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NOTES ON THE LIFE HISTORY
OF EUMECES SKILTONIANUS SKILTONIANUS¹

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One of the most interesting lizards in Utah is our representative of the sincoids, *Eumeces skiltonianus skiltonianus* (B. & G.). This attractive lizard, with its bright blue tail and the four light body stripes across its dark body, attracts the attention of laymen as well as students. The color pattern is very striking in the young and the adult males. The females are less colorful. I have examined females with but little blue in their tails, and only faint body markings. This drab color seems to persist during the entire year and is not in any way related to the mating or egg laying period. In my experience during the past summer, the sexes can be readily distinguished by the intensity of the blue color. The brilliant blue tail of the males was always the most noticeable body part. I am in agreement with a study² made recently, suggesting that the tail factor has survival value for this genus.

The following notes on the life history of Skilton's Skink are based on specimens collected and nests observed during the summer of 1939, while the writer was collecting in northwestern Utah county. These specimens are now in the Brigham Young University Herpetological collection.

Other specimens were collected during the early summer of 1941 and 1942. Those taken in the latter year were placed in three cages. Two cages contained two females and one male each; the third cage contained one pair. Each cage was provided with a thick layer of loose soil mixed with rocks. Two cages were placed under trees in order to provide conditions as near that of the collecting area as possible. The third was kept in the laboratory. In spite of careful feeding and observation no mating activities were observed in either, nor were there any eggs laid.

Other specimens in the collection, collected from various parts of the state, Washington, San Juan, Beaver, Millard, San Pete, Summit,

¹ Contribution No. 107, Department of Zoology and Entomology, Brigham Young University.

² Jopson, Harry G. M. 1938. Observation on the survival value of the character of the blue tail in *Eumeces*. *Copeia*, June 30, 1938, No. 2, pp. 90.

and Utah Counties, indicated that this species is quite widely distributed over the entire state of Utah.

DESCRIPTION OF THE NESTS

Five nests of these lizards were found and placed under observation and study for two weeks, August 2 to August 15 in 1939. The nests were all located on the south side of a small rocky point. The rocks were not excessive in size and were partly shaded by sage, *Artemisia tridentata*, oak, *Quercus gambellii* and with a few Utah junipers, *Juniperus utahensis* scattered through the sage. Only two (2) nests were associated with rocks which were shaded. The others were in the open.

My discovery of these underground dwellings came as a great surprise, while turning rocks in search for snakes. My interest was intensified when I found that only a little had been written about the nesting habits of this species. The only reference in the literature referring to the reproduction of this lizard, I have been able to find, is one by Dr. John Van Denburgh.³ Dr. Van Denburgh states: "Mr. Edmund Heller secured the eggs of this lizard at Pacific Grove, California. The five eggs were spherical and of a blackish brown color, with soft flexible shells. They were about the size of a Chipping Sparrow's egg (*Spizella socialis occidentalis*). He found them in an open field, among a rock pile, under a flat rock. They were covered with about half an inch of loose earth. The female was found under the rock with them. The date was about June 15, 1898. The eggs were far advanced in incubation, the embryos presenting nearly all the adult characteristic markings, coloration, etc."

Dr. Edward H. Taylor in his extensive report on the genus *Eumeces*⁴ makes but little reference to the habits of Skilton's Skink; his report deals entirely with the taxonomy and distribution of the species. In this respect it is most complete; in this report I am dealing only with life history notes.

The following notes are presented in the belief that they may be of interest, and a contribution to the present information of our western reptile fauna.

³ Van Denburgh, John, 1922. Reptiles of the Western United States. Occasional Papers of the California Academy of Sciences. Vol. 1, Lizards, pp. 84.

⁴ Taylor, Edward H., 1935. A Taxonomic Study of the Cosmopolitan Scincoid Lizards of the Genus *Eumeces*. Bull. Univ. of Kan., Vol. 36, No. 14, pp 410-428.

Nest Number One

The first nest was found $9\frac{1}{2}$ inches below the surface of the ground and $3\frac{1}{2}$ inches in the soil from the uphill side of the rock. The small hole leading to the nest was one inch in diameter, while the nest had been rounded out and was $2\frac{1}{2}$ inches wide. The floor of the nest was covered with loose moist soil. No leaves or debris was present. This nest contained four newly incubated lizards and the adult female. The entire family was collected and preserved. The measurements were taken soon after the lizards were killed. (August 3)

Nest Number Two

The second nest was found soon after the first. It was eight inches below the surface of the ground and three inches in the soil from the uphill side of the rock. The hole leading into the nest was $\frac{5}{8}$ of an inch wide and $1\frac{1}{2}$ inches high. The nest itself was nearly three inches wide. The nest contained four (4) eggs. They were white and very uniform in size. The eggs measured 15–16 mm. long and 9–10 mm. wide. One side of each egg was slightly distended. The eggs were in the center of the nest, and were not in any sense covered with soil. The soil below them was moist and loose. When the rock was moved the eggs were noticed at once. Before I could examine them, the female came from the back of the nest, saw me, and deserted her nest. She was captured and one toe on the right hind foot was clipped off for identification. The female was returned to her nest, and the eggs left for observation and incubation. (August 3)

