



# Me First! An Analysis of Loggerhead (Cc) Hatchling Size and Mass on Emergence Order

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## Introduction

- The bigger is better hypothesis postulates that offspring of larger size should have greater fitness and survival<sup>1</sup>.
- In sea turtles, larger offspring show greater fitness through their speed and ease of movement, minimizing their time in high-risk locations<sup>2</sup>.



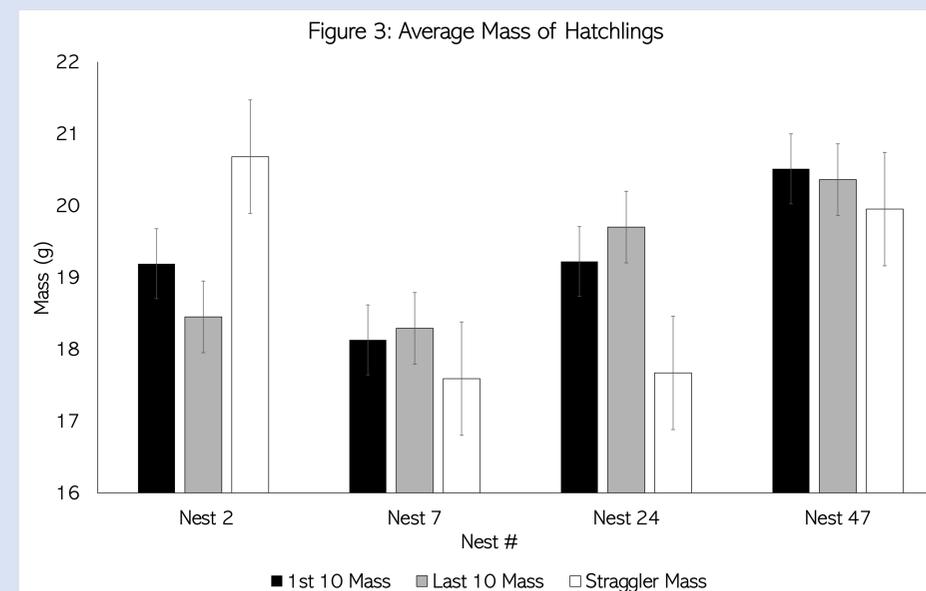
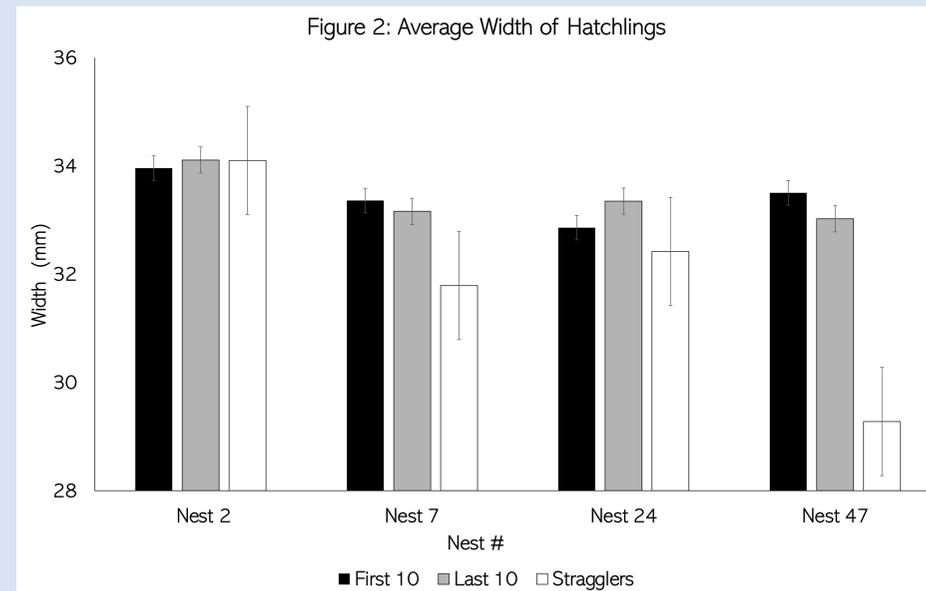
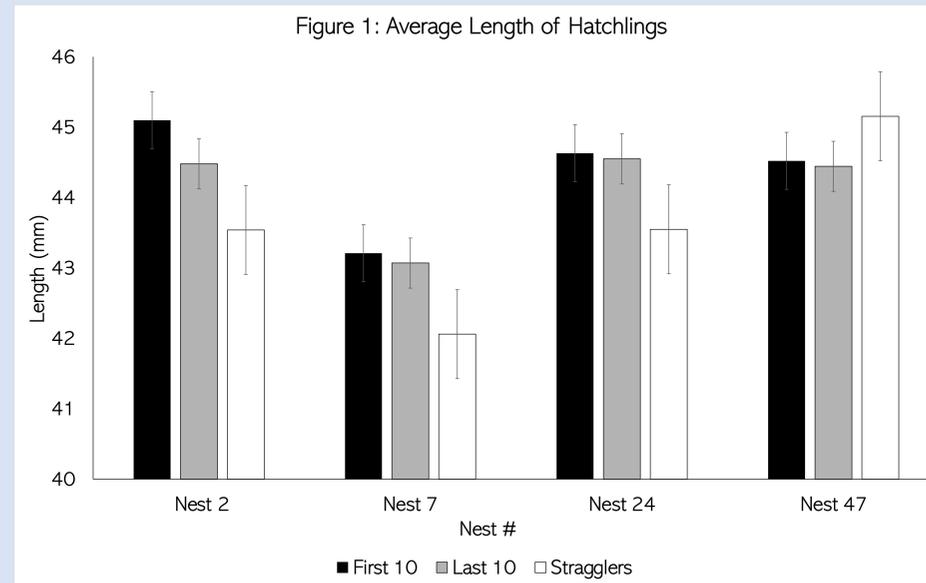
- Understanding hatchling fitness and its effect on emergence can provide insight on hatchling survival rates as well as influencing management decisions.

