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DISTRIBUTIONAL SURVEY OF THE EASTERN COLLARED LIZARD, *CROTAPHYTUS COLLARIS COLLARIS* (SQUAMATA: IGUANIDAE), WITHIN THE ARKANSAS RIVER VALLEY OF ARKANSAS

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ABSTRACT

A distributional survey of the eastern collared lizard, *Crotaphytus collaris collaris*, was conducted in the Arkansas River Valley of Arkansas during the summer of 1988. Thirty-four sites in 10 counties were searched. Only three localities yielded colonies of lizards; all were found south of the Arkansas River. This species has a discontinuous distribution in central Arkansas; habitat depletion and overzealous collection may have contributed to the extirpation of lizards at formerly-reported localities in the Arkansas River Valley of Arkansas.

INTRODUCTION

A number of publications have provided a wealth of information on the present distributions of herpetofaunal species of the Interior Highland Region (an isolated mountainous uplands spread unevenly over the states of Arkansas, Kansas, Missouri, and Oklahoma); these include works by Anderson (1965), Collins (1982), Conant (1975), Dellinger and Black (1938), Dowling (1957), Johnson (1987), Schuier *et al.* (1972), Schwardt (1938), Smith (1961), and Webb (1970). Only a few papers have considered, in any detail, the paleo-ecological and climatological impact of the post-Wisconsin glacial period on these present-day distributions (Auffenberg and Milstead, 1965; Cole, 1971; Dowling, 1956, 1958; Holman, 1974; Porter, 1972; Smith, 1957). The late glacial climatic episode (12,000 to 9,000 yr. B.P.), also called the pre-Climatic Optimum (pine) Phase (Smith, 1957), was followed by a period of warming and aridity resulting in desert and prairie extensions into the central United States. This latter Xerothermic Phase occurred between 6,000 and 3,000 yr. B.P. (Cole, 1971; Smith, 1957) and established the Prairie Peninsular Corridor for herpetofaunal dispersal (Auffenberg and Milstead, 1965). It was during this period that xeric-adapted species of plants and animals (e.g., prickly pear cactus and the eastern collared lizard) moved from the Great Plains eastward to become residents in xeric habitats in Arkansas.

Although recent work on the life history and ecology of the eastern collared lizard, *Crotaphytus collaris collaris*, in northern Arkansas (McAllister, 1980a, 1980b, 1985; McAllister and Trauth, 1982, 1985; McAllister *et al.*, 1985; Trauth, 1974, 1978, 1979) qualifies this species as one of the most thoroughly-studied reptiles inhabiting the state, no details have been published on any aspect of its biology elsewhere in Arkansas. Conant (1975) illustrated the range of *C. c. collaris* to be throughout the Interior Highland Region; however, few locality records exist for the lizard along the Arkansas River or in the Ouachita Mountains. In the White River drainage system of the Ozark Plateau of northern Arkansas, collared lizards are commonly found on arid, rocky, sandstone/limestone "cedar glades" where they spend much of the daytime foraging for insects or basking on rock perches overlooking their territories. Because these lizards are large, colorful, active by day, and conspicuous in their habitats, they are quite vulnerable to natural predators (mainly birds and snakes) as well as to human extirpative activities. One of the most destructive practices by man is the prevention of periodic fires on glades; consequently, encroachment by the oak-hickory forest association occurs and reduces suitable environmental conditions for the existence of collared lizards.

No recent distributional information has been published on *C. c. collaris* in the Arkansas River Valley of Arkansas. Collections from Conway County (in the vicinity of Petit Jean State Park), Logan County (near Mt. Magazine), and Pulaski County (on Pinnacle Mountain) are on record at the Carnegie Museum dating back to 1944 and 1945. Only two records for collared lizards are available from the Ouachita

Mountains of western Arkansas (Polk and Montgomery counties; see Dellinger and Black, 1938; Dowling, 1957). In this report, I provide information on the geographic distribution of *C. c. collaris* within the Arkansas River Valley from Little Rock to Fort Smith. This type of biological inventory furnishes a database for future studies designed to monitor changes in unusual environments (Smith *et al.*, 1984) and is beneficial to sound conservation management.

MATERIALS AND METHODS

Thirty-four sites in 10 counties along the Arkansas River were included in this study (Fig. 1). Fieldwork was conducted from late May to early August, 1988. Both natural as well as man-made habitats were visited. Habitats were searched on sunny days during the optimal activity period (10:00 a.m. to 3:00 p.m.) of the lizards. Most habitats were photographed, and the general condition of the environment was recorded. Lizards collected as voucher specimens were deposited in the Arkansas State University Museum of Zoology (ASUMZ).