Nest Number Three

The third nest was found under one of the largest rocks on the hillside. The outside entrance apparently did not go under this rock, but along the side. The entrance tunnel was about 15 inches long. The nest was located in the soil about $2\frac{1}{2}$ inches above the bottom of the rock and eight (8) inches below the surface. This was the largest nest found; it measured $3\frac{1}{2}$ inches wide and $1\frac{1}{2}$ inches high. The nest contained four (4) newly hatched lizards and the female lizard. Soon after the rock was moved the female lizard deserted her nest. No effort was made to capture her, instead rocks were placed around the entrance leading to the eggs; this was done to protect the nest from the loosened soil. I then remained a few feet away to observe.

After ten minutes I observed her in the oak and sage leaves at the

edge of the hole by the rock. For several minutes she explored the hole thoroughly, as well as the rock pile which protected her eggs, passing the entrance to the eggs several times. Finally, very cautiously she entered the nest and remained. (August 3)

Nest Number Four

Nest number four was found at the edge of a large flattened rock, which was under a sage brush. Upon moving the rock the nest was clearly visible. It contained four (4) eggs. The eggs were in a nest about 3 inches wide and about $1\frac{1}{2}$ inches high. The entrance to the nest was level with the base of the rock. The nest was not disturbed further that day. (August 3)

Nest Number Five

The next morning I found the fifth nest. Of all the nests this one was most difficult to locate. The tunnel was located under a small rock and between two other rocks. These were moved and the tunnel was found under still another rock, at the back of which two (2) eggs and the female guardian were found. The nest was ten inches below the surface. It was small, being only 2 inches wide and 1 inch high. No attempt was made to capture the female at this time.

The nests were all found within a short distance of each other. The extreme distance being 200 feet. It is interesting to find that a female was found in each of the five nests.

THE EGGS AND YOUNG LIZARDS

In this study ten eggs and eight young lizards were observed. The eggs were uniformly white in color and all were uniform in size (15-16 mm. long and 9-10 mm. wide). From a short distance away they appeared as sparrow eggs. At the time of discovery none of the eggs were covered, not even in part, but were lying on the floor of the nest not more than a fourth of an inch apart. The day after my discovery of nest number two (2) an egg was removed from it in order to observe the extent of incubation. The young embryo was well formed and measured 57 mm. The other eggs from this nest hatched August 14, eleven days after they were discovered. The largest specimen measured 69 mm.

In locating nest number five (5) one of the eggs was injured. This egg was opened and studied. The embryo in it was alive and measured 62 mm., total length, and 34 mm., tail length. The second egg hatched four days later, August 8, and measured 66 mm. in length. From my study of the embryos from nests two and five it appears

that for the last few weeks the embryo develops at the rate of about one mm. per day. The other eggs were observed while hatching, and in each nest (2 and 4) the eggs all hatched within a few hours of each other. Example: Nest four was observed at 2:30 p. m., August 13. One egg was hatching. At 10 p. m. all eggs had completed their hatching.

The young lizards taken from nest one (1) had, from all appearances, just completed hatching a few hours before they were collected. Their measurements were almost identical with those hatched later. Nest three (3) was left for observation. No measurements were taken since they appeared identical with those in nest one (1). After observing this nest for several days the "family" suddenly disappeared. I searched relentlessly in the hope of finding them under a nearby rock. After working a radius of 43 feet from the nest a small garter snake *Thamnophis o. vagrans* B. & G. was collected. After examining it, it was found to have just eaten a meal of four (4) young lizards, two of which had not been digested. They were 4 to 5 mm. longer than the average newly incubated lizard. Whether they were from another nest or from the one under observation is not known. It is my opinion they represent a new family.

During my spring collecting, a young skink was collected about three miles from the nesting area described above. This lizard was collected May 15, 1939 and measured 90 mm. long. In appearance this lizard is the same as those observed in August. From my findings it appears that *Eumeces s. skiltonianus* in Utah "nests," mostly if not entirely, from the first of July until late August.

INTERESTING HABITS

During the study of this species only rarely were specimens observed out feeding or moving from one place to another. Most specimens observed were seen only after they had been molested by turning rocks. On one occasion two specimens were observed in a small opening among the oak brush. Upon approaching too close, both hurried into the loose dry oak leaves. As they moved across the opening their blue tails were vigorously wiggled, as if to attract one's attention. This tail wiggling was observed in all specimens, even the young lizards exhibited it.

One morning while observing in the nesting area, one of the females was seen a short distance from her nest. Her movements through the leaves and rocks were slow and with a jerky motion. Her

ability to creep over and through the dry leaves without making a noise was amazing. The fact that these forms are very secretive in their habits explains in part why more were not seen. Their movements and habitats must also be regarded as an important factor.

