

1980

## Hemogregarines in the Red-Eared Slider, *Chrysemys scripta elegans* (Wied) from Arkansas

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### Recommended Citation

McAllister, Chris T. and King, Anthony W. (1980) "Hemogregarines in the Red-Eared Slider, *Chrysemys scripta elegans* (Wied) from Arkansas," *Journal of the Arkansas Academy of Science*: Vol. 34, Article 43. Available at: <https://scholarworks.uark.edu/jaas/vol34/iss1/43>

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HEMOGREGARINES IN THE RED-EARED SLIDER, *CHRYSEMYS SCRIPTA ELEGANS* (WIED) FROM ARKANSAS

Twenty-five red-eared sliders, *Chrysemys scripta elegans* (Wied), were examined for hemogregarines. Turtles were purchased in late October, 1979 and early May, 1980 from Anderson's Minnow Farms, Lonoke County, Arkansas (T. 1N, R. 9W, Sec. 35). Blood samples (2.0 ml) were obtained by puncturing the heart with a 21 gauge needle fitted on a 10 ml syringe. Thin blood smears were air dried, fixed in absolute methanol for 2-3 minutes, stained with Giemsa for 25 minutes, dipped briefly in buffered water (pH 7.0 @ 25°C) and allowed to dry. Blood smears were examined under oil immersion and infected erythrocytes were located to avoid the possibility of confusing ex-erythrocytic forms of the parasite with normal blood cells, especially young thrombocytes. The staining characteristics, cytoplasmic characteristics, and general shape and form of the parasitic forms were noted. Measurements were taken with an eyepiece micrometer. No attempt was made to study the tissue stages of the hemogregarines through histological preparations.

All of the *C. s. elegans* examined were infected with intraerythrocytic forms. Parasitemias ranged from approximately 0.5 percent of the erythrocytes in one turtle to barely detectable infections in the majority of the turtles. Following a conservative strategy, no attempt was made to relegate parasitic forms to particular life cycle stages. Rather, individual forms were assigned to one of four morphological types as follows (measurements in micrometers [ $\mu\text{m}$ ], the range follows in parentheses):

Type I is crescent shaped, measuring  $8.9 (9.8-7.8) \times 2.3 (2.9-2.0)$ . The parasite, as is true for all morphological types, is apparently encased by some form of cyst or vacuole. The cytoplasm is flocculated and stains a light blue. Inclusions are rarely seen, and a nucleus is not readily discernable. The nucleus of the invaded erythrocyte is at most only slightly displaced from its normal position.

Type II is characteristically "bean shaped"  $13.4 (14.1-12.7) \times 4.2 (4.9-2.9)$ , with a short recurved tail. The cytoplasm is somewhat more basophilic and appears more dense in some specimens. Acidophilic inclusions are common in the cytoplasm. A distinct nucleus is not generally evident, but a dark irregularly shaped structure is sometimes present instead. The parasite usually displaces the nucleus laterally.

Type III parasites are  $13.6 (14.1-12.7) \times 5.6 (6.8-3.9)$  and vary from "bean shaped" to nearly oval. Cytoplasmic and nuclear characteristics are similar to those of Type II. The acidophilic inclusions are prominent in this type, and the nucleus of the invaded cell is displaced toward one end.

Type IV is the most distinctive of the morphological types. The large  $17.5 (19.5-15.6) \times 5.9 (7.8-4.9)$  "banana-shaped" parasite occupies nearly all of the turtle erythrocyte. The erythrocyte nucleus is displaced to the extreme end of the cell. The parasite appears to be formed by two arms or bodies at the ends, as a clear "canal" or "groove" extends the length of the organism. The flocculated cytoplasm stains a light blue. Acidophilic granules characteristically border the periphery of the parasite, including the central "canal". A distinct nucleus  $6.0 (6.8-5.9) \times 2.2 (2.9-2.0)$  is apparent in one arm adjacent to the bend.

A determination of the relative frequencies of the morphological types could be made for only one turtle. Twenty percent of the infected erythrocytes contained the Type I parasite. Twenty-nine percent carried Type II. Type III occurred in 21% of the parasitized cells, and Type IV in 30%. There was no statistically significant difference in the occurrence of morphological types (Chi square = 3.28). No evidence of schizogony or other nuclear division was seen.

This report represents the first published record of a hemogregarine from an Arkansas turtle species. Mohammed and Mansour (*Bull. Fac. Sci. Cairo Univ.* 35:39-51, 1959); Ball (*J. Protozool.* 18:198-210, 1967); Ball et al., (*J. Parasitol.* 53:897-909, 1967) have stated that the establishment of the taxonomic status of hemogregarines at both the generic and specific levels is dependent upon a thorough examination of all stages of the life cycle in both the vertebrate and invertebrate hosts; however, in the absence of such data, the exact determination of the taxonomic status of hemogregarines in Arkansas turtles awaits further study.

The authors thank Dr. James J. Daly, University of Arkansas for Medical Sciences, for reviewing representative slides.

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