A STUDY OF A POPULATION OF THE SLENDER GLASS LIZARD IN WAUSHARA CO., WISCONSIN

The slender glass lizard *(Ophisaurus attenuatus),* a limbless member of the family Anguinidae, is one of the few lizards found in the state of Wisconsin. Records indicate that it is found locally in several sandy areas in the southern half of the state but little was known about its abundance in any of these areas before the present study was conducted in 1973 and 1974.

The study area was located in Waushara Co. near the town of Redgranite. This is within that area known as the central sand counties, the subject of Aldo Leopold's *A Sand County Almanac* (Leopold, 1949). There is a gradient of vegetation types which fit under the general category of oak savanna as used by Curtis (1959). The area is characterized by low, open forests of Hill's oak and black oak *(Quercus ellipsoidalis* and *Q. velutina)* interspersed with grassy areas which included many prairie species. For a more complete vegetation description of a very similar area in nearby Marquette Co., see Whitford and Whitford (1971). The slender glass lizard is generally considered an animal of prairie habitats and requires loose soil in which to burrow. These sandy oak savanna areas provide both loose soil and a grassland habitat. Unfortunately, these oak openings are also useful for both farming and pine plantations, and undisturbed oak openings are becoming fewer and farther between.

The slender glass lizard is a snakelike animal up to 70 cm. in length, two thirds of which is a long, fragile tail. It is brown with longitudinal black stripes and can be separated from true snakes by the presence of eyelids and external ear openings. Its protective coloration makes the animal almost invisible against a background of dried grass. It feeds primarily on insects, but will feed on other animals if it can capture them. The lizards' predators include hawks, badgers and perhaps foxes.

Many aspects of the ecology of *Ophisaurus* were considered during the course of the study, only some of which can be summarized here as follows:

Population – Animals were marked to enable individual identification by removing scales from the ventral surface. The population estimates were made using a multiple mark-recapture method (Chapman, 1952) for each year of the study. The population estimates based on over 200 encounters of approximately 70 individuals were 1.7 lizards per ha. in 1973 and 1.2 lizards per ha. in 1974. There was no significant difference between these two estimates, indicating a relatively stable population during the study.

Activity – Daily activity in the spring and fall was as expected in an ectothermic animal. That is, the animal was active around mid-day in order to take advantage of the warm temperatures. In many species of lizards, this activity pattern is shifted in midsummer to morning and evening hours to avoid the hot, noonday sun. In *Ophisaurus,* summer activity was shifted entirely to evening hours, with no activity occurring in the morning. This absence of activity in the morning may be related to the avoidance of the very wet conditions found every morning caused by the heavy dew in this area.

Seasonally, activity occurs from May into September with peaks occurring in early June and in August. The early June peak has been attributed to reproductive activity of males actively seeking females (Fitch, 1967). The August peak probably involves increased search for food after the breeding season and in preparation for hibernation.

Growth – The population of lizards studied in this project was located near the northern limit of the range of this species and it was felt that an examination and comparison of growth rates between this population and one nearer the species center of distribution (studied in Kansas by Fitch, 1967) would be useful. As one would expect from the shortened warm season in Wisconsin, the growth rates were considerably slower for the northern population (Table 1).

Table 1. Average length and weight of *Ophisaurus attenuatus* in Wisconsin (present study) and in Kansas (Fitch, 1967).

Year Class	SVL* in mm		Weight in g	
	Wisconsin	Kansas	Wisconsin	Kansas
1st	62	60	1	1
2nd	88	120	3	9
3rd	114	180	8	30
4th	155	210	22	47
5th	186	220	37	55
Largest	232	285	63	121

*SVL = snout to vent length

Habitat – The actual capture sites were studied carefully and the lizards were found almost exclusively in areas of dry grass with little bare sand. One would expect this as the lizard would be very conspicuous anywhere else. What was important was that this habitat was not only found in the oak openings, but also along the shoulders and ditches of roads. The road shoulder areas are cut by the county to maintain good driving conditions and are ideal lizard habitat. Not only do these mowed grass areas provide corridors between the oak openings for

the lizards, but a higher population of lizards was maintained in the ditches than anywhere else. The importance of the practice of hand or mechanical cutting of these ditches cannot be overemphasized in considering the maintenance of the population and a switch to chemical weed control could seriously jeopardize the lizard population in this area.

Home Range – The animals' home range for most of the activity season was quite small (.07 and .15 ha. for 1973 and 1974, respectively). However, the hibernation sites may be long distances from the areas occupied during the summer, and the mating season also results in long movements for some individuals. If these movements are included in the home range calculation, the above values are greatly increased.

The factors limiting the range of this species to no farther north than Waushara County, Wisconsin do not appear to be related to unsuitable climate or lack of habitat farther north. The sandy jack pine barrens farther north would seem ideal and the climate is not that much different. Indeed, these Waushara Co. sandy areas in the present study enable the lizard to burrow much deeper to avoid cold than would be possible in its more normal tall grass prairie habitat farther west. This probably explains the absence of the lizard from this latitude (44° N.) in the prairie states. Rather, the distributional limit seems to have been set by the non-suitable habitat barrier between the central sand counties and the northern pine barrens and by the glass lizards' own rather poor powers of dispersal. Fitch (1967) noted that it took years for the species to repopulate a suitable area in Kansas. The lizard also has such an apparent avoidance of open areas that a black top road may isolate two populations. Further, casual observations indicate that the animal may not be able to swim and thus, a stream could be a nearly insurmountable barrier to invasion of new areas.

In closing, it should be noted that the study of non-game animals is important in encouraging the preservation of these species in their natural habitats and in providing information to indicate what, if any, protective measures are in order.

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