

KANSAS HERPETOLOGICAL SOCIETY



NEWSLETTER No. 105

SEPTEMBER 1996



ANNOUNCEMENTS

THE KHS 23rd ANNUAL MEETING

The 23rd Annual Meeting of the Kansas Herpetological Society will be held on 2-3 November at Lawrence High School, Lawrence. The High School is located on the southwest corner of 19th and Louisiana Streets and the main parking lot is found just west of 19th and Louisiana on 19th Street. Those coming from the west and south get on Iowa Street [west Kansas Turnpike exit (west) and U. S. Rt. 59 (south)] and proceed to 19th Street. Turn east on 19th Street until you come to the school. If you are coming from the east on the Turnpike, exit at the East Lawrence exit. Turn south on North Second Street, cross the river, and turn right at the first stoplight intersection. Proceed to Tennessee Street and go south to 19th Street. Turn right (west) on 19th until you come to Louisiana Street (two blocks). Those entering Lawrence on Ks. Rt. 10 should proceed directly to Louisiana Street and turn north (right) to 19th Street.

Registration will begin at 0830 hrs and the opening session will begin at 0930. This year's keynote speaker will be KHS past-president Janalee P. Caldwell of the University of Oklahoma. Jan is one of the world's foremost authorities on neotropical frogs and will speak on reproductive strategies of South American frogs.

The annual slide free-for-all will be held Saturday afternoon, so remember to bring your 10 favorite slides. The annual social and auction, led by the raconteurial Joe Collins, will be held at Louise's in downtown Lawrence beginning at 1900 hrs. Directions to Louise's will be available at the meeting. Remember to bring all those valuable herpetological (or not-so-herpetological, we'll sell anything) items to auction. Oh, and don't forget your wallets. Cash, checks, VISA, and MasterCard will be eagerly accepted.

There are still some slots open for those desiring to make presentations at the meeting. Those interested should contact KHS President Stanley D. Roth, Lawrence High School, 1901 Louisiana, Lawrence, Kansas 66046 or call 913-843-5050. We look forward to seeing you in November!

KHS FALL FIELD TRIP

The Kansas Herpetological Society fall field trip will be held on 28-29 September 1996 at Lake Wabaunsee, located about 5 miles west of Eskridge in Wabaunsee County,

Kansas. The lake is located on Kansas Routes 4/99. For those with topographic maps, the legal description of the site is Sections 3 & 4, T14S, R11E. Campsites with and without electrical hookups are located at the lake and permits are available at the bait shop near the lake entrance. There is a convenience store near the lake but there are no motels in the nearby area.

CB channel 4 will be monitored for those arriving on Friday and signs to the camp area should be up by 7:00 that evening. A final meeting before dispersing to collect and observe amphibians and reptiles will be held at the main camp at 9 am on Saturday.

Wabaunsee County is in the heart of the Flint Hills, one of the premier herping spots in Kansas and the Great Plains. Amphibians and reptiles commonly observed include Colared Lizards, Prairie Skinks, and all three native species of *Lampropeltis*. All KHS members are invited to attend and bring guests. If you have additional questions or need other information, contact KHS Field Trip Committee Chairperson Larry Miller, 840 SW 97th Street, Wakarusa, Kansas 66546; phone - 913-836-2119.

GLOYD-TAYLOR SCHOLARSHIP

Nominations are still being accepted for the annual KHS Howard K. Gloyd-Edward H. Taylor Scholarship in Herpetology. Nominations for this award are open to any student enrolled in an accredited educational institution in Kansas or any KHS member enrolled in any accredited educational institution outside of Kansas. Students from primary school through university are eligible. Nominations should include typewritten details, not to exceed two pages, of the nominee's qualifications, plus name and address of the nominee and nominator. Self-nomination is not allowed.

All nominations should be sent to KHS President Stanley D. Roth, Jr., Lawrence High School, 19th and Louisiana Streets, Lawrence, Kansas 66044. The KHS Executive Council will make the final decision and announce the scholarship winner at the KHS annual meeting.

Those wishing to contribute to the scholarship fund should send contributions to KHS Secretary/Treasurer Karen Toepfer and note that the contribution is specifically for the Gloyd-Taylor scholarship fund. All contributions are tax-deductible.

KHS BUSINESS

CHANGES TO THE KHS CONSTITUTION

At the 1995 Annual Meeting of the Kansas Herpetological Society, the general membership voted in principle to split the office of KHS Secretary-treasurer into two separate offices, Secretary and Treasurer. To make this official, the KHS Constitution must be amended at this year's annual meeting. The following are the proposed changes to our Constitution which must be voted on in November.

CONSTITUTION OF THE KANSAS HERPETOLOGICAL SOCIETY

Article VI. Amendment of the Constitution

Section 2. Proposed amendments must be submitted in writing to the ~~Secretary-treasurer~~ *Secretary* at least three months before the general meeting at which they are to be discussed.

Section 3. Such amendments shall be submitted in writing by the ~~Secretary-treasurer~~ *Secretary* to the general membership at least two months prior to the general meeting at which they are to be discussed.

Section 5. Any adopted amendment shall become an integral part of the Bylaws and the ~~Secretary-treasurer~~ *Secretary* shall be instructed to add them to copies of the Bylaws and to distribute the amended Bylaws to the members of the Executive Council of the Society and to other interested members of the Society.

BYLAWS

Article II. The Officers

Section 1. The Officers of the Society shall be of two kinds, elective and appointive.

a. The elected officers shall be President, President-elect, ~~Secretary-treasurer~~ *Secretary*, *Treasurer*, and the Immediate Past President.

c. The ~~Secretary-Treasurer~~ *Secretary* shall maintain the records of the Society and its officers; shall notify the membership of pertinent business; shall be responsible for all general correspondence of the Society;

d. *The Treasurer* shall keep records and accounts of the Society including all monies received and disbursed; shall collect the annual dues and maintain the membership roster; and shall be responsible for all financial reports required by the business of the Society. The ~~Secretary-Treasurer~~ *Treasurer* shall make a financial report to the membership at the general meeting.

An outside audit shall be conducted immediately prior

to the elected ~~Secretary-Treasurer's~~ *Treasurer's* acceptance of the Society's financial records by a three member committee appointed by the Society's President.

Article III. The Executive Council of the Society

Section 1. The Executive Council of the Society shall consist of the President, President-elect, ~~Secretary-Treasurer~~ *Secretary*, *Treasurer*, Immediate Past-president, and the Editor of the Society Newsletter.

Article IV. Elections of Officers

Section 4. The Slate of Nominations shall be circulated to the entire membership by the ~~Secretary-Treasurer~~ *Secretary* via the Newsletter not later than one month before the general meeting.

Section 5. Voting shall take place at the general meeting of the Society. The ~~Secretary-treasurer~~ *Secretary* shall receive and count the votes. The results of the election shall be communicated to the membership via the Newsletter.

Section 6. The ~~Secretary-treasurer~~ *Secretary* shall inform the elected candidates of their election. Newly elected persons will take office after the date of the general meeting of the election.

Article IX. Amendment of the Bylaws

Section 2. Proposed amendments must be submitted in writing to the ~~Secretary-treasurer~~ *Secretary* at least three months before the general meeting at which they are to be discussed.

