

Movements and Home Range of Hatchling and Yearling Gopher Tortoises, *Gopherus polyphemus*

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ABSTRACT. – Fourteen hatchling gopher tortoises were released at their nests within one day of emergence and located daily with radiotelemetry for up to 22 months. Active and dormant periods were evident from burrow activity observations and were found to be closely related to environmental temperature. Most hatchlings dug burrows within one day of release; the mean distance of the first burrow from the nest was 14.6 ± 6.3 m. The mean daily location was 7.7 ± 6.5 m from the burrow. The tortoises dug a total of 83 burrows at a mean rate of 4.8 burrows/tortoise-year and at a mean distance of 17.1 ± 23.7 m apart. The mean home range during the active period was 363 ± 265 m², significantly larger than dormant period home ranges. The mean annual range of nine tortoises surviving a year was 2032 ± 1307 m², and their mean total range at the end of the study was 2554 ± 1382 m². We suggest annual or total ranges should be employed by wildlife managers in estimating the area requirements of this species.

KEY WORDS. – Reptilia; Testudines; Testudinidae; *Gopherus polyphemus*; tortoise; hatchlings; ecology; movements; home range; activity patterns; telemetry; Florida; USA

The gopher tortoise, *Gopherus polyphemus*, has sustained population declines primarily because of habitat destruction resulting from urbanization and other human activities (Auffenberg and Franz, 1982). Attempts to slow the declines have escalated recently (Diemer, 1986), and in Florida, relocation of imperiled populations is sometimes chosen as a partial solution (Diemer, 1989). The practice of relocation led Cox et al. (1987) to estimate the minimum area required by an adult animal based on home range measurements by McRae et al. (1981). Those estimates were similar to gopher tortoise ranges estimated by Auffenberg and Iverson (1979), Wright (1982), and Douglass (1986) based on recapture. Diemer (1992) found home ranges of adult tortoises to be larger than those reported by McRae et al. (1981).

Gopher tortoises dig burrows in which they sleep, hibernate, and avoid high temperatures, desiccation, and predators (Pritchard, 1979). Adult burrows average 4.6 m long and 1.8 m deep, and sand excavated from the tunnel is piled in a mound or "apron" just outside the burrow mouth (Hansen, 1963). The apron is a site for basking, courtship, and copulation (Douglass, 1986); and in some cases females deposit eggs in a nest about 10–20 cm deep in the apron (Iverson, 1980).

Adult tortoises and their burrows are relatively easy to locate, but in an intensive nine-year study on the Archbold Biological Station in southern Florida, only 59 tortoises under 100 mm in plastron length were observed (Douglass, 1978). Only three studies to date report on movements and ranges of juvenile or hatchling gopher tortoises. McRae et al. (1981) reported movements of juveniles and hatchlings based on capture and field observations. Radio telemetry

was used by Diemer (1992) in northern Florida and Wilson et al. (1994) in southern Florida to track juveniles (1–4 yr). This paper presents the first study of activities and home ranges of gopher tortoises beginning with emergence from the nest using radio telemetry. We observed the tortoises to identify periods of dormancy and activity, to determine how many burrows they dug, how far burrows were from one another and from the nest, the length of daily movements from the burrow, and to estimate seasonal, annual, and total home ranges.

MATERIALS AND METHODS

Study Area. — Our 13 ha study site is located in the southwestern quadrant of the campus of the University of North Florida, Jacksonville, Duval County, Florida. It is bordered to the north and south by thick saw palmetto (*Serenoa repens*), west by a four-lane highway, and east by a slough. Soils in the area include Kershaw and Ortega fine sands (Soil Conservation Service, 1978).

The ecosystem is a sandhill, but with turkey oak (*Quercus laevis*) as the dominant woody species rather than longleaf pine (*Pinus palustris*). Myers (1990) calls these "turkey oak sandhills" and attributes their existence to changes in natural fire regimes that controlled encroachment of hardwoods onto the sandhill. This land was acquired in 1969 to build the university, and the fire management practices before that are unknown. The first recorded controlled burn of the area was initiated in early 1982 and completed in the winter of 1984 (no burning occurred in 1983). The site was burned again in the winters of 1985 and 1986, then not again until the fall of 1991.