# Morphometrics of female painted turtles (*Chrysemys picta bellii*) in Clay County, Minnesota


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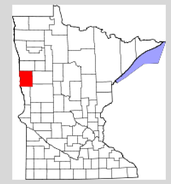


## Abstract

This long term study (2001-2019) focuses on western painted turtles (Chrysemys picta bellii) in Clay County, MN. Live floating/basking traps were used to capture turtles from three different sloughs. Captured turtles were weighed, sexed, notched and measured (carapace length, width, curvature, and plastron). If large enough (usually 10 cm or greater in carapace length), captured turtles were PIT-tagged for permanent identification. After data were collected from the turtles, the turtles were released back into the sloughs from which they were captured. In this poster, we are analyzing the data from 2016 (when we started using PIT tags) to 2019 only for PIT-tagged females. Past research has shown that females reach a larger size than same-aged males, and also that female carapace curvature is greater than that of males of the same age, supposedly because it allows more space for females to carry eggs. In this poster, we investigate if the ratio of carapace curvature length to carapace (straight) length changes as the females grows larger. If the ratio increases as the female gets larger it would have implications that perhaps she could carry more eggs or the same number of eggs, but larger eggs as she grows.


## Introduction

We have been live-trapping painted turtles in a long-term, ongoing study since 2001. The purpose is to study population characteristics and behaviors in painted turtles. The turtles will bask on the live traps and are captured when they fall in. In this study we compared the carapace length with the carapace curvature. Female turtles need the extra space under their shells to house the eggs. Larger size female turtles are associated with increasing offspring quality (Tucker and Moll, 1997). Egg size is also proportional to the body size in females (Congdon and Tinkle, 1982). To accommodate this changing egg size, will the carapace length/curvature relationship remain the same, or change?

## Hypotheses

**Null Hypothesis:** There will be no numerical relationship between female turtle carapace length and carapace curvature

**Alternate Hypothesis:** There will be a numerical relationship between female turtle carapace length and carapace curvature

## Methods

We used our trapping data between 2016 and 2019 in the months of May-August. Live basking traps are located in three neighboring sloughs, Stockrahm, Middle, and Aakre. There were six traps located in Aakre and Stockrahm Sloughs, and, starting in 2011, three in Middle Slough. Once turtles were captured, measurements were collected on weight, carapace length/width/curvature and sex. The measurements used in this study were carapace length and curvature, and sex. Carapace length was measured with calipers (Figure 1), and carapace curvature was measured with a rubber, bendable ruler. We only used females over 10cm in length and sorted them into 4 sub groups: 10-13cm, 13.1-16cm, 16.1-19cm, and >19cm. The data were then graphed in Excel plotting carapace curvature versus carapace length.

**Figure 1. Measuring carapace length of *Chrysemys picta bellii* with calipers.**

## Results

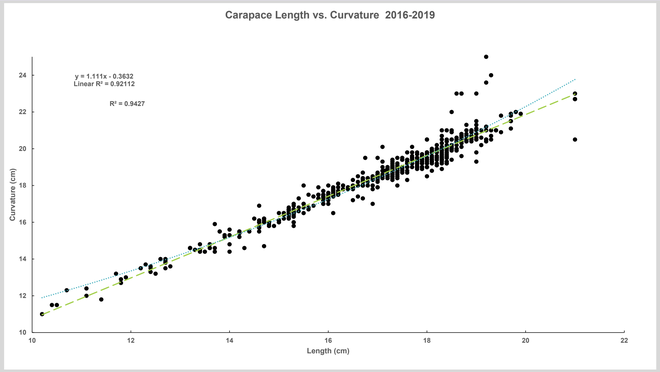


**Figure 2: All data used from 2016-2019. Shows an overall trend. Linear trend shown in green, exponential shown in blue.**