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KHS DISPLAY AND SSAR MEETING A SUCCESS

The Kansas Herpetological Society had a strong presence at the recent annual meeting of the international *Society for the Study of Amphibians and Reptiles* in Lawrence. Over 400 professional herpetologists from around the world (and a pretty good number of KHS members) had the opportunity to learn about our Society, snatch up our free literature, and view an impressive exhibit of native Kansas amphibians and reptiles. Those attending agreed that the meeting was extremely well run and KHS and its volunteers had a hand in helping ensure the success of the meeting.

The Live Herp Display (an SSAR tradition begun by KHS at the 1977 SSAR/Herpetologist's League meetings), presented by KHS, was a particular hit and was extremely well attended. Professional photographers and many others were able to view over 60 species of native herps (a splendid number considering the severe challenges this spring's weather offered). I thank the following individuals for all their efforts in collecting or obtaining specimens, volunteering to monitor the display and run the KHS booth, and otherwise assisting at the meeting: William H. Busby and the Kansas Biological Survey, Keith Coleman, Joseph T. Collins, Jessica Cook, Mary Crouch, Danitra Cushinberry, Mark Ellis, Cory Fincher, David Grow and the staff of the Department of Herpetology at the Oklahoma City Zoo, James Gubanyi, Errol D. Hooper, Jr., Eric Kessler, Stephanie Meador, Larry Miller, Emily Moriarty, Alexis Powell, Allison Reber, David Reber, Daren Riedle, Stan Roth, Nancy Schwarting, Paul Shipman, Sarah Temple, Karen Toepfer, and Al Volkmann. Thanks also go to the University of Kansas Natural History Museum and its Department of Public Education for loan of specimens.

— EMR

KHS OFFICERS NOMINATED FOR 1997

The nominees for KHS elective office at this year's annual meeting are as follows: President-elect: Eric Kessler and John Lokke; Secretary-treasurer: Karen Toepfer (unopposed).

John Lokke is a longtime KHS member who has been active in many Society functions and is a frequent contributor to the *KHS Newsletter*. He is currently a student at the University of Nebraska-Omaha where he is attempting to synthesize his lifelong work in art and herpetology.

Eric Kessler is beginning his fifth year of teaching biology at Blue Valley North High School in Kansas City, Kansas. He is currently working on a Master's Degree in Biology at Emporia State University, where his thesis work will include habitat selection of snakes in Miami County. He also has been quite active in the annual KHS Herp Counts.



KHS BRINGS YOU GREAT NEWS OF THE WORLD

FROG STUDY A NATURAL FOR YOUNG SCIENTIST

If clichés were adequate to describe the extraordinary, you could say Emily Moriarty has been a researcher since she wasn't much bigger than a tadpole.

Moriarty, a May graduate of Lawrence High, is in the middle of a two-year study of the molecular structure of two kinds of Chorus Frogs [*Pseudacris triseriata* complex] living in Douglas County.

She gathered about 75 specimens from the Baker Wetlands and a marsh near the Lawrence airport. Staff in the Natural History Museum at Kansas University have provided mentoring, lab space, and technical support.

"I hope to find whether the Chorus Frogs are different species," she said. "They've proven they're different species," she said. "They've proven they're different morphologically — leg lengths, head widths. I want to see if they're different molecularly."

That question should be answered by DNA testing at KU>

Her work is a follow-up study to research conducted 10 years ago on Chorus Frogs by a Creighton University faculty member.

At 18 years of age, Moriarty is doing the type of research normally reserved for graduate students in college. She began this spring by collecting frogs at night. Dissection

and testing consume her summer days.

Moriarty's goal is to present her findings at the 1997 meeting of the Society for the Study of Amphibians and Reptiles in Seattle.

The society's 1996 meeting ... is hosted by KU. About 400 people interested in the field are expected to attend.

Moriarty's career began in a spot familiar to most children. She was drawn to a pond near her house, which was full of turtles.

"I'd catch them, measure their length and width, and mark their shell. The idea was to measure the growth rate. I had three years of data and wrote it up last winter for use in a biology class project," she said.

In a Kansas academic science contest, she received the highest ranking for her work with the turtles.

"Emily does a fantastic job," said Joe Collins, a zoologist at the Natural History Museum. "We're real proud of her."

Moriarty will have to hustle to finish her research at KU. In about a month, she begins college at St. Mary's at South Bend, Indiana. She will major in biology and work in a molecular biology lab.

It's possible that she'll return to KU for graduate school.

"I may become a Jayhawk yet," she said. "We'll see."

— Lawrence Journal-World, 22 July 1996
(submitted by Suzanne L. Collins, Lawrence)



FEATURE ARTICLES

A PRELIMINARY REPORT ON NUMBER, SEASONAL AND DAILY ACTIVITY, AND GROWTH RATE OF A POPULATION OF PAINTED TURTLES (*CHRYSEMYS PICTA*) IN NORTHEASTERN KANSAS: A THREE YEAR STUDY

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INTRODUCTION

Little is known about the biology of the Painted Turtle (*Chrysemys picta*) in northeastern Kansas. This study of a population of turtles was undertaken four years ago to determine three aspects of the biology of this reptile: number of individuals, seasonal and daily activity, and growth rate. Earlier studies by Ernst (1972) included a comparison between age of turtle and plastron length and an estimation of the percentage of growth in a turtle each year; the main objective of this study is to observe the trend of growth rate as the turtle matures. The data obtained during the first year of this study were lost due to a faulty marking method; however, the next three years yielded an extensive amount of information about several aspects of the life cycle of this turtle.

METHODS

This study was conducted at a small reservoir within the city limits of Lawrence, Douglas County, Kansas. Observations in 1992 revealed a sizable population of Painted Turtles at this locality. In 1993, a mark and recapture study of these turtles was initiated. Specimens were captured by hand or in hoop traps: one a 32-inch diameter trap with 1-inch mesh, the other a 34-inch diameter trap with 1/2-inch mesh netting. Each trap was set in 2-3 feet of water. Traps were baited with liver, hearts, sardines, ground beef, and fish scraps. Captured turtles were marked by notching edges of carapace marginal scutes with a file (Figure 1). From May 1993, until November 1995, straight line length and width of carapace of each turtle was measured; a simple tape measure was used from May 1993, until December 1994 (inches); thereafter, dial calipers were used (millimeters) (Appendix I and II). Sex of each turtle was determined by comparing preanal and postanal length of the tail and length of foreleg claws. From July 1995 until October 1995 weights were taken of all turtles

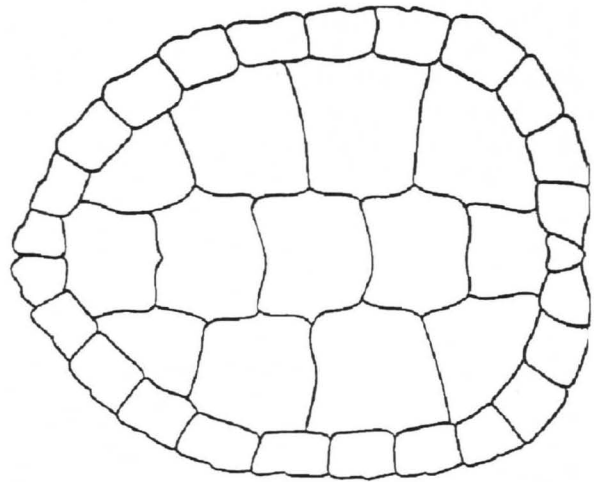


Figure 1. Diagrammatic drawing of a turtle carapace. Turtles were marked by notching two or more of the twenty-five marginal scutes. Each scute was assigned a letter of the alphabet (A-Y) clockwise from the anterior center scute.

using a Homs Model 10 laboratory spring scale with measurements in grams (Appendix III). For all turtles throughout this study, date of capture was recorded and captures were released the same day at the original location. Turtles under 100 mm in carapace length were not included in this study.

