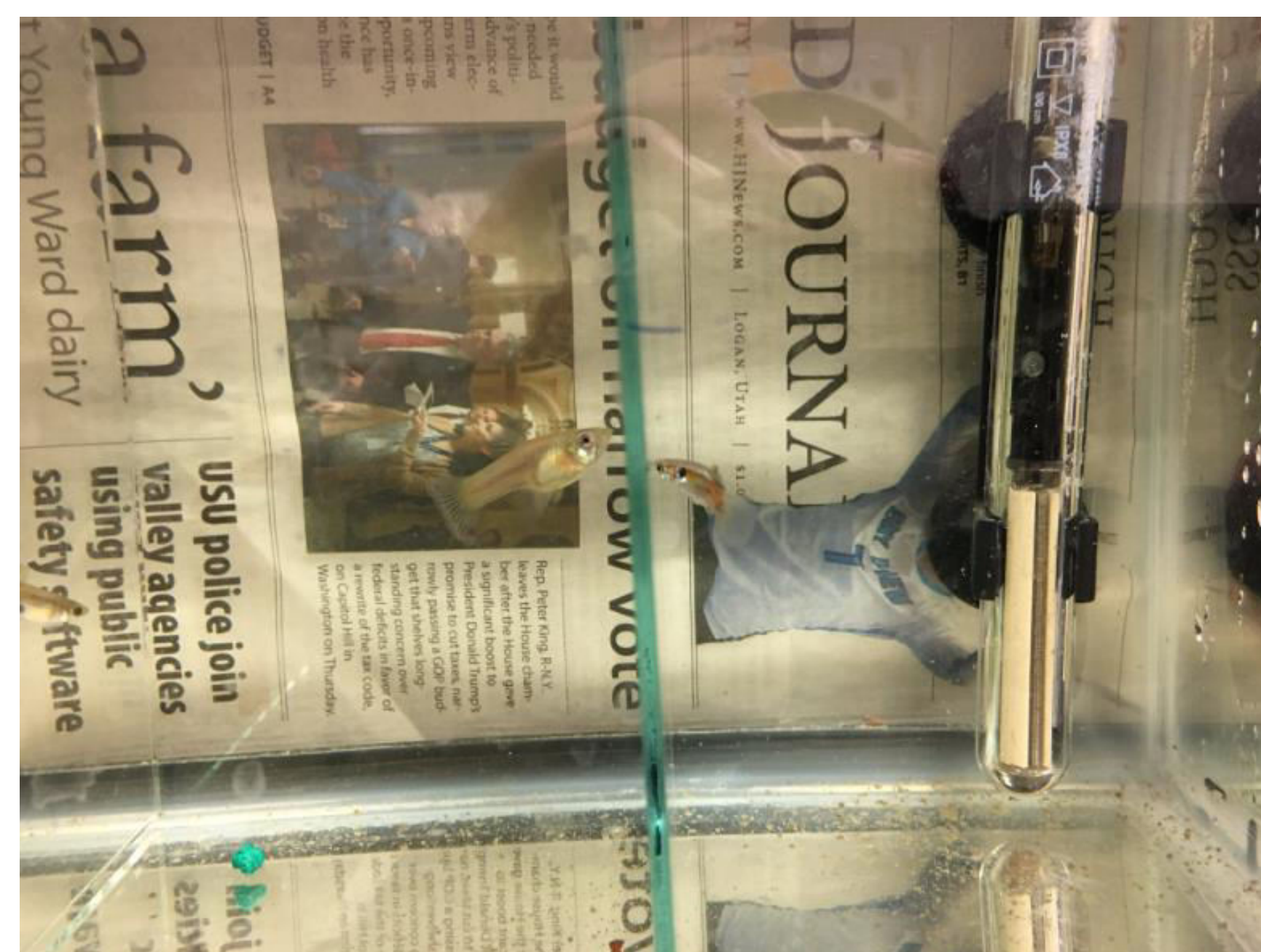


Mean Girls: The Effect of Multiple Females on Sexual Selection Behavior In Guppies

Douglas Brian, Sean Bergeson, Isaiah McDonough

Introduction

It is well documented that females play a prominent role in the sexual selection behavior of guppies. Working within the lab in the BNR building, our experiment sought to determine whether the presence of multiple females would, as a result of being within a more competitive environment, affect the sexual selection behavior of female guppies. As we wanted our test to be within a larger environmental context, we decided to use wild type males. One tank had one male on either side with one female in the middle, while the other tank had one male on either side and 3 females in the middle. Female glass tapping behavior against either the right or left glass pane was our measure of female interest. Guppies, male and female, were selected at random. We predicted that females, in the presence of other females, would be more compelled to pursue males and instances of glass tapping would increase.