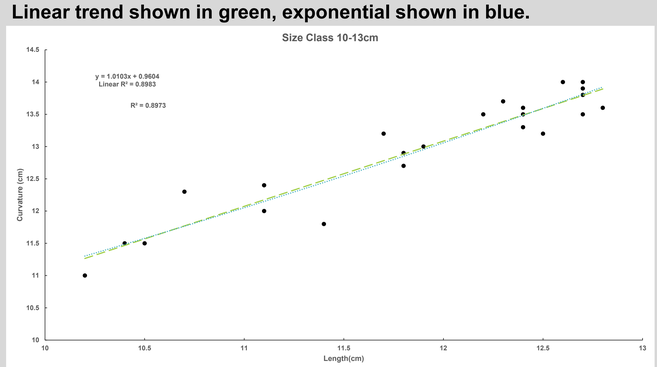


**Figure 3: Carapace length vs. curvature: size group 10-13cm.**

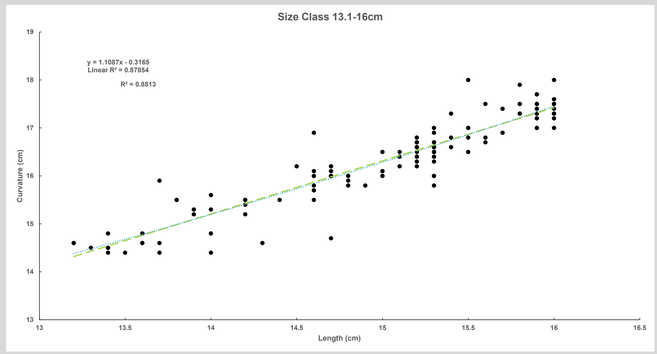


**Figure 4: Carapace length vs. curvature: size group 13.1-16.**

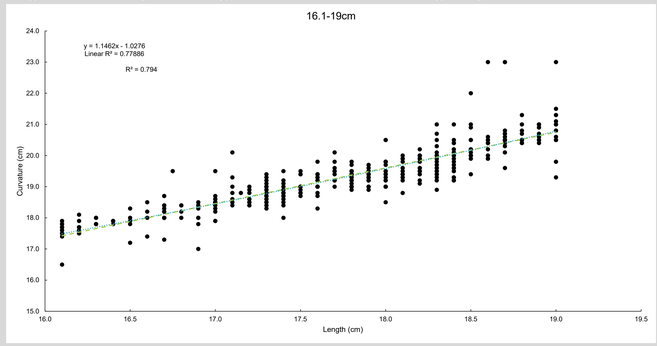


**Figure 5: Carapace length vs. curvature: size group 16.1-19.**

## Results (continued)

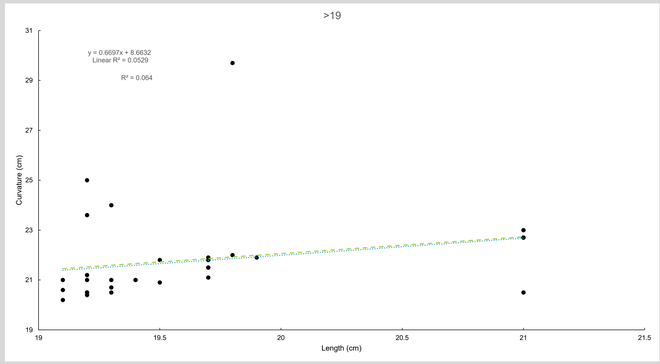


**Figure 6: Carapace length vs. curvature: size group >19. Linear trend shown in green, exponential shown in blue.**

## Results (continued) & Discussion

We plotted the data for each size class then fitted a trendline for each group to see if a linear or exponential line would best fit the data, with the higher $R^2$ value depicting the best fit. We did the same thing for all the data combined to see the overall trend. When all data were combined, the overall trendline was a better fit for an exponential curve (Figure 2). For the individual size classes, the smallest class, i.e., 10-13cm had a better fit for a linear trendline (Figure 3). For the larger classes, i.e.,13.1-16 and 16.1-19cm, the fit was slightly better for an exponential relationship rather than linear (Figures 4 & 5). In the class >19 there were no conclusive trends, probably due to a small sample size in this class.

If we look only at female turtles larger than 13cm, the trendline is an exponential fit. Turtles this size and larger would be the ones who have reached sexual maturity and more likely to lay eggs. This exponential relationship indicates that the curvature (i.e., the "domedness") of the carapace is increasing at a slightly faster pace than the length of the carapace, indicating more of a "done-shaped" carapace in larger females. This could then reasonably translate to more space to carry either more eggs or the same number of eggs, but larger eggs.

In future analyses, we could run similar tests, but group our data differently – perhaps 13.1cm->19cm, or 16.1- >19cm. This would eliminate smaller turtles who most likely are not yet reproducing. It would also incorporate the very largest turtles (i.e., >19cm) into a more conclusive analysis.

**Additional Field Crew Members**: Alex G. Hexum, Fernando Lambert, Casey L. Coombs, Megan L. Gates, Syreeta M. Shigematsu, Emily A. Larsen, Avery J. Knisley, Patrice M. Delaney, Nick R. Wilm, Samantha A. North, Joanna E. Blum, Stephanie E. Sonnenberg, Ajayi A. Temiloluwa, Savanna J. Hohenstein, and Nicholas A. Marshall

## Literature Cited


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