RESULTS AND COMPARISONS

Number

Number of turtles in the colony studied was estimated using the Lincoln index (Mosby 1963). Total number (n) was calculated by the equation: $T = n1R/n2$ where $n1$ = number captured in first sampling period (July 1995); R = number captured during both first and second sampling periods; $n2$ = number captured in second sampling period (August 1995). The population of Painted Turtles

(*Chrysemys picta*) at this locality was estimated for July and August of 1995 at 81 turtles at minimum size of 100 millimeters in carapace length; 49 of these turtles were captured at least once and marked; 23 were captured two or more times. The density of *Chrysemys picta* per square acre of water was estimated at 20.25 turtles.

Seasonal and Daily Activity

Chrysemys picta is a diurnal turtle. From early morning to late afternoon, it basks on overhanging logs and rocks on the banks of ponds and lakes. In the evening, turtles submerge to forage for food (Ernst and Ernst, 1972). Turtles were seen basking on the banks of the pond more frequently on sunny days than cloudy days. Painted Turtles were observed basking at the study site as early as March 12, but were not trapped until April 3. They continued activity until early November. Females were trapped throughout spring and summer into late August, and males were trapped until late November (Table 1). The turtles in this study were observed mainly in one area of the lake. This area was protected from rough water by an island,

contained more aquatic plants than surrounding areas, and had a shallow muddy bottom.

Growth

Growth rate was calculated by dividing difference in measurement of initial capture and recapture by the number of days between captures (millimeters per day). Data was separated by 10 millimeter increments in order to demonstrate growth rate in relation to size (Table 2). Rate of weight increase could not be determined at this point in the study, due to small sample size. However, a relationship between length and weight was found from weights taken this summer (Appendix III). Using the formula $y = 97.156 + 0.12038x$, weights were estimated for turtles not weighed earlier in the study (Appendix I). Width was compared to rate of growth in width. Length of carapace was compared to rate of growth in length of carapace. Width was compared to length of carapace. Turtles under 100 millimeters in carapace length were not included in this study because this species exhibits a high juvenile mortality rate (Ernst and Barbour 1972).

Table 1. Change in activity from summer to fall among Painted Turtles (*Chrysemys picta*): Captures from August to October.

Date	Sex	Identification Mark
8-03-95	M	CD
	F	DM
8-07-95	M	DO
	M	BC
	M	CD
	M	CE
	M	CJ
	F	CO
	F	CV
8-27-95	M	CX
	F	CK
	F	CS
8-30-95	M	CD
	F	CK
	F	CQ
	M	CT
	M	DN
9-05-95	F	BD
	M	CD
	M	CU
10-24-95	M	CY
	DL	
	M	DMN
	M	DQ
	M	BE
	M	BF

Table 2. Rate of growth in length of carapace among Painted Turtles (*Chrysemys picta*) separated into 10 mm increments. E-2 = number times ten to the negative second power.

Carapace Length (mm)	<i>n</i>	Average Rate of Growth in Length (mm/day)
170-180mm	4	0.18 E-2
160-169	4	0.35 E-2
150-159	3	1.00 E-2
140-149	3	1.09 E-2
130-139	2	2.02 E-2
120-129	3	4.42 E-2
110-119	2	5.59 E-2
100-109	2	3.61 E-2

DISCUSSION

During the first two years of this study all measurements were taken in inches. For the summer of 1995, turtles were measured in millimeters. Slight inaccuracies have occurred caused by conversions of earlier data to millimeters (Appendix I and II). One reason for the relatively low recapture rate (about 50%) is the likelihood that many of the turtles migrated to other bodies of water or were lost through predation during the course of this study.

To continue this research on the Western Painted Turtle, I wish to continue the mark-recapture study for adult turtles; in the following years I also wish to include juveniles (less than 100 mm) which requires a different method of capture, e.g. dip netting. After more data have been compiled, I will separate the sexes in my analyses to determine whether this species exhibits sexual dimorphism in weight, length, and width of carapace. Other aspects of the biology of the Painted Turtle that I wish to study in the future include: clutch sizes, age estimation, weight vs. rate of growth in weight, fall activity of male turtles vs. that of females, and observe whether there is a correlation between female shell width and clutch size.

CONCLUSIONS

The population of turtles over 100 mm in carapace length at the study site was estimated at 81 turtles using the Lincoln index (Mosby 1963). 49 of these turtles were captured at least once and marked; 23 were captured two or more times.

(Collins 1993 pp. 117-119) stated that adult Painted Turtles in Kansas are active from "March to October . . ." The results of this study support that statement. However, a trend has been found that is not documented on the biology of this turtle in Kansas: female turtles were captured only until late August; males were caught into early November. This suggests that female Painted Turtles (*Chrysemys picta*) begin their period of winter inactivity

earlier than males which begin hibernation under cooler weather conditions several weeks later (Table 1).

The rate of carapace growth in length declines exponentially as the individual increases in length (Table 2). A significant relationship between width and rate of growth in width was not found. There was a strong positive linear relationship between length of carapace and width of carapace. A strong positive correlation between weight and

Table 3. Growth rate of width of carapace among Painted Turtles (*Chrysemys picta*) separated into 10mm increments. E-2 = number times ten to the negative second power.

Carapace Width (mm)	<i>n</i>	Average Rate of Width Growth
120-130	7	1.15 E-2
110-119	4	1.38 E-2
100-109	5	2.09 E-2
90-99	2	4.84 E-2
80-89	5	4.80 E-2

Table 4. Weight ranges according to size class in Painted Turtles (*Chrysemys picta*).

Carapace Length	Range Weight
170-180	625-675
160-169	500-650
150-159	375-575
140-149	300-400
130-139	-400
120-129	225-250
110-119	100-225
100-109	—

carapace length was found from turtle weights taken after July 1995, which allowed estimation of weight for turtles captured before that date (Appendix I).

SUMMARY

A three-year mark and recapture study of Painted Turtles (*Chrysemys picta*) at a pond in northeastern Kansas was undertaken to determine their number, seasonal and daily activity, and growth rate. Turtles were captured, measured, marked, and released. Number was estimated, using the Lincoln index (Mosby 1963), at 81 turtles. Turtle activity was observed by day and by season. Turtles were diurnal and were active from March to early November. Males were found to be active into November while females were captured only until late August. From difference in measurement between initial capture and recapture, growth rate was calculated for carapace length and width; weight of each turtle was measured from July 1995 to November 1995. A strong linear correlation was found between length and width of shell and between length and weight. An exponential relationship was found between length of shell and growth rate in length. No definite

relationship between width of shell and growth rate in width was found.

ACKNOWLEDGMENTS

I am extremely grateful to the following people for their help and advice on this project: David Edds, Henry S. Fitch, Linda Fuselier, Kelly Irwin, Al Kamb, Andrew Moriarty, Annie Moriarty, Michael Moriarty, Carolyn Moriarty, Judy Pohl, Stanley D. Roth Jr., Eric M Rundquist, Travis Taggart, Christina Van Auken and especially Joseph T. Collins.

