

# The Effects of Classical Music on a Breeding Pair of Siamese Fighting Fish, (*Betta splendens*)

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We below, certify that this grant proposal is a true and accurate representation of the  
research intentions of the student.

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Review Only

# **The Effects of Classical Music on a Breeding Pair of Siamese Fighting Fish, (*Betta splendens*)**

## **Introduction**

My interest for Bettas began when I got my first one almost two years ago. I currently have a pair of Bettas. One night my sister moved her female Betta into my room next to my male and he instantly presented himself to her through the glass by flaring his gills and posing. It was really neat to watch the interaction. I wanted to try and breed the Bettas, so I began to research the breeding of Bettas. I learned that the male Betta can be aggressive towards other males and females of its species. During courtship the male will nip at the female to entice her under the bubble nest he has created for the purpose of holding the eggs and fry (baby fish) until they are ready to live on their own. This can be an intense and rough period for the female sometimes causing damage to fins, scales, and possibly death if she isn't receptive to the male's advances.

While I understand this is part of their natural instinct, I wondered if it always had to be this way. I have read that classical music can have a calming effect on animals, it made me wonder if it would have the same effect on fish. So, I've decided to play classical music around them as they court and spawn to test if the classical music will relax and calm the male Betta so that he will not be as aggressive (i.e. fin ripping, scales missing, possibility of the female being killed). This would be beneficial research as it would make spawning easier, maintain the appearance of the female, and reduce the possibility of death of the female Betta resulting from an unattended spawn.

Can the aggressive reproduction behavior of the male Siamese Fighting Fish be influenced by the exposure to classical music? My hypothesis is that the classical music would affect the reproductive behavior of the bettas. I think the music will cause the male Betta to be more relaxed and less aggressive.

## **Procedure:**

1. A 10-gal aquarium with a mesh divider splitting it into 2 compartments will be used to separate the fish. Two dividers (one clear and one opaque) will allow the water to be the same (temperature & quality) in both sections as it will be able to flow between. The opaque mesh will prevent the Bettas from seeing each other until the designated observation time, while the clear divider maintains separation. The tank will have a heater keeping the

temperature of the water at 78-80 degrees F. A carbon filter system will be used to maintain water quality. The tank will be empty except for two artificial plants on each side to provide shelter & protection.

2. Two tests will be performed. The first is a control with no music played. The second will have the cd, *The Best of Vivaldi* played continuously from 7am-7pm. Each test will last until courting/spawning occurs or for maximum of 1 month.
3. Week 1: This is the control experiment. The male will be placed in one side of the tank and the female in the other.
4. Data collection will begin during week one. The opaque screen will be removed (allowing the fish to see each other) and the fish will be observed for 10 minutes 3x per day (7am/1pm/7pm). The opaque screen will be returned at the end of ten minutes.
5. The following data will be collected:
  - a. For signs of courting:
    - i. Male: flaring of gills, posing, and wagging of body
    - ii. Female: appearance of dark vertical bars and swimming near the partition
  - b. Frequency of each courting behavior during observation period (total number of each behaviors listed above 0-4, 5-9, 10+).
  - c. Length of time it takes for the male to start flaring (stopwatch begins when opaque screen is removed and ends at first flare).
6. When courting occurs the female will be moved into the male's section of the tank and monitored to watch for aggressiveness (excessive biting/nipping at female scales and fins and/or chasing continuously). If the male is too aggressive the female will be removed and tried again the next day.
7. Observations of behavior will increase in frequency when the pair are placed together to insure safety for the female Betta and to determine baseline behavior for this pair during spawning for male and female.
  - a. Frequency of male biting/nipping at female (number of attacks 0-4, 5-9, 10+)
  - b. Length of time for male to entice female under bubble nest (stopwatch begins when female is placed in male side of tank and ends once under the bubble nest).
8. Test one is complete after spawning occurs or 1 month whichever comes first. The male Betta will be removed from the 10-gal aquarium and returned to his individual tank for 2 weeks, while the female will remain in the 10-gal aquarium.

9. Test two begins with the male Betta returned to the 10-gal aquarium with a CD player centered next to the aquarium. It will be plugged into a timer to turn the music on at 7am and shut off at 7pm.
10. Data collection during test two will follow the same procedure as test one. Upon completion of the experiment, it will repeated with 2 more pairs of Bettas to verify data collected is consistent with multiple pairs of Bettas.
11. Data Analysis will be completed after the 3 trials. Differences in behavior frequency and level of aggression will be compared to determine if the classical music had any effect

## **Literature Review**

### **Lucas, G. A. (2017, October 20). Suggestions for research project [phone interview].**

Dr. Gene Lucas, a retired biology professor of Drake University and founder of the International Betta Congress (IBC). I emailed my research project to him for feedback. He agreed to mentor and offered suggestions to simplify and remove extra variables that may hinder the experiment.

### **Ostrow, M.E. (1989). Bettas. Neptune City, N.J: T.F.H. Publications, Inc.**

This book was really helpful to me because it explained how the Bettas spawn, and what their courtship behavior is like. It also had really nice photos of Bettas spawning so I could see what it looked like. It also talked about various diseases that are common with Bettas and some of the different variations. It also talked about some of the ideal foods to feed bettas and how to set up a tank for them.

### **Lucas, G. A., Axelrod, H.R. (1996). Siamese Fighting Fish. Neptune, N.J: yearBOOKS, Inc.**

This book was helpful in the sense that it explained more on Betta reproduction. It had a nice variety of Betta photos. It also had updated information about what to feed Bettas. This was a good resource for me to better understand how reproduction works, what the courtship and spawning looks like in the Betta species.

### **Ocean Conservation Research. (2017). Retrieved October 24, 2017.**

<http://ocr.org/learn/how-fish-hear/>

This website explained how marine animals hear and why. It also showed diagrams of the anatomy of the fish's ear. It pointed out where the lateral line is on a fish and how they use it. This article helped me understand how the fish hear sounds more like vibrations and they do respond to sound.

### **McConnell, P.B. (2013). Retrieved October 1, 2017.**

<http://www.patriciamcconnell.com/theotherendoftheleash/new-research-on-dogs-and-music>

This article was about the effects of music on dogs. It showed me that classical music will have a positive effect on animals and can help calm them down. The tones and tempos of music are what the animals pick up on. That each species tend to lean towards different variations of tones and tempos.

Ava Rectenbaugh

Vertebrate Animal Form [5A]

**2. Describe completely the housing and husbandry to be provided. Include the cage/pen size, number of animals per cage, environment, bedding, type of food, frequency of food and water, how often animal is observed, etc. Add an additional page as necessary.**

The male and female pair of Bettas will live in a 10-gal aquarium that is divided down the middle by a clear plastic mesh with holes to allow the water to flow between. An opaque screen will be placed next to it to prevent fish from seeing each other until designated observation time. A carbon filter system will be used to maintain water quality. A heater will be used to keep the water temperature at 78-80 degree Fahrenheit. The tank will be empty except for 2 artificial plants on each side to provide shelter and protection. During the experiment the female will be moved into the male's side of the tank for observation during spawning. The Betta with both be fed 4 bloodworms each twice a day (morning/night).

During the experiment the fish will be observed 3x/day (7am/1pm/7pm) for 10min each to watch for courtship. When courtship begins and the female is moved into the male tank, initial observation will increase to 20min to watch for the receptiveness of the female and the level of aggressiveness of the male. If there is no excessive aggressive behavior then the fish will be checked hourly to watch for spawning. If the male is too aggressive (continuous chasing and/or excessive biting at her scales/fins) the female will be returned to her side of the tank and tried again the next day.