

GROWTH CURVE OF WHITE-TAILED ANTELOPE SQUIRRELS FROM IDAHO

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Abstract.—Daytime rodent trapping in the Owyhee Desert of Idaho produced a single diurnal species: the White-tailed Antelope Squirrel (*Ammospermophilus leucurus*). I found four females that were pregnant and took them back to my laboratory to give birth and I raised their litters in captivity. Litter size ranged from 10 to 12 pups. The pups were born weighing 3–4 g, with purple skin color and with the eyes closed. Pups were successfully weaned at 60 d of age and approached the adult body mass of 124 g at 4 mo of age.

Key Words.—*Ammospermophilus leucurus*; Great Basin Desert; growth; Idaho; Owyhee County

The White-tailed Antelope Squirrel (*Ammospermophilus leucurus*; Fig. 1) is indigenous to a large segment of western North America, from as far north as southern Idaho and Oregon (43° N) to as far south as the tip of the Baja California peninsula (23° N; Belk and Smith 1991; Koprowski et al. 2016). I surveyed a small part of the northernmost extension of the range of the species in Owyhee County, Idaho, south of the Snake River, which initially I searched for likely habitat. Positive confirmation was obtained of a considerable amount of undisturbed desert habitat and I sighted squirrels at and near localities previously recorded in museum databases (vertnet.org). The area surveyed was about 200 km² in the Owyhee Desert, south of Oreana (43°00'N, 116°20'W, elevation 850 m). Much of the Owyhee Desert is public land managed by the U.S. Bureau of Land Management. The soils and vegetation were typical of arid lowland scrub within the Great Basin Desert, with sparsely distributed shrubs, predominantly Great Basin Sagebrush (*Artemisia tridentata*) and Greasewood (*Sarcobatus vermiculatus*). The ground squirrels were strongly associated with the more alkaline soils dominated by Greasewood.

Once I confirmed the existence of suitable habitat, I set out Sherman live traps (model LFAGTD, H.B. Sherman Traps Inc., Tallahassee, Florida) in mid-December and again in early April. I captured one female and two males 12–13 December 2016 and four females and five males 1–2 April 2017. I took the animals into the laboratory immediately upon capture. White-tailed Antelope Squirrels were the only vertebrate animals I captured in the traps. I prevented unintentional capture of nocturnal rodents by closing the traps at night. Although other diurnal rodents, such as Least Chipmunks (*Tamias minimus*), Townsend's Ground Squirrels (*Urociellus townsendii*), and Belding's Ground Squirrel (*Urociellus beldingi*) are reportedly present in southwestern Idaho (Groves et al. 1997), I did not find them in this transect.

The average body mass of 12 White-tailed Antelope Squirrels I captured in December and April was 108 g (91–122 g). The four females I captured in the spring were pregnant but were early in their pregnancies, and the body masses of the seven males and five females did

not differ significantly ($t = 0.715$, $df = 10$, $P = 0.503$). After four months in the laboratory (after parturition and lactation for the four pregnant females), average body mass stabilized at 124 g (106–145 g).

The four pregnant females were left undisturbed in individual polypropylene cages with wire tops (36 cm length, 24 cm width, 19 cm height). The cages were lined with cellulose bedding (Comfort Bedding, BioFresh, Ferndale, Washington) and were kept inside light-tight, ventilated chambers maintained under a light-dark cycle with 12 h of light per day (12L:12D) in a room kept at 25° C with 25% relative humidity. I provided nest-building material of thin strips of crinkled paper (Crink-I-Nest, Andersons Lab Bedding Products, Maumee, Ohio) and square cotton pads (Signature Care, Better Living Brands, Pleasanton, California). I provided Purina rodent chow (Rodent Diet 5001, Lab Diet, St. Louis, Missouri) *ad libitum* on the metal cage top, which also held a water bottle with a sipping tube extending into the cage. I provided fresh carrot slices and grapes three times a week.