LITERATURE CITED

- Collins, Joseph T. 1993. *Amphibians and Reptiles in Kansas. Third Edition.* Univ. Press of Kansas, Lawrence, Kansas. xx + 397 pp.
- Ernst, Carl H. 1972. Biology of *Chrysemys picta belli* in southwestern Minnesota. *Minnesota Acad. Sci.* 38(2, 3).
- Ernst, Carl H. 1972. *Turtles of the United States.* Lexington, Kentucky, Univ. Press of Kentucky. x + 347 pp.
- Mosby, A. S. 1963. *Wildlife Investigational Techniques.* Wildlife Soc., Ann Arbor, Michigan. 419 pp.

Figure 5
Weight in Comparison to Carapace
Length of Individual *Chrysemys picta*

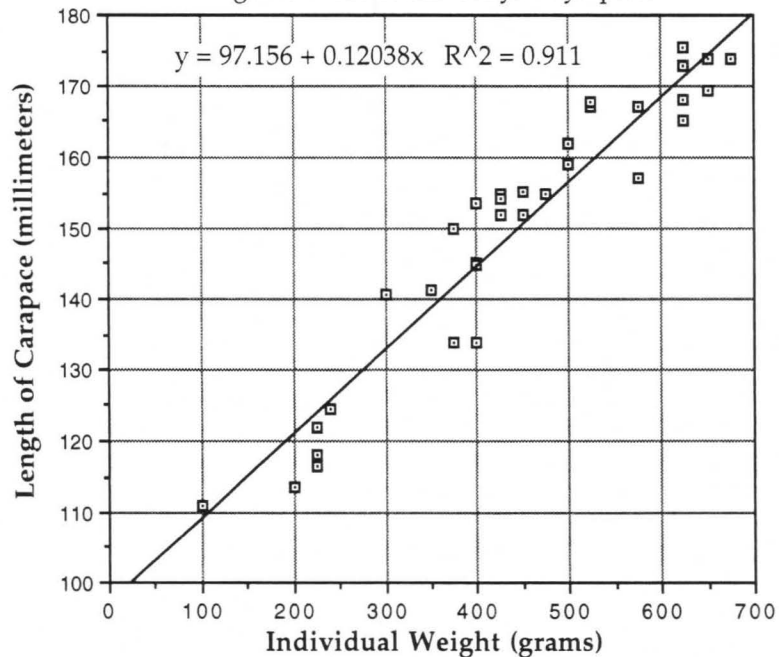


Figure 6
Carapace Width vs Rate of Growth
in Width in *Chrysemys picta*

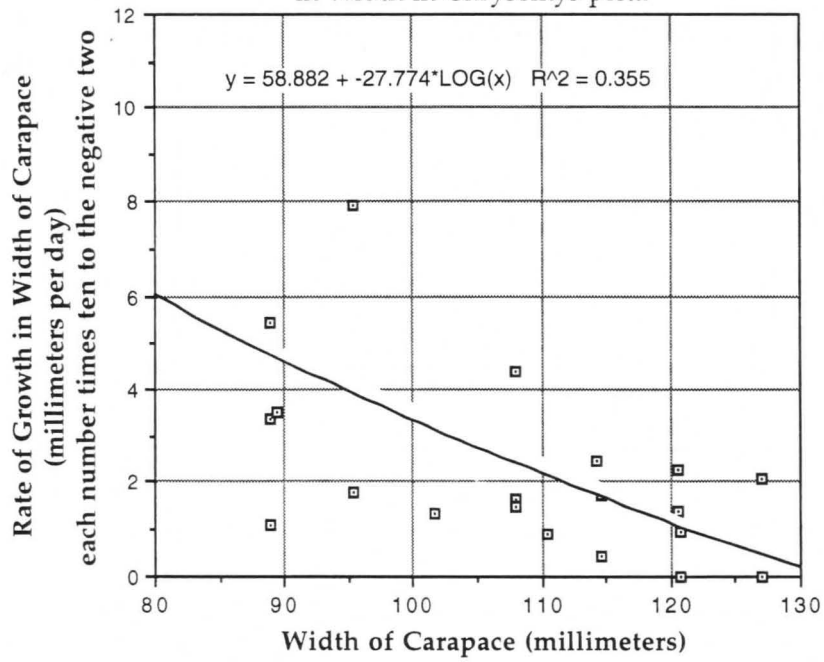


Figure 7
Carapace Length vs Rate of Growth in
Length of Carapace in *Chrysemys picta*

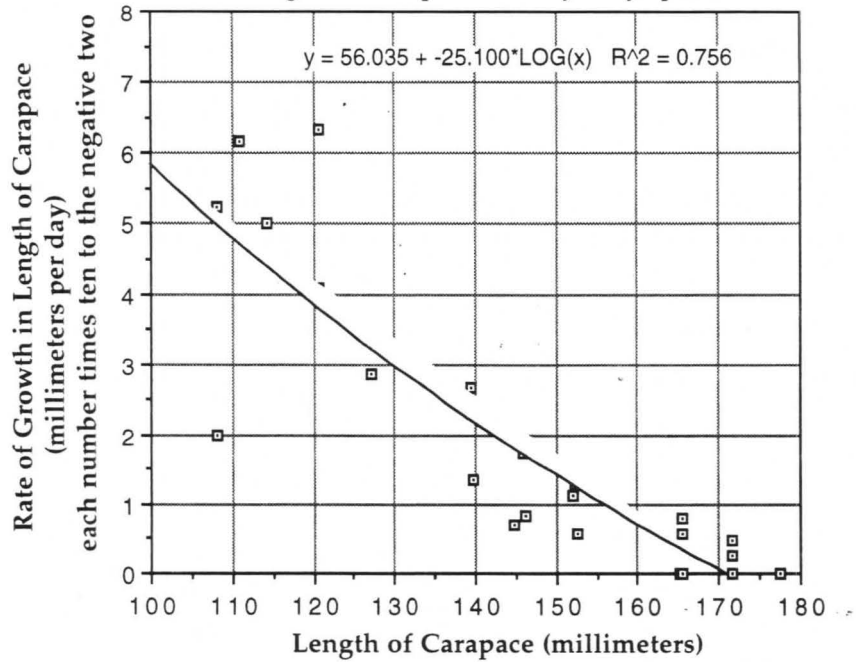
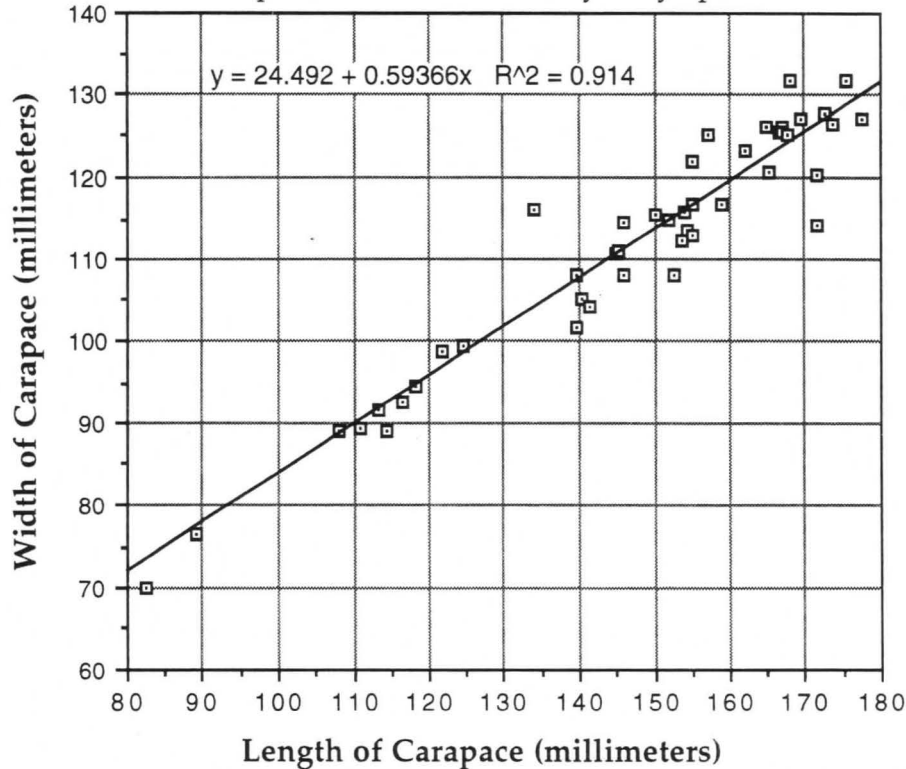


