

DENSITY, GROWTH, AND HOME RANGE OF THE LIZARD *UTA STANSBURIANA STEJNEGERI* IN SOUTHERN DONA ANA COUNTY, NEW MEXICO¹

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ABSTRACT.— Side-blotched lizards, *Uta stansburiana*, were marked and recaptured on a study plot near Anapra, Dona Ana County, New Mexico, during the summer of 1971. The density in July was estimated to be 20.3 individuals per acre (50.2 per hectare). The home range size for males averaged 0.254 acres and for females, 0.097 acres. Males 48-53 mm s-v increased 0.034 mm/day in s-v length and 0.067 mm/day in tail length from middle July to early September. Females 41.5-46 mm s-v increased 0.028 mm/day in s-v length and 0.058 mm/day in tail length during the same period.

During the past hundred years the vegetation of southern New Mexico has changed from a desert grassland climax to a desert climax (York and Dick-Peddie, 1969). Presumably, there have been major changes in the composition of the vertebrate fauna and the relative abundance of different species. Preliminary investigations of the lizard fauna on a study plot located near Anapra, Dona Ana County, New Mexico, were begun during the summer of 1970 in order to determine species composition, relative abundance, and other ecological parameters of the different populations. Data gathered on *Uta stansburiana stejnegeri* during the summer of 1971 have been analyzed and are presented and compared with the results of other investigators.

METHODS

A study plot measuring 100 yards to a side (10,000 sq yd; 2.07 acres) was constructed on the morning of 18 July 1971 and marked with numbered and lettered stakes at 50 ft intervals forming 36 quadrats. Observations were begun on the same afternoon. The study plot was worked by two observers on 14 visits and by one observer on two visits through 29 July. Lizards were collected by noosing and marked by toe clipping. Numbers were painted on the backs of lizards with a water-base paint to facilitate recognition with a minimum of recaptures. The point at which the lizard was first seen was noted, and the number of feet to the nearest stake recorded in order that the home range could be reconstructed. The sex, snout-vent length, tail length, and length of any regenerated portion of the tail was determined for each lizard at the time of first capture.

We attempted to estimate density by marking all individuals on the study plot and have followed Tinkle and Woodard (1967) in considering individuals as residents if most of the capture points were within the study plot. The study plot and its immediate periphery were patrolled in different patterns to avoid biasing the observations.

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Only individuals with five or more recapture or sighting points (up to a maximum of 10) during the July period were used for determination of home range. The study area was worked again on three occasions (4-6 Sept.) in order to recapture individuals marked in July for the determination of growth rates.

Two methods were used to describe the vegetation of the study plot. A direct count of the larger plants which could supply cover for the lizards was made. In addition, ten groups of four one-meter-square plots were selected randomly utilizing a random numbers table to determine the quadrat, coin tosses to determine the quarter of the quadrat, and stick toss to determine the one-meter plots. All of the plants were low; therefore, the basal area (shade area) was determined for each individual plant present. Frequency and coverage estimates were calculated. The vegetation analysis was conducted in September, and the area occupied by annuals and other plants that sprouted during the summer rainy season was subtracted in order to approximate plant coverage for July.

STUDY AREA

The study area is in the southern part of Dona Ana County, New Mexico, along the United States-Mexico boundary (lat. 31°47' 10"N, long. 106°35'05"W). It is situated at the edge of the La Mesa Surface near the Rio Grande and the town of Anapra at an elevation of 1250 m. The area consists of low dunes of windblown sand which attain a maximum height of 1.3 m and which are covered sparsely by vegetation. Larger plants on the study plot providing cover for lizards are 68 *Larrea tridentata*, 52 *Yucca elata*, 27 *Dalea scoparia*, 4 *Prosopis glandulosa*, and 2 *Ephedra* sp. Plant coverage increased from about 19 percent at the time the study was initiated to 31 percent in September. Frequency and percentage of total coverage for plants encountered in 40 one-meter-square plots selected at random are presented in Table 1. Botanical preparations of a majority of the species encountered in the study area have been deposited in the Museum of Arid Land Biology, University of Texas at El Paso.

TABLE 1. Relative coverage and frequency of plant species determined from one-square-meter plots (N=40) selected at random in the study area during September 1971.