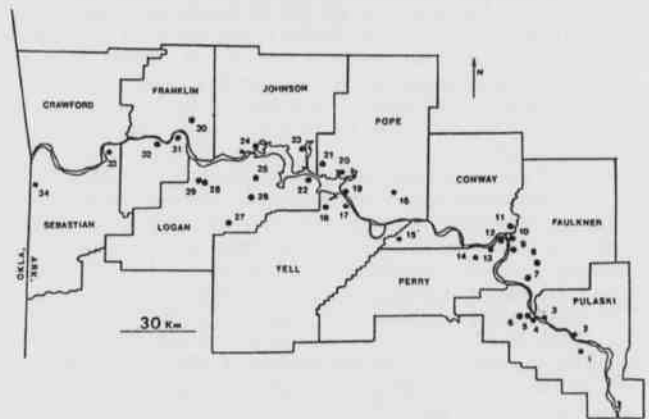


Figure 1. Map of counties along the Arkansas River from Little Rock to Fort Smith showing the location of habitats visited during this survey of the eastern collared lizard, *Crotaphytus collaris collaris*.

RESULTS AND DISCUSSION

Only three sites (15, 22, and 25) contained populations of collared lizards, and all three were located south of the Arkansas River. One, (15) in the vicinity of Petit Jean State Park, was a natural habitat while the other two populations were associated with sandstone rock quarries. The following provides a brief description of each site.

Distributional Survey of the Eastern Collared Lizard, *Crotaphytus collaris collaris* (Squamata: Iguanidae)

1—Rock quarries and open rock outcropping (Granite Mountain), ca. 1.6 km N Woodyardville, Pulaski Co. (T1N, R12W, S34). Workers at this expansive rock quarry just south of Little Rock had never observed "mountain boomers" (collared lizards) at the quarry. A rocky glade (igneous rock) was examined, and there was no evidence of collared lizards.

2—Rock quarry (vicinity of Riverview Park), North Little Rock, Pulaski Co. (T2N, R12W, S28; 29). This abandoned quarry lies along the bank of the Arkansas River and has a rocky interior suitable for collared lizards. The entire inner perimeter of the quarry was examined, and no sign (scats or fecal pellets on top of rocks) of the lizards was observed.

3—Rock quarry (Round Hill), ca. 3.2 km SE Maumelle, Pulaski Co. (T2N, R13W, S3). This active rock quarry had no collared lizards according to heavy machine operators (including one person who had worked at the quarry for 17 yrs.).

4—Rock quarry (Fulk Mountains, Pinnacle Mountain State Park), Pulaski Co. (T2N, R14W, S1). This quarry site was suggested to me by one of the park naturalists (although he had never seen any collared lizards there). The site was an excellent potential habitat, and a few fence lizards (*Sceloporus undulatus*) were observed but no collared lizards. In general, the presence of basking fence lizards on the tops of conspicuous rocks in a rocky habitat usually indicates the absence of collared lizards or that they are present in low numbers.

5—Pinnacle Mountain (Pinnacle Mountain State Park), Pulaski Co. (T2N, R14W, S3). Collared lizards were collected from Pinnacle Mountain around 40 yrs. ago by collectors passing through the state. No recent records exist according to park officials. This site may have been subjected to overcollection prior to the formation of the state park. I climbed the east and west face trails to the summit and observed potential habitat for the lizards. Park officials discourage hiking beyond designated trails; therefore, the possibility of a population still existing somewhere on the mountain is plausible.

6—Maumelle Pinnacles (east pinnacle), Pulaski Co. (T2N, R14W, S5). The two pinnacles with crests running east-west lie just west of Pinnacle Mountain. I transversed the rocky summit of the easternmost pinnacle, a distance of ca. 250-300 m. The habitat is very steep and rugged, yet collared lizards could have existed there. Hiking activities on these pinnacles could have led to the demise of collared lizards in this terrain. The westernmost pinnacle was not investigated.

7—Reynolds Mountain, ca. 4.8 km W Mayflower, Faulkner Co. (T4N, R14W, S15). A distinct clearing in the hardwood forest on the south-facing slope of this mountain consisted of exposed ledges and rocky formations that could have supported a small population of collared lizards at one time was examined. A thick layer of grasses covered areas between rocky places, and a basking fence lizard was collected at this site.

8—Rock quarry, 6.1 km N Mayflower, Faulkner Co. (T4N, R13W, S5). This abandoned quarry site, located at the easternmost rim of a northward extension of Reynolds Mountain, was well suited for collared lizards. A small lake was present at the back of the quarry and was probably used as a swimming hole for local residents. Parts of the site were being used as a dump and a firing range.

9—Rock quarry, 1.2 km S Toad Suck Ferry Lock & Dam, Faulkner Co. (T5N, R14W, S18). This isolated and abandoned quarry was probably worked during the construction of TSF Lock & Dam. The site, an excavated V-shaped trench (100 m long), was partially filled with water. While parts of the quarry were capable of harboring collared lizards, the isolated nature (surrounded by woods) of this site would restrict migrations by collared lizards.