The four females gave birth 14–19 April. The litter sizes were 10, 10, 10, and 12, which fall within the range of six to 14 reported for a sample of 31 litters from Oregon (adjacent to Idaho) as assessed by autopsy (Whorley and Kenagy 2007). The pups were born with purple skin



FIGURE 1. White-tailed Antelope Squirrel (*Ammospermophilus leucurus*) from Owyhee County, Idaho. (Photographed by Roberto Refinetti).



FIGURE 2. Development of White-tailed Antelope Squirrel (*Ammospermophilus leucurus*) pups in captivity: (Left) Postnatal day 2, (Middle) day 24, (Right) day 36. (Photographed by Roberto Refinetti).

color and with the eyes closed (Fig. 2). By 9 d of age, the skin began to show some darker pigmentation. By day 13, the eyelids became conspicuous but remained closed. By 19 d, a light, soft body pelage was noticeable. By 24 d, body stripes were showing along the flanks (Fig. 2). After 30 d, the eyes were opened, and pups began to venture out of the nest. After 35 d, the pups were exploring the cage more extensively and starting to nibble on solid food (Fig. 2). After 40 d, all pups moved extensively around the cage and consumed solid food. All pups were successfully separated from their mothers at postnatal day 60, when body mass ranged from 66 to 95 g. I provided grapes *ad libitum* to the recently weaned animals to ensure appropriate hydration.

I initially weighed pups in groups and later individually in intervals of 11 d. The growth curve based on weight gain for squirrels from Oregon is similar to the curve by Pengelley (1966) from four litters raised in the laboratory by females trapped in the Mojave Desert in California (Fig. 3). Both curves show an acceleration of growth around day 40, when the pups start to eat solid food. The similarity of the two curves reveals little difference in the growth of captive White-tailed Antelope

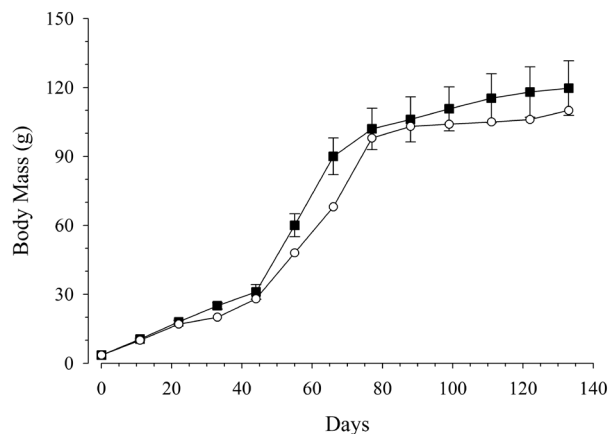


FIGURE 3. Growth curve of White-tailed Antelope Squirrels (*Ammospermophilus leucurus*) in captivity. Closed squares: data from this study (means \pm SD). Open circles: data from Pengelley (1966).

Squirrels from the Mojave and Great Basin deserts. As is the case in primates (Altmann et al. 1981; Cheverud et al. 1992; Bolter and Zihlman 2003), it is likely that captive individuals have accelerated rates of growth in comparison to their wild counterparts.

Litter size cannot be reliably compared because of the small number of litters in both cases, but the litter size reported by Pengelley (1966) in California (range, 8–11 pups) was slightly smaller than what I found in Idaho (range, 10–12 pups). In the wild, mean litter size is known to be smaller in California (7.4) than in Oregon (9.3) and even smaller further south in Baja California (5.9; Whorley and Kenagy 2007). Benchmarks of development, such as the timing of the onset of skin pigmentation and opening of the eyes, were also similar to observations for California squirrels (Pengelley 1966), except that the Idaho animals opened their eyes, and later could be weaned, about 5 d ahead of the California animals. In general, my observations from Idaho are in agreement with observations from California that the young of White-tailed Antelope Squirrels are born in larger litters and develop more slowly than the young of three other ground squirrel species, Golden-mantled Ground Squirrel (*Callospermophilus lateralis*), Mohave Ground Squirrel (*Xerospermophilus mohavensis*), and Round-tailed Ground Squirrel (*Xerospermophilus tereticaudus*; Pengelley 1966).

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