Figure 8
Length in Comparison to Width of
Carapace of Individual *Chrysemys picta*



APPENDIX I: CHRONOLOGICAL ORDER OF ALL CAPTURES

Chronological order of 49 Painted Turtles (*Chrysemys picta*) captured 83 times during this study. * = estimated weights using linear regression line $y = 97.156 + .12038x$ with Pearson correlation coefficient of $r = 0.954$ (Figure 3). x = weight, y = length carapace. NW indicates turtles under 100 mm in carapace length whose weights were not estimated. In some turtles sex could not be readily determined, especially old adults or juveniles. NC = not converted to inches.

Mark	Date Captured	Carapace Length	Carapace Width	Weight	Sex
BH	31 May 93	6.75 in 171.5 mm	4.50 in 114.3 mm	*620 g	F
BI	31 May 93	3.25 in 82.6 mm	2.75 in 70.0 mm	*NW g	
BL	13 Jun 93	6.00 in 152.5 mm	4.25 in 108.0 mm	* 461 g	
BN	14 Jun 93	4.50 in 114.4 mm	3.50 in 89.0 mm	* 144 g	F
BR	18 Jun 93	6.50 in 165.1 mm	4.75 in 120.7 mm	* 566 g	F
BV	29 Jun 93	6.50 in 165.1 mm	4.75 in 120.7 mm	*566 g	F
BZ	3 Apr 94	5.75 in 146.1 mm	4.50 in 114.4 mm	*408 g	
CD	3 Apr 94	6.75 in 171.5 mm	4.75 in 120.3 mm	*620 g	M
CE	3 Apr 94	6.50 in 165.4 mm	4.75 in 120.7 mm	*569 g	M

APPENDIX I. CONTINUED.

Mark	Date Captured	Carapace Length	Carapace Width	Weight	Sex
CF	3 Apr 94	5.50 in 139.7 mm	4.00 in 101.7 mm	*355 g	M
CG	3 Apr 94	3.50 in 89.0 mm	3.00 in 76.5 mm	*NW g	
CH	17 Apr 94	5.75 in 146.1 mm	4.25 in 108.0 mm	*408 g	
CI	17 Apr 94	7.00 in 177.6 mm	5.00 in 127.0 mm	*670 g	
CJ	17 Apr 94	5.50 in 139.5 mm	4.25 in 108.0 mm	*353 g	M
CK	17 Apr 94	4.25 in 108.0 mm	3.50 in 89.0 mm	*90 g	F
CL	17 Apr 94	5.75 in 146.1 mm	4.25 in 108.0 mm	*408 g	M
CM	17 Apr 94	7.00 in 177.6 mm	5.00 in 127.0 mm	*670 g	
CN	17 Apr 94	3.75 in 96.0 mm	4.50 in 114.6 mm	—	
CO	17 Apr 94	7.00 in 177.6 mm	5.00 in 127.0 mm	*670 g	F
CP	17 Apr 94	6.50 in 165.4 mm	5.00 in 127.0 mm	*569 g	
CQ	17 Apr 94	6.75 in 171.5 mm	4.75 in 120.6 mm	*620 g	F
CR	17 Apr 94	7.50 in 191.0 mm	5.50 in 140.0 mm	*782 g	
CS	17 Apr 94	6.50 in 165.4 mm	5.00 in 127.0 mm	*569 g	F
CT	17 Apr 94	5.00 in 127.0 mm	3.75 in 95.3 mm	*249 g	M
CU	17 Apr 94	6.00 in 152.4 mm	4.50 in 114.6 mm	*460 g	M
CV	17 Apr 94	6.50 in 165.4 mm	4.75 in 120.6 mm	*569 g	F
CW	17 Apr 94	6.50 in 165.4 mm	4.75 in 120.6 mm	*569 g	
CX	17 Apr 94	5.75 in 146.0 mm	4.25 in 108.0 mm	*407 g	M
CY	17 Apr 94	4.25 in 108.0 mm	3.50 in 88.9 mm	*90 g	M
DE	22 May 94	4.25 in 133.3 mm	5.25 in 108.0 mm	*301 g	
DF	22 May 94	7.50 in 191.0 mm	6.00 in 152.5 mm	*782 g	
BV	22 May 94	6.50 in 165.1 mm	4.75 in 120.7 mm	*566 g	F
DG	22 May 94	5.00 in 127.0 mm	4.00 in 101.7 mm	*249 g	
DH	22 May 94	6.00 in 152.5 mm	4.50 in 114.6 mm	*461 g	F
DI	22 May 94	6.00 in 152.5 mm	4.75 in 120.6 mm	*461 g	
CX	22 May 94	5.75 in 154.2 mm	4.25 in 115.7 mm	*475 g	M
DK	18 Jul 95	7.50 in 191.0 mm	5.50 in 139.7 mm	*782 g	F
DL	18 Jul 95	6.00 in 152.5 mm	4.25 in 108.0 mm	*461 g	M
BN	18 Jul 95	6.00 in 152.8 mm	4.50 in 114.6 mm	*464 g	F

APPENDIX I. CONTINUED.

