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Authors: HOLCOMB, CHARLIE M., JACKSON, CRAWFORD G., and JACKSON, MARGUERITE M.

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SERUM CHOLESTEROL VALUES IN THREE SPECIES OF TURTLES

CHARLIE M. HOLCOMB, Department of Physical Sciences, Mississippi State College for Women, Columbus, Mississippi, U.S.A. 39701

CRAWFORD G. JACKSON, JR., and MARGUERITE M. JACKSON, Department of Biological Sciences, Mississippi State College for Women.

Abstract: Samples of 3 species of recently captured turtles from the southeastern U.S.A., the peninsula cooter, pond slider, and box turtle, were examined to determine base line values for blood serum cholesterol. Means with standard errors, ranges, and coefficients of variation of this blood parameter were calculated for each species.

INTRODUCTION

In a recent statement, the paucity of our knowledge of the normative serum chemistry of wild species was emphasized.¹ One of the biochemical parameters of clinical interest is blood serum cholesterol. During the course of other studies, we recently had the opportunity to determine this parameter in three species of turtles of the family Testudinidae which occur naturally in southeastern United States: the peninsula cooter (*Chrysemys floridana peninsularis*), pond slider (*Chrysemys scripta*), and box turtle (*Terrapene carolina*).

METHODS

All turtles were recently captured and none had been fed prior to bleeding; therefore, the data are assumed to reflect the blood picture existing in nature. All animals appeared to be healthy except an adult female box turtle which was found to have a bacterial infection of the reproductive system. Despite its morbid condition, the cholesterol value of the turtle (402 mg/100 ml) was well within one standard deviation of the sample mean of the box turtles reported in this study. Examination of the reproductive tracts revealed nearly all the animals to be sexually mature with the exception of a few of the smallest members of the series of peninsula cooters. Turtles were collected from Mississippi (*C. scripta*, *T.*

carolina), Georgia (*T. carolina*), Tennessee (*T. carolina*), and Florida (*C. f. peninsularis*).

The animals were anesthetized by intraperitoneal injection of Nembutal (sodium pentobarbital) shortly before bleeding. Blood was obtained by cardiac puncture and needle aspiration. Quantitative cholesterol determinations were made spectrophotometrically using a Beckman DB Spectrophotometer. The procedure followed that of Zlatkis et al.⁶ and consisted in the photometric measurement of the color developed in a diluted serum by a ferric chloride — sulfuric acid reagent.

RESULTS AND DISCUSSION

Relatively little attention has been devoted to the study of blood serum cholesterol levels in turtles. Recently we reviewed the literature and pointed out that with few exceptions, cholesterol data were obtained from captive specimens and based on very small size samples.² Apparently, the only published values for freshly captured turtles of the species reported by the present paper are those given for *Chrysemys scripta scripta* (1 specimen), *Chrysemys floridana* (1 specimen) and *Terrapene carolina* (3 specimens) in the survey paper by Jackson and LeGendre.³ All of these values (except the single specimen of *Chrysemys floridana* which was extremely low) are well within the range of one to three standard deviations of the means shown

in Table 1. The great amount of variability encountered in studying biochemical and physiological parameters of lower vertebrates demands that series be examined if an accurate picture of the modal situation and upper and lower limits is to be obtained.

Scatter plots revealed no apparent statistically significant correlation between size of the animal and serum cholesterol level in any of the 3 species studied. This is perhaps a reflection of the samples being composed mostly of mature animals. Because of small sample size or very unequal intrasample sex ratios, it was not possible for us to detect statistically significant differences between the means of males and females even though such differences may actually exist in nature.

Table 1 contains the statistical treatment of the blood data. Although perhaps fortuitous it is of interest that the form exhibiting the least variability in serum

cholesterol was the one collected from the most restricted area (Marion County, Florida) and the one with the greatest genetic homogeneity. With respect to the latter factor, the large area from which the box turtles were collected has been shown by Milstead⁴ to be an area where various intergradation occurs between interbreeding populations possessing a mixture of the characteristics of three subspecies of *Terrapene carolina*.

The pond sliders were collected mostly in or near a zone of intergradation which we have found (unpublished data) to occur between two subspecies of *Chrysemys scripta*.

Since the data are preliminary, no further interpretations of the results have been made. With the acquisition of additional material, especially animals of a wider size range, we anticipate being able to refine our knowledge of this important blood parameter and the variables which affect it.

TABLE 1. Comparison of blood serum cholesterol values (mg/100 ml) of three species of wild-caught turtles.

Species	Number examined	Mean	S.E.	Range	Coefficient of variation
<i>Chrysemys floridana peninsularis</i>	12	303.6	±12.2	255-362	14.0%
<i>Chrysemys scripta</i>	8	290.0	±42.3	174-512	41.2%
<i>Terrapene carolina</i>	31	339.7	±15.6	178-511	25.6%

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