The most interesting habits observed were those associated with the "nesting" females. As stated above, all nests were cared for by a guardian; this term has been applied to the female since in every instance she was present at the nest. In some cases the area around the nests was completely changed due to the turning of the rocks. In spite of these changes the guardian was undaunted in her efforts to remain with the eggs or the young. For a few days it appeared as though nest No. 2 had been deserted, but after 6 days she was again on duty. Of the five (5) nests observed only one lizard made any attempt to remain with the nest while it was being uncovered and investigated. This lizard, in nest 4, was a real guardian. Each day she appeared in front of her eggs and attacked any object thrust into the entrance. On August 4, with the aid of a small stick, an attempt was made to remove one of the eggs for examination. No sooner had the egg been touched than she attacked the stick, biting it and holding on tenaciously. In removing the stick she was pulled with it to the mouth of the entrance. Here she released her hold and returned to the nest. A second attempt resulted in the same activities. No other lizard showed so much concern about her nest. Each day as the nest was visited she would engage in the same defense of her eggs.

On August 10, the eggs from nest 2 and 4 were collected. In collecting them a small stick was used to roll the eggs out of the hole. As before the stick was attacked several times by the female in nest 4 before the eggs could be rolled toward the entrance of the nest. In nest 4, while the first egg was being rolled, the guardian followed close behind. As it neared the entrance, she seized the egg, after biting it several times she released it. In this encounter the egg had been ruptured slightly. The female lizard made no attempt to escape, but remained with the egg until she was collected.

In locating the nests a certain amount of disturbance of the soil at the nest entrance was unavoidable; this resulted in the guardian moving the eggs in and extending the nests. In nests Nos. 4 and 5 the females nearly filled up the entrance to the nests with soil and moved the eggs several inches farther in from the entrance.

It was interesting to note the large number of males uncovered in the nesting area. Most of them were found under rocks, but several

were found at the end of small tunnels leading 10 to 15 inches under ground. From my observations it appears that the males have underground tunnels much the same as those of the females but without an enlarged nest.

FEEDING HABITS

A number of writers have referred to this species as an insect feeder (3) (4). Dr. Woodbury⁵ observed them "feeding on flies." During this study at no time was it my good fortune to observe them feeding. An attempt to observe feeding was made while they were in captivity but without success; although it is certain that feeding did occur because the insects, grasshoppers, flies, etc., disappeared. A study of the stomach contents of six specimens reveals, at least in part, the types of invertebrates preyed upon by these lizards. Much of the food was of those forms commonly found under rocks and leaves (moths, beetles, crickets, and grasshopper remains were observed in the stomach contents). This may explain why open feeding was not observed in the nesting area.

An attempt to further study the life history of these lizards has failed to produce any information pertaining to the date of egg laying, mating or other desirable data. The study will continue in the hope that a more complete story may be told at a later date.

In order to provide a basis for comparing juvenile and adult specimens, a table of measurements and scale counts is included of those taken in the nesting area.

SUMMARY

1. In this paper the life history of Skilton's Skink, *Eumeces s. skiltonianus* (B. & G.) is discussed.

2. The lizards were found to have under ground "nests," in which the eggs were laid and protected by the females, until the young lizards were hatched, and were able to care for themselves.

3. The female lizard did not readily desert her nest.

4. The food habits were apparently quite secretive. The food consisted of insects.

5. A table of measurements reveals the size of these forms at the time of hatching and at adulthood.

⁵ Woodbury Angus M., 1931. A Descriptive Catalog of the Reptiles of Utah. Bull. Univ. of Utah, Vol. 21, No. 5, pp. 59-61.

TABLE OF MEASUREMENTS

B. Y. U. Museum No.	Nest No.	Sex	Total Length	Tail Length	Snout to Anus	Dorsals	Ventrals	Scale Rows
2217	1		70	42	28	59	63	25
2218	1		70	42	28	57	65	24
2219	1		69	41	28	57	64	24
2220	1		68	40	28	57	65	24
2222	2		57	33	24	61	66	25
2229	2		69	41	28	60	64	24
2230	2		67	39.5	27.5	58	65	25
2226	3	♀	76	46	30	60	62	26
2227	3		75	45.5	29.5	60	66	25
2223	5		61	34	27	55	66	25
2224	5		66	39	27	60	66	24
2292	4		68	40	28	58	64	26
2293	4	♀	69	41	28	56	66	25
2099			90	55	35	56	62	24
2849	1	♀	138	78	60	59	66	26
2850		♀	162	103	59	58	67	25
2239		♂	140	98	52	59	67	25
2225	5	♀	117	54	63	60	66	24
2221	2	♀	125	64	61	58	66	24
2228	4	♀	125	60	64	61	66	26
2238		♀	113	50	63	60	64	24
2237		♂	135	74	61	56	64	24
2233		♀	131	70	61	60	67	24
2232		♀	131	67	64	61	67	25
2236		♂	123	69	54	55	67	24
2235		♂	144	89	55	58	65	24
2234		♂	129	78	51	58	65	24
2231		♂	147	89	58	57	67	25