, in Curlew Valley, Utah and Idaho. Long (1973) reported that large males can exceed 11.5 kg. Male badger weights on our study site were less than that reported by Wright (1969) and Lindzey (1971). Badgers

caught on CWMA had total body lengths and tail lengths that fell within the range reported by Long (1973) of 60-73 cm and 10.5-13.5 cm respectively, as well as the documented total body length measurements by Messick (1982) in southwestern Idaho for male (73.9 cm) and female (70.8 cm) badgers. Two male badgers documented in their southern range in northwestern Mexico were found to weigh 4.1 kg and 9.3 kg, and have total lengths of 58.7 cm and 84.9 cm (Ruiz-Campos et al. 2002). Ruiz-Campos et al. (2002) suggested this wide range in measurements is a result of sub-species variation with the larger specimen being *T. t. jeffersonii* and the smaller *T. t. berlandieri*. In our study, *T. t. berlandieri* were larger than the one reported specimen from Ruiz-Campos et al. (2002).

Telazol proved to be a reliable anesthetic agent for immobilization of badgers under field conditions and anesthesia was characterized by a rapid induction, wide safety margin, and gradual recovery. A larger sample size was needed in order to determine the best dosage an individual should receive. The first three captured individuals received a dosage that anesthetized the individuals for a period of time that was longer than required for data collection and handling and the final two individuals received a dosage that was enough for all data collection and handling. Data indicated that a mean dosage of 0.75 cc was needed to properly collect data and handle individuals. However, dosage should depend on the goals and objectives of the study. For this study, a lower dosage around 0.35-0.40 cc was needed to properly work on individuals efficiently and safely.

Studies involving badgers conclude that restraint is the number one issue when handling badgers for injection. Fitzgerald (1973) reported the defensive postures assumed by badgers made it difficult to handle and estimate weight. He suggested forcing captured individuals into a restraining cone once a neck noose was around the individual, but found it to be unsuccessful. Bailey (1971) suggested using a pole mounted syringe; however, it is easy to miss muscle mass with the injection being subcutaneous, prolonging immobilization. The badgers we captured were caught with both hind feet in a trap allowing us to place the pole noose around their head and to stretch the individual out flat, making it difficult for the badger to assume any defensive posture. We would approach the badger from the back side, minimizing movement to reduce additional stress on the badger. While capture by both hind legs was more than likely an anomaly, we would suggest being prepared with both a pole-mounted syringe and a pole noose (Ketch-all®, San Luis Obispo, California) to allow for flexibility in handling the captured animal. A pole-mounted syringe would allow for injection if the captured individual was in an awkward space or position, making approach to the animal difficult. However, this situation would increase the risk of injury to the animal as Bailey (1971) suggested. A pole noose allows for approach to captured animals no matter which leg is contained within the leg hold trap, giving the researcher the opportunity to immobilize the animal and provide an unobstructed view for injection of the selected immobilizing agent. Injection was always done in the hind quarter with a 16-gauge syringe containing the estimated dosage of Telezol. Individuals were completely anesthetized before being approached for data collection.

In conclusion, badgers in this study exhibited variation in morphology that has been previously reported in past studies across their range and were anesthetized successfully using a single intramuscular injection which provided an adequate field immobilization time for all data collection and handling procedures.

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