Mark	Date Captured	Carapace Length	Carapace Width	Weight	Sex
DMN	18 Jul 95	4.75 in 120.6 mm	3.50 in 89.0 mm	*195 g	M
BH	18 Jul 95	6.75 in 171.5 mm	5.25 in 133.3 mm	*620 g	F
DN	18 Jul 95	6.00 in 152.5 mm	4.37 in 107.8 mm	*461 g	M
CF	19 Jul 95	5.75 in 146.1 mm	4.25 in 108.0 mm	*408 g	M
DO	19 Jul 95	4.75 in 120.6 mm	3.75 in 95.3 mm	*195 g	M
DP	19 Jul 95	5.75 in 146.0 mm	4.62 in 114.5 mm	*407 g	F
DH	23 Jul 95	NC 155.0 mm	NC 122.0 mm	475 g	F
DQ	25 Jul 95	NC 111.0 mm	NC 89.5 mm	100 g	M
DR	25 Jul 95	NC 162.0 mm	NC 123.2 mm	500 g	F
DN	25 Jul 95	NC 144.8 mm	NC 110.5 mm	400 g	M
DS	25 Jul 95	NC 165.0 mm	NC 126.2 mm	625 g	F
DT	25 Jul 95	NC 167.0 mm	NC 125.5 mm	575 g	F
CL	25 Jul 95	NC 150.0 mm	NC 115.5 mm	375 g	M
DL	25 Jul 95	NC 154.3 mm	NC 113.5 mm	425 g	M
CJ	27 Jul 95	NC 152.0 mm	NC 115.0 mm	450 g	M
DM	03 Aug 95	NC 157.2 mm	NC 125.0 mm	575 g	F
CD	03 Aug 95	NC 173.8 mm	NC 126.6 mm	675 g	M
CD	03 Aug 95	NC 173.8 mm	NC 126.6 mm	675 g	M
CO	07 Aug 95	NC 175.4 mm	NC 131.7 mm	625 g	F
CD	07 Aug 95	NC 173.8 mm	NC 126.6 mm	675 g	M
CJ	07 Aug 95	NC 152.0 mm	NC 115.0 mm	425 g	M
CV	07 Aug 95	NC 168.2 mm	NC 131.5 mm	625 g	F
BC	07 Aug 95	NC 167.0 mm	NC 126.0 mm	525 g	M
CX	07 Aug 95	NC 154.2 mm	NC 115.7 mm	425 g	M
CE	07 Aug 95	NC 167.7 mm	NC 125.0 mm	525 g	M
DO	07 Aug 95	NC 121.8 mm	NC 98.7 mm	225 g	M
CS	27 Aug 95	NC 169.4 mm	NC 127.0 mm	650 g	F
CK	27 Aug 95	NC 134.0 mm	NC 116.0 mm	400 g	F
CK	30 Aug 95	NC 134.0 mm	NC 116.0 mm	375 g	F
DN	30 Aug 95	NC 145.1 mm	NC 110.9 mm	400 g	M

APPENDIX I. CONTINUED.

Mark	Date Captured	Carapace Length	Carapace Width	Weight	Sex
CT	30 Aug 95	NC	NC		M
		141.3 mm	104.2 mm	350 g	
BD	30 Aug 95	NC	NC		
		155.2 mm	116.7 mm	450 g	
CD	30 Aug 95	NC	NC		M
		173.8 mm	126.6 mm	650 g	
CQ	30 Aug 95	NC	NC		F
		172.8 mm	127.7 mm	625 g	
CY	05 Sep 95	NC	NC		M
		118.1 mm	94.5 mm	225 g	
CU	05 Sep 95	NC	NC		
		158.9 mm	116.7 mm	500 g	
CD	05 Sep 95	NC	NC		M
		173.8 mm	126.6 mm	625 g	
DL	24 Oct 95	NC	NC		M
		153.6 mm	112.3 mm	400 g	
DQ	24 Oct 95	NC	NC		M
		116.6 mm	92.7 mm	225 g	
BE	24 Oct 95	NC	NC		M
		113.4 mm	91.5 mm	200 g	
BF	24 Oct 95	NC	NC		M
		155.0 mm	113.0 mm	425 g	
DMN	24 Oct 95	NC	NC		M
		124.6 mm	99.4 mm	240 g	
BG	26 Oct 95	NC	NC		M
		106.7 mm	85.4 mm	150 g	
CT	1 Nov 95	NC	NC		M
		140.5 mm	105.1 mm	300 g	
CE	1 Nov 95	NC	NC		M
		166.5 mm	125.5 mm	500 g	

APPENDIX II: LIST OF RECAPTURED TURTLES

List of 23 Painted Turtles (*Chrysemys picta*) recaptured during this study. First line for each individual turtle indicates initial capture; subsequent lines indicate recaptures. Mark= identifying mark of each turtle; length= carapace length in millimeters; width= carapace width in millimeters; # days= number of days between initial capture and recapture; rate L= rate of increase in length (mm/day); rate W= rate of increase in width (mm/day). E-2 = number times ten to the negative two. This appendix may contain some errors in measurement caused by conversions from inches to millimeters.

Mark	Length (mm)	Width (mm)	Sex	No. of days	Rate L	Rate W
BH	171.5	114.3	F	778	0	2.442E-2
	171.5	133.3				
BN	114.4	89.0	F	764	5.026E-2	3.350E-2
	152.8	114.6				
BV	165.1	120.7	F	327	0	0
	165.1	120.7				
CD	171.5	120.3	M	487	0.472E-2	1.290E-2
	173.8	126.6				
CE	165.4	120.7	M	491	0	0.978E-2
	167.7	125.0				
CF	139.7	101.7	M	472	1.356E-2	1.335E-2
	146.1	108.0				
CJ	139.5	108.0	M	466	2.682E-2	1.502E-2
	152.0	115.0				

APPENDIX II. CONTINUED.

Mark	Length (mm)	Width (mm)	Sex	No. of days	Rate L	Rate W
CK	108.0 134.0	89.0 116.0	F	497	5.231E-2	5.433E-2
CL	146.1 150.0	108.0 115.5	M	464	0.841E-2	1.616E-2
CO	177.6 175.4	127.0 137.0	F	477	0	2.096E-2
CQ	171.5 172.8	120.6 127.7	F	500	0.260E-2	1.420E-2
CS	165.4 169.4	127.0 127.0	F	498	0.803E-2	0
CT	127.0 141.3	95.3 104.2	M	500	2.860E-2	1.780E-2
CU	152.4 158.9	114.6 116.7	M	506	1.285E-2	.415E-2
CV	165.4 168.2	120.6 131.5	F	477	0.587E-2	2.285E-2
CX	146.0 154.2	108.0 115.7	M	477	1.719E-2	1.614E-2
CY	108.0 118.1	88.9 94.5	M	506	1.996E-2	1.107E-2
DH	152.5 155.0	114.6 122.0	F	427	0.585E-2	1.733E-2
DL	152.5 153.6	108.0 112.3	M	98	1.122E-2	4.390E-2
DMN	120.6 124.6	89.0 99.4	M	98	4.082E-2	10.612E-2
DN	144.8 145.1	110.5 110.9	M	43	0.698E-2	0.930E-2
DO	120.6 121.8	95.3 98.7	M	19	6.316E-2	7.895E-2
DQ	111.0 116.6	89.5 92.7	M	91	6.154E-2	3.516E-2

APPENDIX III: ACTUAL WEIGHTS OF TURTLES

Actual weights (not estimated) of 27 Painted Turtles (*Chrysemys picta*) taken during this study after July 1995. For multiple recaptures repeated below, the first line of data shown for each marked turtle indicates the initial capture; subsequent lines of data indicate recaptures.

Mark	Weight (g)	Length (mm)	Width (mm)	Sex
BC	525	167.0	126.0	M
BD	450	155.2	116.7	F
BE	200	113.4	91.5	M
BF	425	155.0	113.0	M
CD	675	173.8	126.6	M
CD	675	173.8	126.6	M
CD	650	173.8	126.6	M
CD	625	—	—	M
CE	525	167.7	125.0	M
CE	500	166.5	125.5	M
CJ	450	152.0	115.0	M
CJ	425	152.0	115.0	M

APPENDIX III. CONTINUED.