Name	No. Plants	Relative Coverage	Frequency (%)
<i>Larrea tridentata</i>	17	46.9	18
<i>Salsola kali</i>	20	10.1	30
<i>Amaranthus</i> sp.	41	16.7	53
<i>Sporobolus giganteus</i>	12	3.1	15
<i>Sporobolus flexuosus</i>	4	2.9	10
<i>Erioneuron pulchellum</i>	7	1.1	13
<i>Tidestromia</i> sp.	5	4.3	10
<i>Dalea scoparia</i>	4	9.8	8
<i>Yucca elata</i>	1	4.0	3
Others	8	1.2	10

Weather data for the El Paso International Airport, located about 21 km east of the study area, are available (Orton, 1969). The average annual precipitation is 20.04 cm, about half of which falls between June and September. El Paso averages 101 days a year in which the maximum temperature is 32.2 C or above and only one day a year in which the maximum temperature is 0 C or below. The percentage of possible sunshine is 83. Extremes of temperature range from -22.2 to 41.1 C.

Uta stansburiana is the most abundant lizard on the study plot. Other reptiles collected on the study plot are *Sceloporus undulatus*, *Phrynosoma cornutum*, *Cnemidophorus tigris*, *Crotaphytus wislizeni*, *Masticophis flagellum*, and *Crotalus viridis*.

POPULATION DENSITY

During July a few hatchlings were beginning to appear in the population. One hatchling was marked and two others were seen; however, they were not included in the population estimates. Estimates pertain only to individuals that have overwintered at least once. The smallest of these individuals was a 39 mm s-v immature male; however, most of the individuals were sexually mature.

A total of 45 lizards were marked. Population estimates based on 42 individuals having all or a majority of capture points within the study plot are 20.3 individuals per acre or 50.2 per hectare. The sex of one individual was not determined, but of the remaining 44 individuals marked, the sex ratio was equal. Turner et al. (1970) found density estimates for four Nevada study plots over a three-year period to vary from 25.7 to 113.1 individuals per hectare. The mean estimates of the four plots for the years 1966 and 1968 show close agreement to the results reported here with estimates of 56.8 and 42.5 individuals per hectare respectively. The 1967 estimate of 80.3 is considerably higher than the Anapra estimate and indicates that wide fluctuations may occur at a given site.

Tinkle and Woodard (1967) compared densities of three populations of *Uta stansburiana* located in Texas, Colorado, and Nevada. Estimates ranged from 12.6 individuals per acre (Nevada, June-July 1964) to 17.5 per acre (Colorado, June-August 1965), which are lower than the Anapra estimate. Other estimates of the size of *Uta stansburiana* populations in Nevada during June (Tanner and Jorgensen, 1963; Tanner and Hopkin, 1972) range from 4.5 to 10.4 individuals per acre and are also lower than reported for Anapra. The El Paso area was experiencing a severe drought just prior to the study, with an official rainfall of less than 2 cm for the first six months of 1971. This suggests the possibility that the estimate of 20.3 individuals per acre may be lower than normal.

HOME RANGE

Home range size estimates were determined from recapture radii (mean radius plus 2s) for individuals with five or more points of capture or sighting. This method is considered the most reliable

for estimating the home range size of *Uta stansburiana*, although there is some disagreement relating to the minimum number of points to be used (Jorgensen and Tanner, 1963; Tinkle, 1967; Tinkle and Woodard, 1967).

The average home range area for 9 males was 0.254 acres (0.046-0.712 acres). The average home range area of 11 females was 0.097 acres (0.016-0.164 acres). These estimates are consistently lower than those reported by Jorgensen and Tanner (1963) and Tinkle and Woodard (1967). Jorgensen and Tanner (1963) report home range sizes of 0.98 acres (adult males), 0.68 acres (adult females), and 0.42 acres (juveniles) for *Uta stansburiana* on the Nevada Test Site. Tinkle and Woodard (1967) report home range sizes for *Uta* in Texas, Colorado, and Nevada ranging from 0.27 acres (Colorado) to 0.50 acres (Texas) for males and 0.12 (Nevada) to 0.23 (Colorado) acres for females. Density figures for the populations studied by Jorgensen and Tanner (1963) and Tinkle and Woodard (1967) are lower than those reported for Anapra. Tinkle (1967) has determined that the juveniles establish home ranges by penetrating and continually expanding their initial home range until they can no longer do so. This suggests an inverse relationship between density and home range size and indicates that the Anapra estimates are comparable to those obtained by other investigators.

