

Possible Female Preference in Hatchling Collared Lizards, *Crotaphytus collaris*: Precocial Sexual Selection

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Abstract

All species have a varying preference for phenotypic traits for sexual selection. Sexual selection can be based on the specie's sexual dimorphism such as their color, size, and structure. A lot of the extraordinary morphological and behavioral diversity in the animal kingdom has come up through sexual selection. The species in particular that we are researching over is the *Crotaphytus collaris* along with their choices for sexual selection. Males of this species show off vivid orange bars horizontally across their backs while the females stay drab. And the true purpose of these orange bars is unknown though they bring up questions. These lizards also pair bond so they will have a mate when they come out of hibernation for the mating season. Because of this, females get to choose which males they want to mate and pair bond with based on their preference of phenotypic traits of the males. Much of this helped us bring up the question that we are asking which is "Do either female collared lizard hatchlings and/or yearlings prefer males with bright orange bars over the males that are drab?" Understanding this question will help with understanding the questions behind the mystery of the oranges bars. I hypothesize that females would have a greater preference towards the Hatchling orange barred males which will be a delayed benefit towards fitness. I hypothesized this because if the females preferred males with orange bars then there would be less of an availability of mating with males making for a smaller amount of clutches leading to a delayed benefit towards the lizard's fitness. In order to try to prove my hypothesis for this project we will go out to our site at sooner lake; we have sites on both the dam known as SL1 and in an area along the shoreline known as SL2. By use of the technique known as noosing we will capture about 20+ of both males and females ranging from hatchlings to yearlings so as for a larger group of test subject. The lizards will be transported back to our lab at the Stillwater campus. We will use three tanks for the lizards during trials; two tanks will be set up identical to each other side by side, horizontally, but have the view of both tanks side blocked from sight so the males will not be able to see each other. We will observe the decisions of the females over a period of one to two hours to see which male she prefers. Her preference will be determined based on which of the two males she will stay closest to or further from the longest. I expect that the females will choose the females will choose the males with these orange bars over their drab counterparts. Though I do expect that there is a possibility that my hypothesis is wrong and the females might choose the drab males over the vivid males or they may choose neither.

Keywords: *Crotaphytus collaris*, Sexual Selection, Precocial, Pair Bonding, Hatchling Orange Bars

Introduction

Sexual selection occurs in many species though it varies from species to species. It is based on the relationship between certain phenotypic traits to frequency of mating (Husak et al. 200). In 1871, Darwin proposed that these traits had evolved either through intrasexual competition between males in order to dominate access to females or through constant female preferences towards mating with exceptional males. Sexual selection can be based on the specie's sexual dimorphism

such as their color, size, and structure. A lot of the extraordinary morphological and behavioral diversity in the animal kingdom has come up through sexual selection. Two main developments within the extensive realm of sexual selection theory are male competition and female choice (Irschick et. al. 2007). Determining a female's choice in sexual selection is what we are going to be testing with the Eastern Collared Lizard, *Crotaphytus collaris*. Hatchling males show off bright orange bars across their backs and

down their sides, while females stay drab. The purpose of these orange bars on the males is unknown. Collared lizards also show pair bonding which pair bonding is when a male of the species occupies some of a female's time in order to create a social bond such that once mating season comes; the females that have been bonded with will be more likely to join a certain male's mating harem or group of females. Because of this, females get to choose which males they want to mate and pair bond with based on their preference for phenotypic traits of the males. All of this brings up the question "Do female collared lizard hatchlings prefer males with bright orange bars over the males that are drab?" Understanding this question will help with understanding the questions behind the mystery of the orange bars. I hypothesize that females will have a greater preference towards the males with hatchling orange bars, whose benefit will be a delayed one towards fitness. We hypothesize that females will prefer males with orange bars and form pair bonds with them so that the next year when they are sexually mature, they will mate with these known partners

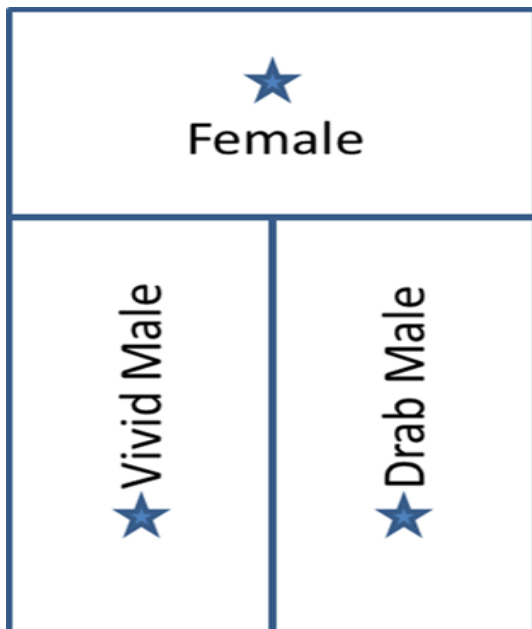


Figure 1

early on in the season, which will allow more egg clutches and better offspring survival.

Methods

My hypothesis for this project is that females would have a greater preference towards the Hatchling orange barred males which will be a delayed benefit towards fitness. In order to try to prove my hypothesis for this project I will go out to our site at sooner lake beginning in May and continuing into the fall of 2015. Along the lake we have sites on both the dam known as SL1 and in an area along the shoreline known as SL2. I will use long telescoping fiberglass poles about 12-13 feet in length with little slipknot thread to put around the lizards head in a technique known as noosing to capture these lizards alive (Baird et al 1997). About 20+ both males and females, the experiments will be done using both hatchlings and yearlings so I can have a larger diverse range of test subjects. Once trials are over the lizards will be marked by having the very distal parts of the toes clipped, which this hasn't shown to affect the lizards in any negative way. I will do this so I can know if the lizard has been caught before through different combinations of clippings. Also once finished the lizards will be returned back at their exact locations of capture unharmed. The lizards will be transported back to our lab at the Stillwater campus. I will use three tanks for the lizards during trials, two tanks will be set up identical to each other side by side, horizontally, but have the view of both tanks side blocked from sight so the males will not be able to see each other (Baird et al 1997). There is a possibility that the males will be able to smell each other possibly messing with the trials in the process, so I will have to watch their behavior and remove them if they begin to have troubles. I will have a third at the end of the other tanks for the

female to be in. I will add a drab male to one tank; one vivid male will be added to the other tank next to the first tank. The drab male will be painted brown so the orange bars on the lizard's back and sides are concealed from the female's sight, and the vivid male will receive orange paint to intensify its natural orange bars. A female, who will be able to see both of the males, will be added to the third tank. During the spring the preliminary study will utilize yearlings (due to a lack of hatchlings in May and June) to develop our methods to be used in the definitive study conducted on hatchlings in late summer. We will conduct 5 choice trials with yearlings in the spring, and 20 or more choice trials in the fall. It could be possible that the female will smell the paint that I have add to the drab male's back and dislike it, or it will flake off of the male showing his orange bars which could mess with her decision making, I will have to buy paint that is odorless and one that doesn't flake off in order for this not to happen. I will observe the decisions of the females over a period of one to two hours to see which male she prefers. During the experiments, the female's preference will be determined based on which of the two males she will stay closest to the most. We expect that the females will choose the vivid males over the drab ones. We would then be able to conclude that these orange bars have an importance in the sexual selection of the Collared Lizard. A Chi-Squared Test will be used to analyze any tendency to prefer one class of males over the other. Our Null Hypothesis is no preference.

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