Mark	Weight (g)	Length (mm)	Width (mm)	Sex
CK	400	134.0	116.0	F
CK	375	134.0	116.0	F
CL	375	150.0	115.5	M
CO	625	175.4	131.7	F
CQ	625	172.8	127.7	F
CS	650	169.4	127.0	F
CT	350	141.3	104.2	M
CT	300	140.5	105.1	M
CU	500	158.9	116.7	M
CV	625	168.2	131.5	F
CX	425	154.2	115.7	M
CY	225	118.1	94.5	M
DH	475	155.0	122.0	F
DL	425	154.3	113.5	M
DL	400	153.6	112.3	M
DM	575	157.2	125.0	F
DMN	240	124.6	99.4	M
DN	400	144.8	110.5	M
DN	400	145.1	110.9	M
DO	225	121.8	98.7	M
DQ	100	111.0	89.5	M
DQ	225	116.6	92.7	M
DR	500	162.0	123.2	F
DS	625	165.0	126.2	F
DT	575	167.1	125.5	F



NOTES ON THE NATURAL HISTORY OF SOME KANSAS AMPHIBIANS AND REPTILES: PARASITES

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In the course of extensive collections of live Kansas amphibians and reptiles for short-term captive maintenance, fecal materials were routinely collected and examined to determine parasite presence/absence. Direct smear and fecal flotation (sodium nitrate, Fecasol[®]) microscopic (at 100 and 400X) examinations were conducted on a variety of species and the results are reported herein.

Amystoma mavortium

Analysis of fecal material from an adult from Cheyenne County collected in May 1996 revealed numerous oocysts of *Eimeria*.

Eurycea longicauda

Fecal analysis of two subadults collected in Cherokee County in April 1996 showed the presence of *Rhadobias* larvae and ova and trichomonad flagellates.

Bufo cognatus

Examination of fecal material from a subadult collected in Cheyenne County in May 1996 revealed at least two, probably three, species of ciliates and two kinds of flagellates, including one trichomonad species.

Pseudacris cf. triseriata

Microscopic examination on two females from Douglas County collected in May 1996 revealed numerous eimerian coccidia, three ciliate species, a small Hexamita-like flagellate, and an unusual flagellated protozoan of unknown origin.

Rana blairi

Fecal examination of an adult female from Atchison County in June 1996 showed rhabditiform larvae and two forms of flagellates, including trichomonads.

Chrysemys picta

Fecal contents from an adult female captured in May 1996 in Linn County exposed trematode ova and eimerian coccidia.

Terrapene carolina

Fecal analysis of an adult male collected in May 1996 in Cherokee County revealed ascarid ova and eimerian coccidia.

Elaphe obsoleta

A young adult male *Elaphe obsoleta* was captured in Cherokee County in April 1996. Fecal analysis showed the presence of a sporulated oocyst of the coccidian *Sarcocystis*. The coccidian *Frenkelia* has an identical oocyst to *Sarcocystis* (D. Smith, pers. comm.) but is identified as the parasite in this case, as the definitive hosts for *Frenkelia* are birds. Additional parasites were not observed.

Sarcocystis is a known pathogen of mammals and birds (Dubey et al. 1989). It has also been reported in reptiles (Dubey et al. 1993) but its pathogenicity in these animals is unknown. *Sarcocystis* has been reported in *Elaphe obsoleta* in Arkansas (McAllister, et al. 1995).

Intermediate hosts for *Sarcocystis* in *Elaphe* have been determined to be mice of the genera *Clethrionomys*, and *Microtus* (Matuschka 1986, D. Smith pers. comm.). The specific intermediate host in *Pituophis* is *Peromyscus maniculatus* (Bledsoe 1980). Analysis of mammal hairs in the subject snake's feces were determined to be either *Microtus ochrogaster*, *Peromyscus leucopus* or *P. maniculatus* (T. Holmes, pers. comm.). The snake was taken in typical Ozarkian oak-hickory deciduous forest, the preferred habitat of *P. leucopus*. However, grassy fields, the preferred habitat of both *Microtus* and *P. maniculatus*, occur within 100 m of the collection site. Therefore, although it is impossible to state with certainty the source of infection of *Sarcocystis* in this snake, it is likely that *P. leucopus* was the source, as both *E. obsoleta* and *P. leucopus* have distinct preferences for wooded areas.

This is a new distributional record for *Sarcocystis* in *Elaphe obsoleta* (McAllister, et. al. 1995). Additional studies are being undertaken to determine the species of *Sarcocystis* involved.

An adult male *Elaphe obsoleta* was captured in April 1996 in Linn County. Fecal analysis revealed *Capillaria* ova and adult females, larvae, and ova of *Strongyloides*-like strongyle worms.

Pituophis catenifer

Fecal samples from an adult female collected in Douglas County in May 1996 contained gravid females, larvae, and ova of a *Strongyloides*-like strongyle worm.

Thamnophis sirtalis

Fecal analysis of an adult male from Sedgwick County showed ova and larvae of a *Strongyloides*-like nematode and hookworm ova.

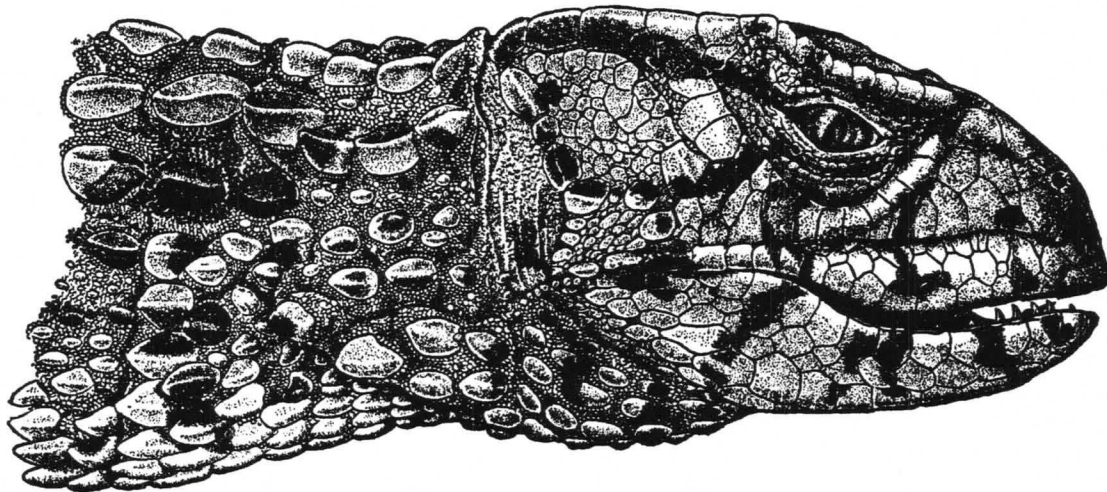
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LITERATURE CITED

- Bledsoe, B. 1980. *Sarcocystis idahoensis* sp. n. in deer mice *Peromyscus maniculatus* (Wagner) and gopher snakes *Pituophis melanoleucus* (Daudin). Journ. Protozool. 27: 93-102.
- Dubey, J. P., C. A. Speer, and R. Fayer. 1989. *Sarcocystis of Animals and Man*. CRC Press. 215 pp.
- Matuschka, F.-R. 1986. *Sarcocystis clethrionomyelaphis* n. sp. from snakes of the genera *Elaphe* and different voles of the family Arvicolidae. Journ. Parasitol. 72: 226-231.
- McAllister, C. T., S. J. Upton, S. E. Trauth, and J. R. Dixon. 1995. Coccidian parasites (Apicomplexa) from states in the central and southwestern United States: New host and geographic records. Journ. Parasitol. 81(1): 63-68.



SOME OCCURRENCES OF THE WESTERN DIAMONDBACK RATTLESNAKE (*CROTALUS ATROX*) IN KANSAS

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INTRODUCTION

The Western Diamondback Rattlesnake, *Crotalus atrox*, is a large rattlesnake, reaching 2 m in length, whose range may extend into a small portion of south-central Kansas (Smith 1956; Collins 1982). Identifying characteristics include a brown to gray ground color, 24 to 45 dark, light-bordered diamond or hexagon-shaped blotches running along the dorsal surface, and a distinctly marked tail consisting of large alternating black and white bands (Ernst 1992).