GROWTH

The study area was worked between 4 September and 6 September 1971 to recapture lizards marked during July in order to determine summer growth rates. During the period of July through September, rainfall, plant growth, and presumably insect abundance are maximal. Most, if not all, of the period is within the breeding season of *Uta*, and many of the females collected in July were gravid. Growth data for males and females are summarized in Table 2.

Tanner and Jorgensen (1963), Tanner (1965), Tinkle (1967), and Tanner and Hopkin (1972) present growth data for *Uta stansburiana*. Tinkle (1967) presents daily growth rates of adult *Uta* from near Kermit, Texas. Daily growth rates of 0.17 mm (males) and 0.24 mm (females) for the August-September period and 0.10 mm (males) and 0.32 mm (females) during the June-July period are considerably higher than reported for Anapra lizards (Tinkle, 1967). It is possible that the discrepancy may represent the inclusion of many immature individuals in the size classes Tinkle (1967) constructed, whereas all of the Anapra lizards are reproductive. Growth data for Nevada and Utah *Uta* (Tanner and Jorgensen, 1963; Tanner, 1965; Tanner and Hopkin, 1972) indicate that adults increase in size at rates more comparable to those reported for the Anapra population.

Tail-growth rates as high as 0.13 mm/day for 9 males (46-50 mm s-v) and 0.05 mm/day for 3 females (42-46 mm s-v) are reported by Tinkle (1967) for *Uta* collected during September through November near Kermit, Texas. These rates are comparable to those

determined for Anapra lizards; however, Tinkle's June through August sample rates of 0.01-0.02 mm/day are lower (Table 2). Rates of increase for total length are included for future comparisons (Table 2).

TABLE 2. Daily growth rates of *Uta stansburiana stejnegeri* in southern Dona Ana Co., New Mexico, marked between 18 July and 26 July and recaptured during 4-6 September 1971.

Sex	S-V Size Range July	N	Increase S-V (mm/day)	Increase Tail (mm/day)	Total Increase (mm/day)
Males	48-53	10	0.034	0.067 (N=6)	0.105 (N=6)
Females	41.5-46	10	0.028	0.058 (N=5)	0.099 (N=5)

LITERATURE CITED

- JORGENSEN, C. D., AND W. W. TANNER. 1963. The application of the density probability function to determine the home ranges of *Uta stansburiana stansburiana* and *Cnemidophorus tigris tigris*. *Herpetologica* 19(2):105-115.
- ORTON, R. B. 1969. Climates of the states (Texas). U.S. Dept. Commerce, Env. Sci. Serv. Admin., Env. Data Service, pp. 1-46.
- TANNER, W. W. 1965. A comparative population study of small vertebrates in the uranium areas of the upper Colorado River Basin of Utah. Brigham Young Univ. Sci. Bull., Biol. Ser. 7(1):1-31.
- TANNER, W. W., AND J. M. HOPKIN. 1972. Ecology of *Sceloporus occidentalis longipes* Baird and *Uta stansburiana stansburiana* Baird and Girard on Rainier Mesa, Nevada Test Site, Nye County, Nevada. Brigham Young Univ. Sci. Bull., Biol. Ser. 15(4):1-39.
- TANNER, W. W., AND C. D. JORGENSEN. 1963. Reptiles of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 3(3):1-31.
- TINKLE, D. W. 1967. The life and demography of the side-blotched lizard, *Uta stansburiana*. Misc. Publ. Mus. Zool., Univ. Mich., No. 132, p. 1-182.
- TINKLE, D. W., AND D. W. WOODARD. 1967. Relative movements of lizards in natural populations as determined from recapture radii. *Ecology* 48:166-168.
- TURNER, F. B., G. A. HODDENBACH, P. A. MEDICA, AND J. R. LANNOM. 1970. The demography of the lizard, *Uta stansburiana* Baird and Girard, in southern Nevada. *J. Anim. Ecol.* 39:505-519.
- YORK, J. C., AND W. A. DICK-PEDDIE. 1969. Vegetation changes in southern New Mexico during the past hundred years, pp. 155-166. In W. G. McGinnies and B.J. Goldman [ed.] *Arid lands in perspective*. Am. Assoc. Advance. Sci., Washington, D.C.



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