## Objective & Hypothesis

- To test the "bigger is better" hypothesis by determining if fitness traits such as length, width, and mass show a genetic predisposition dictating the emergence order of Loggerhead (*Caretta caretta*) hatchlings on Bald Head Island, North Carolina.
- We hypothesized that the first hatchlings out of the nest would be larger than any trapped stragglers, showing greater phenotypic fitness and supporting the bigger is better hypothesis.

## Methods

- At the initial boil, the first 10 and last 10 hatchlings to emerge were collected to record their length, width, and mass.
- During the excavation, measurements were recorded for any live stragglers remaining in the nest.
- After measurements, all hatchlings were immediately released.
- Each nest was analyzed individually for differences between the 3 sample groups using a Welch's t-test.
- Then data for all nests was analyzed together to determine differences between the 3 sample groups using a Welch's t-test.



## Results

- Data was taken from 35 nests, but due to equipment constraints, only 4 nests are complete datasets.
- All 4 nests with complete data sets (4,7,24, 47) showed significant differences in the size of hatchlings from the initial boil and the stragglers (Fig 1-3).
- When examining the data for all nests, the stragglers were significantly smaller (Table 1) by an average of 1.63 grams in mass, 2.17 mm in width and 1.21 mm in length.
- There was no difference in size and mass between the first 10 and last 10 of the initial boil (Table 1).

Table 1: P-values When Comparing All Nests

	Length	Width	Mass
First 10/Last 10	0.906	0.3306	0.954
First 10/Stragglers	8.41666E-09	2.62372E-18	1.78637E-06
Last 10/Stragglers	7.30611E-08	1.1816E-19	2.41752E-06

## Discussion

- Our results show that hatchlings of a larger size and mass could have greater phenotypic fitness than their smaller counterparts, allowing them to emerge from the nest first.
- We found that hatchlings of smaller size are less likely to emerge first, and more likely to become trapped in the nest.
- Due to equipment failure, we were unable to attain more than 4 complete data sets. Despite this, the full data sets as well as all other data show significant difference in all three traits.
- After examining these findings further investigation is necessary with a larger sample size, as well as investigating possible connections to optimal egg theory and mother size.



## Acknowledgements

- 2022 Bald Head Island Sea Turtle Protection Team and Bald Head Island Nest Monitors