Methods

We observed the mating preferences of female guppies in a controlled environment. We started by putting two glass panes in the tank, sectioning off the tanks into thirds. We proceeded to cover all the sides of the small aquarium with newspaper, taking care that the paper had as little color as possible as to not distract the guppies as they went about selecting mates. Both male and female guppies had been separated from the opposite sex for a couple of weeks in hope that would encourage female selection when put into the presence of a male.

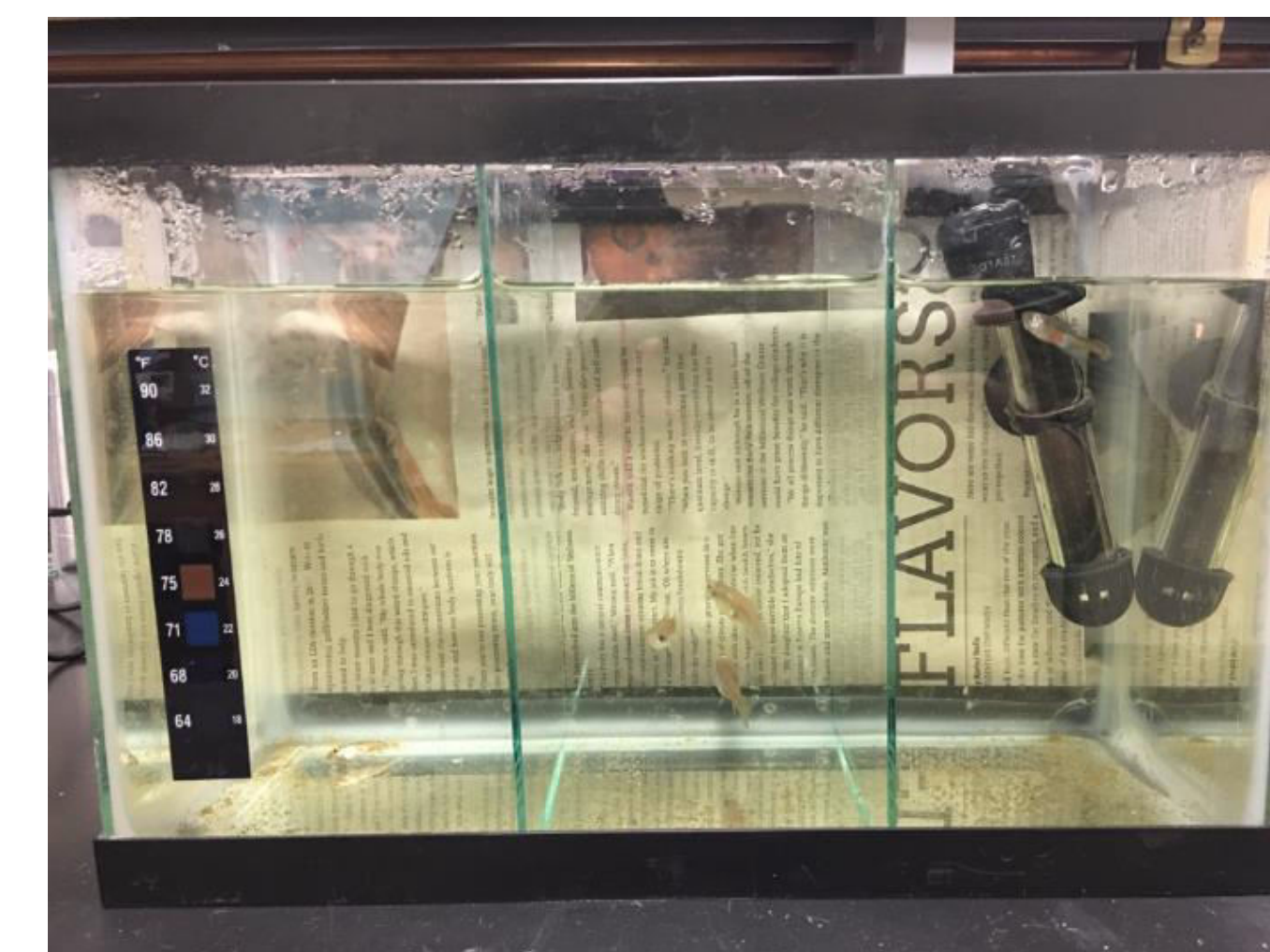
We randomly selected two males from a larger aquarium of about 20 to 25 guppies. We selected males that were as similar in size, tail shape, and color as possible. After making the selection each male was put into either the left or right sectioned side of the aquarium. Before retrieving the female guppies we allowed the male guppies a 2 minute "cool down" period where they were able to acclimate to their surroundings.

We chose females from one of two aquariums with 25 to 30 females in each tank. Female size was not part of the experiment. Rather, random selection of each female was practiced. With our two smaller tanks with males on both ends we conducted two variations of our experiment. The first tank we only allowed one female in the center at a time. After the cool down period was over we released the female into the center section of the aquarium and count glass tapping instances over the period of 3 minutes. Every time a female would touch one glass pane or the other we counted it with clickers. At the end of the time limit we would record our data and reset the trial by selecting completely new males and a new female. This same procedure was repeated the exact same way in the other aquarium with exception of three females in the center section in place of just one. Trials were conducted 15 times in each environment.