10—Cadron Ridge bluff (at the Arkansas River), Faulkner Co. (T5N, R15W, S1). This sheer bluff overlooking the Arkansas River and active shale and sand pits situated just north of the bluff could not support a collared lizard population. Fence lizards were present at the site. Perkins (1928) reported collecting collared lizards on and near Cadron Ridge, west of Conway.

11—Shale pit, ca. 2.4 km SE Menifee, Conway Co. (T6N, R14W, S30). Although situated on a southwest-facing exposure of a small ridge, this arid pit was commonly used as a firing range. No collared lizards were observed.

12—Rock quarry (Jefferson Mountain at the Arkansas River), Perry Co. (T5N, R15W, S2). This active site can be easily seen from Site 10; however, I could not gain access to this quarry.

13—Rock quarry, ca. 0.5 km SE Stony Point, Perry Co. (T5N, R15W, S16). This extensive, two-tiered abandoned quarry has been used as a dump site for years; however, areas within the interior are well suited for collared lizards.

14—Rock quarry, 1.9 km E Houston, Perry Co. (T5N, R16W, S35). This isolated and abandoned quarry was constructed in a similar fashion as Site 9. The sloping banks form a trench that could support collared lizards.

15—Rock outcroppings (Petit Jean Mountain), near SW edge of Petit Jean State Park, Conway Co. (T5N, R18W, S6). I hiked about 200 m west of Highway 155 S through thick vegetation and underbrush to a shelfrock area commonly called "turtle rocks" because of the dome-shaped appearance of the outcroppings. I discovered four adult collared lizards in a very small restricted area. I photographed, measured, and toe-clipped three of the lizards; all were released back into the habitat. Juvenile collared lizards probably emigrate quickly from this site after hatching as it could not support a very large population. The shed skin of an eastern coachwhip (*Masticophis flagellum*), a predatory snake on collared lizards, was observed at the site. This remote population on Petit Jean Mountain will remain small because of the limited local habitat.

16—Carriion Crow Mountain, ca. 3.2 km W Atkins, Pope Co. (T7N, R19W, S13; 14). The southern edge of this mountain has an extensively-exposed rocky bluff. Unfortunately the hardwood forest has intruded to near the very edge of the bluff, effectively devouring suitable habitat for collared lizards. I investigated ca. 150 m of the bluff habitat. People living on the mountain stated that as children (in the 1920's) they saw collared lizards on the mountain.

17—Dardanelle Rock (Dardanelle Mountain), Dardanelle, Yell Co. (T7N, R20W, S30). This rock exposure (mostly a slab) contained very few loose rocks that would normally provide shelter for collared lizards. Fence lizards were common in the habitat.

18—Mount Nebo (Mount Nebo State Park), 9.6 km SW Dardanelle, Yell Co. (T7N, R12W, S18). Mount Nebo exhibits sheer bluffs on all sides. The rocky exposures are similar to situations found at the east face of Petit Jean Mountain. I have yet to find collared lizards inhabiting sheer bluff areas in Arkansas.

19—Rock quarries (Dardanelle Lock and Dam), near Russellville, Pope Co. (T7N, R20W, S18). Corp of Engineers' park personnel advised me that these quarries were mostly full of water. Access roads to the quarries were posted and gated. Workers at the park had never seen collared lizards in the area.

20—"40-acre rock", rock outcropping (Pleasant View Mountain), 5.6 km NW Russellville, Pope Co. (T8N, R21W, S24). This extensive, south-facing rocky exposure was one of the most promising natural habitats investigated. Local people told me that they had never seen collared lizards at the site. I hiked several times over most of the expansive habitat which featured cedar glades and numerous scattered small rocks near the forest edge without observing any collared lizards.

21—Rock quarry, 1.6 km N Georgetown, Pope Co. (T8N, R22W, S18). This small sandstone quarry contained several fence lizards, but there were no signs of collared lizards.

22—Rock quarries (River Mountain), ca. 4.0 km NW Delaware, Logan Co. (T8N, R22W, S27). Much of the forest habitat was mixture of hardwoods and pine; the soil was very sandy. Gas wells dotted the habitat. I visited three sandstone quarries and found collared lizards at two of them. Less than 10 lizards were observed; however, I did not explore all of the potential habitat for lizards. One voucher specimen (ASUMZ 11772) was collected at the site.

23—Bee Bluff (overlooking Dardanelle Reservoir), 2.6 km NE Knoxville, Johnson Co. (T9N, R22W, S28). This sheer bluff had no suitable habitat that would support a collared lizard population.