Distribution and habitat is described by Ernst (1992). *Crotalus atrox* ranges from west-central Arkansas, through eastern and south-central Oklahoma, most of Texas except the Panhandle, west through central and southern Arizona and New Mexico to southeastern California and south into Mexico. This species occurs in a variety of arid or seasonally dry habitats such as deserts, grasslands, shrublands, scrub woods, riparian oak groves, or open coniferous forests. Within these habitats they are usually found among scattered rocks and boulders, or rock outcrops with crevices. *Crotalus atrox* may have a peripheral range along the southwest and south-central border of Kansas (Hall and Smith 1947; Smith 1956; Collins 1982). There has been evidence of introduced populations of the species in the central and southeastern portions of the state (Hall and Smith, 1947; Smith, 1956).

INTRODUCED POPULATIONS

Hall and Smith (1947), documented two individuals of *C. atrox*, and one individual of Western Rattlesnake, *Crotalus viridis*, in southeastern Kansas. One specimen of *C. atrox* was found 6 miles west of Pittsburg in Crawford County, and the other specimen was collected 1 mile north of Weir in Cherokee County. The specimen of *C. viridis* was collected 7 miles west of Pittsburg, near Fleming in Crawford County. Hall and Smith (1947) also collected one individual of *C. atrox* from Greene County in southwest Missouri.

Based on these observations, Smith and Kohler (1977) listed *C. atrox* as endemic extinct species in extreme eastern Kansas, meaning that the species was established outside its natural range, but now is extinct. Both *C. atrox*

and *C. viridis* occupy open arid type climates, whereas southeastern Kansas and southwestern Missouri are representatives of the Ozark Plateau, a more humid environment. For *C. atrox* these records are 150 miles north of their natural range (Hall and Smith, 1947). *Crotalus viridis* does not occur any farther east in Kansas than Republic County in the north-central part of the state (Collins 1993).

On 29 September through 1 October 1995, the Kansas Herpetological Society held a field trip at the Horse Thief Canyon Area near Kanapolis Reservoir in Ellsworth County, Kansas. On the night of 29 September, one individual of *C. atrox* was collected by Michael and Emily Moriarty. This represents the fourth specimen of *C. atrox* collected in Horse Thief Canyon since 1991. All other individuals were collected and killed by Kansas Department of Wildlife and Parks employees. (Kurt Grimm, Kansas Department of Wildlife and Parks pers. com.).

The Ellsworth County specimens probably represent introduced individuals. Kanapolis Reservoir is 125 miles north of their current range, but this species could possibly survive as an introduced colony in Ellsworth County. The habitat is open arid grassland with a lot of rocky bluffs present. Extremely cold weather may play a factor in controlling their population, though, Gloyd (1940) mentioned an introduced population of *C. atrox* in Vernon County, Wisconsin that survived for several years.

Other recent *C. atrox* sightings include a specimen collected on U. S. 77 Highway in Cowley County, Kansas during September, 1994 (Joseph T. Collins, KU Natural History Museum, pers. com.). Another individual was collected recently in Sumner County, Kansas (Bob Gress, Wichita Wild pers. com.).

MEANS OF INTRODUCTION

One of the main means of introduction of this species into the state is the release of pets. In the last few decades, keeping reptiles as pets has become an ever-increasing trend. Rattlesnakes especially have become very popular novelty items.

There is a documented record of an exotic species of rattlesnake being found in Leavenworth County, Kansas on 24 May 1980 (Collins 1993). The species in question was a Mojave Rattlesnake, *Crotalus scutulatus*, which is

Society for the Study of Amphibians and Reptiles
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native to southwestern Texas, southeastern New Mexico, southern Arizona, and central and northern Mexico (Ernst, 1992).

Introduced specimens of *C. atrox*, are also coming from the rattlesnake round-ups currently being held in Texas and Oklahoma. I know of eight individuals of *C. atrox* which have been brought into Kansas and donated to colleges, universities, or zoos. In the instances of which I am aware, an individual had obtained the snake at a rattlesnake round-up with the intention of keeping it as a pet. Then, after a period of time, the owner tired of the rattlesnake and tried to dispose of it. Through correspondence with herpetologists from the Tulsa Zoo and Living Museum in Tulsa, Oklahoma, and the Sedgwick County Zoo in Wichita, I learned that these institutions frequently receive unwanted snakes acquired from round-ups.

POSSIBLE NATURAL POPULATIONS

Collins (1982) stated that there may be suitable habitat for *C. atrox* in south-central Kansas in the Barber and Comanche County area along the Oklahoma border. Webb (1970) documented this species 10 miles from the Kansas border in Alfalfa County, Oklahoma. John Breukelman collected three individuals from Woods County, Oklahoma 0.75 mi S of the Barber County, Kansas border (Hall and Smith 1947). Smith (1956, 1995 pers. com.) also mentioned anecdotal information from local landowners in the Barber, Comanche, and Clark County, Kansas areas stating that *C. atrox* was occasionally seen.

In October 1994, a specimen of *C. atrox* was donated to the Division of Biological Sciences at Emporia State University. According to information given by the collector, the snake was captured in Barber County, Kansas near the town of Medicine Lodge (Riedle, pers. obs.).

CURRENT STATUS

The current status of *C. atrox* in Kansas is undetermined. Smith (1956) included *C. atrox* as part of the state's

herpetofauna. Collins (1982) and Reichard et. al. (1995) listed *C. atrox* as a species of possible occurrence in Kansas, with the most likely place of occurrence being the Barber and Comanche County area. Collins (1993) stated that *C. atrox* was no longer a viable candidate for listing as a species of possible occurrence in Kansas.

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LITERATURE CITED

- Collins, J. T. 1982. Amphibians and reptiles in Kansas. Second edition. Univ. Kansas Mus. Nat. Hist. Pub. Ed. Ser. 8: 1-356.
- Collins, J. T. 1993. *Amphibians and Reptiles in Kansas. Third Edition.* Univ. Press of Kansas, Lawrence, Kansas. xx + 397 pp.
- Ernst, C. H. 1992. *Venomous Reptiles of North America.* Smithsonian Inst. Press, Washington, D. C. 236 pp.
- Gloyd, H. K. 1940. The rattlesnakes, genera *Sistrurus* and *Crotalus*. A study in zoogeography and evolution. Spec. Publ. Chicago. Acad. Sci. 4: 1-270.
- Hall, H. H. and H. M. Smith. 1947. Selected records of reptiles and amphibians from southeastern Kansas. Trans. Kansas Acad. Sci. 49: 447-454.
- Reichard, K., T. Duncan, H. M. Smith and D. Chiszar. 1995. Herpetological microbiogeography of Kansas. Abstract 1995 Kansas Herpetological Society Meeting, 4-5 November, Lawrence, Kansas.
- Smith, H. M. 1956. Handbook of amphibians and reptiles of Kansas. Second edition. Univ. Kansas Mus. Nat. Hist. Misc. Publ. 9: 1-356.
- Smith, H. M. and A. J. Kohler. 1977. A survey of herpetological introductions in the United States and Canada. Trans. Kansas Acad. Sci. 80: 1-24.
- Webb, R. G. 1970. Reptiles of Oklahoma. Stovall Mus. Publ. 2: 1-370.