Data was recorded and shown on a bar graph. To show proper results we took the total number of touches of the female guppies with three in the tank and divided it by three and got the average touch per fish.

Experimental Design

Environments with high female competition are compared to those with low female competition for male and glass tapping behavior is observed.



Results

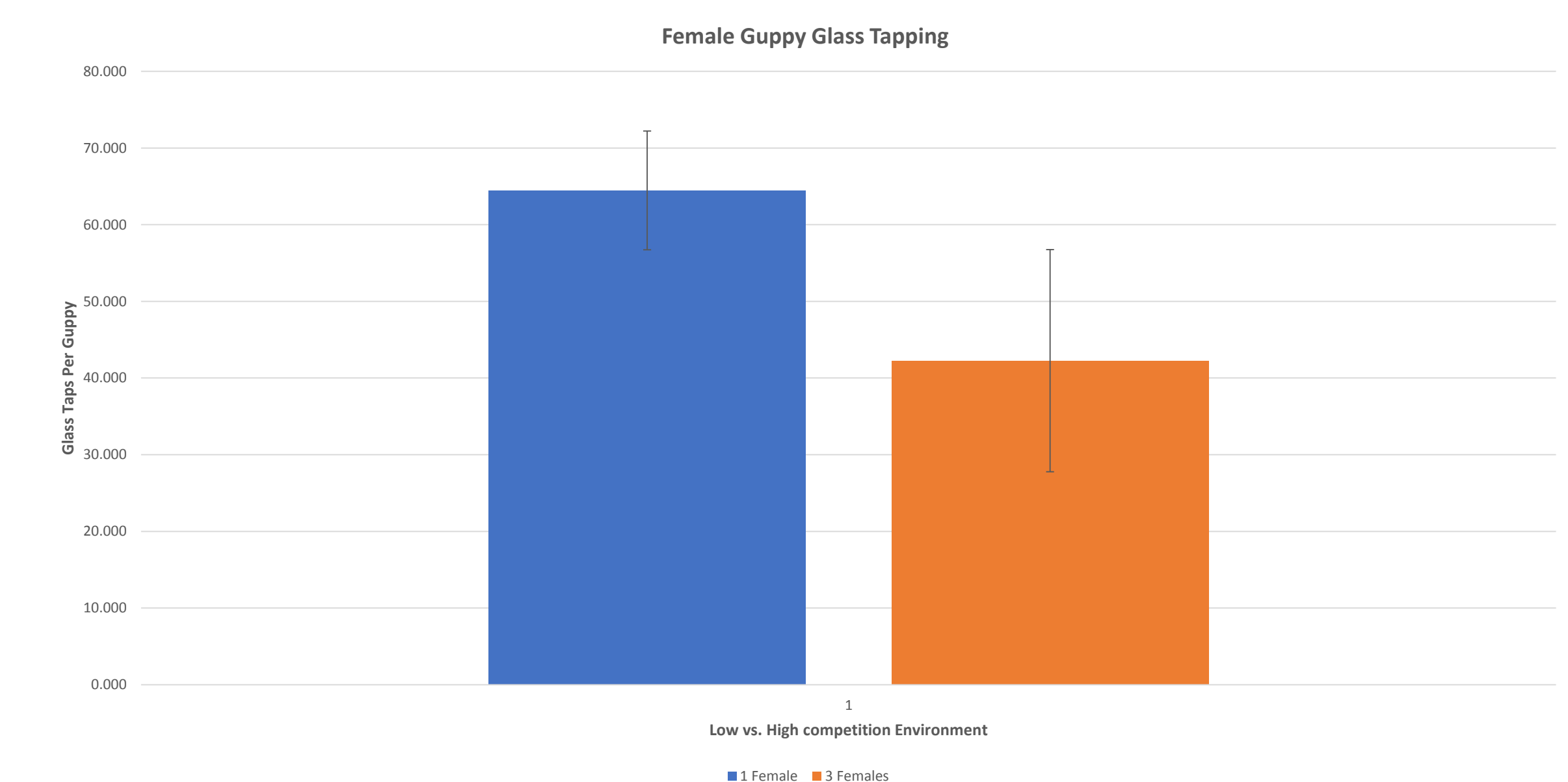


Fig. 1 – Low competition environments with one female are compared with high competition environments with 3 females. Glass tapping behavior is observed and averaged per fish shown with Standard deviation. Data shows no statistical difference in average of glass tapping behavior. T-test value of $P = .23$

Discussion

Our study shows that female mating behaviors do not change significantly based on competition with multiple females. The male contribution to conception is relatively "inexpensive" in terms of energy and time input when compared with females. These differences in sexual biology between male and female guppies lead to differing behaviors. This study gives evidence that females do not perceive or react to competition in selecting male partners.