24—Tick Hill (at the Arkansas River), 1.3 km SW New Spadra, Johnson Co. (T9N, R24W, S27). The south-facing slope of this rock-strewn mountain which faces the Arkansas River exhibited small patches of open habitat. Fence lizards and five-lined skinks (*Eumeces fasciatus*) were abundant.

25—Rock quarries (Prairie View Mountain), ca. 2.4 km N Midway, Logan Co. (T8N, R24W, S34; 35). This complex of active and abandoned quarries contained a large population of collared lizards. At only one other location in Arkansas (Bull Shoals Dam quarry site, Flippin, Marion Co.) had I ever observed more collared lizards. These mostly sandstone quarries (surface rock) occupy around a 3 km tract of land running east-west on the top and south-facing slope of the mountain. The number of collared lizards in a 0.5 km circuit of quarry area was 28; in general, this underestimates the total population of an area by about 50%. Moreover, only 25% of one region of the quarry habitat was examined. This population represents the westernmost site for collared lizards in this study. The continued activity of quarry operations is not likely to harm this population. Two voucher specimens (ASUMZ 11615, 11616) were collected.

26—Rich Mountain (Ozark National Forest), Logan Co. (T7N, R24W, S28-30). This flat-topped mountain running east-west is a stepping stone terrace to Magazine Mountain which lies to the southwest. The mountain was important because collared lizards had been reported from it during the 1940's (Carnegie Museum Herpetological Collection Nos. 24584-85; 24593). As with many sites previously discussed, the natural habitats favoring collared lizards have, through time, been overtaken by successional vegetation. Few large rocks for basking activity and shelter were observed, and large barren tracts of land or cedar glades which typify collared lizard habitats were absent.

27—Magazine Mountain (Ozark National Forest), Logan Co. (T6N, R25W, S20-22). Several places on the top of Magazine Mountain were searched because of the previous records in the literature of collared lizards. Although no lizards were found, talus slides at the base of the summit's bluffy escarpment may harbor lizards. No evidence of these lizards could be ascertained on any cliffs or ledges, such as on Cameron Bluff on the north rim. Several six-lined racerunners (*Cnemidophorus sexlineatus*) were observed in the various habitats.

28—Short Mountain, 1.0 km N Paris, Logan Co. (T7N, R26W, S3-5). This isolated knob rises sharply above the surrounding plain; it has a rim of rocky cliffs and outcroppings. The area near the summit was searched, but this site may be too rugged to support collared lizards.

29—Horseshoe Mountain, ca. 6.0 km NW Paris, Logan Co. (T8N, R27W, S36). Horseshoe Mountain is another isolated knob similar to Short Mountain. High rocky cliffs face to the south. I did not investigate the site.

30—Rock quarry, ca. 4.0 km NE Ozark, Franklin Co. (T10N, R26W, S26). This active quarry showed no signs of collared lizards.

31—Arkansas River bluff, ca. 3.0 km E Webb City, Franklin Co. (T9N, R27W, S9). This isolated bluff overlooking Ozark Lake (Arkansas River) stretches around 2.0 km. Again, high, steep bluffs usually do not support collared lizard populations, and I did not attempt to investigate the habitat.

32—Rock quarries, ca. 2.5 km NE Cecil, Franklin Co. (T9N, R26W, S24). These shallow quarries scattered throughout the area are associated with gas fields. Surprisingly, no collared lizards were observed in this open habitat. One large eastern coachwhip was observed as it hunted among the rock piles.

33—Rock quarry, at the junction of Arkansas Highway 96 and Courthouse Slough (near Arkansas River), Sebastian Co. (T9N, R29W, S1). This abandoned quarry was filled with water. Little area outside the quarry proper was suitable for collared lizards.

34—Gravel pit (George Mountain), ca. 4.8 km S Fort Smith, Sebastian Co. (T7N, R32W, S17). This shale pit was not suitable for collared lizards.

This survey suggests that collared lizards are not as common or ubiquitously distributed in the array of suitable habitats within the Arkansas River Valley in Arkansas. The isolated enclaves of these lizards on the rocky slopes of Petit Jean Mountain may represent one of the few remaining relictual populations occupying an ancestral habitat. The large quarry populations in Logan County demonstrate the vigor of collared lizards in man-made habitats. Collared lizards are not presently a threatened species in Arkansas. Yet, habitat depletion poses a severe threat to their continued existence in the Arkansas River Valley. Because *C. c. collaris* invokes a curiosity and fascination in all who view it, measures to protect the lizard and its natural habitat may eventually

be warranted. To continue to identify new populations of this species, especially in remote habitats within the Interior Highland Region, will add to a database for future conservation considerations. Then, only through monitoring populations will researchers be able to critically evaluate the status of the lizard as a natural component of Arkansas' native herpetofauna.

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