Agonistic Behavior in *Betta splendens*: Data Collection

by Dana Krempels

For the next two lab sessions, you will be collecting behavioral data on *Betta splendens* to test the hypotheses you constructed last week. This chapter should seem familiar, as it contains the same instructions you used in your first exploration of behaviors in your fish subjects. You will use this same method to collect data for your project.

I. General Instructions for a Successful Experiment

1. Some individual fish are particularly sensitive or aggressive, and these may be stimulated even by the sight of brightly colored or patterned clothing. Avoid wearing such clothing to lab. Pale-colored clothing is the least likely to interfere with fish behavior.

2. Position your fish where it cannot see neighboring animals until you are ready to begin your experiment. Keep the visual barriers in place unless you are actually making observations of fish behavior.

3. Avoid abrupt movements when near the fish, and speak quietly. *Do not tap on the side of the fish bowl, as this creates a very loud, stressful noise for the fish.*

4. When recording the positions and movements of your Betta's display, note that the male will employ most of its fins, its gill opercula, and the associated branchiostegal membrane. A particularly energetic male may bend his body in tight angles. Note the orientation of the fish to its stimulus and record any changes in the coloration of your fish (for example, watch for color to fade or become brighter, or for color streaks to appear on various areas of the body.

5. Be sure to record the length of time of each behavior you are recording, as well as its subjective aspects (for example, you might rate the strength of the display ("-" for weak, "+" for medium, "++" for strong—or variations on that theme, perhaps using numbers to rank degree of energy shown by the fish.) Do not stimulate the fish for longer than one minute for each trial, as longer trials may result in habituation to the stimulus.

6. Wait least 5 minutes between trials, allowing the fish to calm down completely. Between trials, be sure to block your subject's view of other fish, and avoid fast movements or loud noises. (Sound travels much more easily through water than through air. So don’t say anything rude about the fish. They can hear you.)

7. It may be helpful to record the sequence of movements the fish uses in a full display.

8. Replicate each trial at least 3 times. Note any differences between replicates. What might cause such differences as time goes on?

9. Paper fish models will also elicit a response from males, but because they are stationery, they might not elicit as strong a response. However, the subject will also not habituate as quickly to a static model as to a mirror (why might this be the case?)

10. When using a paper model, move it slowly up to the subject and then wave it slightly to attract the subject's attention. Try to use similar technique and movement in each trial, to avoid introducing human error into your experiment.
11. Male *Bettas* will respond strongly to the sight of another member of its own species, whether male or female. Consider the responses of your fish to same sex or different sex stimulus.

12. Refer to the fish anatomy diagram in the second week’s lab chapter when designing your ethogram.

Take your time collecting data. Be thorough and thoughtful. Take pictures that you can use in your poster presentation. Remember that you will have two weeks to collect data. So use the time to refine your techniques and get a large sample size.

**II. Ethical Treatment of Experimental Subjects**

As before, any student witnessed abusing animals in the laboratory will be immediately dismissed from the lab, receive a ZERO on the lab project and presentation, and be subject to possible additional disciplinary action.

Animals of any species used in experimental studies should always be treated with respect, and given the proper care and maintenance at all times. Besides, fish have excellent visual acuity. They could identify you in a lineup, if it came to that. If only they could remember things for longer than three seconds.*

* One of those cultural genes (memes) that goes around is the myth that fish have a memory lasting only three seconds. (Remember Dory from "Finding Nemo"? That was the joke.) In reality, some species have been shown capable of remembering certain things for five months.
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Table 3. Behavioral observations of *Betta splendens* during a five-minute period

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III. Adopt-a-Fish!

The fish being used in your project will be available for adoption after all the experiments have been completed. If you would like to adopt a *Betta splendens* for your very own, you will need the following:

1. an appropriate vessel (minimum 2.5 gallons)
2. good-quality food (Spectrum brand is the best)
3. dechlorination solution (essential!)
4. floating live plants (provides cover, comfort, and oxygen)
5. a bit of gravel for the bottom of the bowl
6. a small vessel (e.g., a plastic bowl with a lid) to bring your fish home.

Note that even females will fight and bully one another if they do not have sufficient space to avoid each other, so unless you have a very large, community tank, you must have a separate vessel and supplies for each fish you adopt. Also note that—as aggressive as these fish are to each other—they are relatively docile when confronted with aggression from other species. If you have a community tank with aggressive species (e.g., Tiger barbs, cichlids, etc.), it is best to keep your Betta in a separate environment.

*Betta splendens* is beautiful and relatively easy to keep, but this species does require specific care. Please read about care information before you adopt:

http://www.bettatalk.com/betta_care.htm


http://www.bettacentral.com/care.htm

Please contact our Lab Manager, Ms. Linda White <lwhite@miami.edu> for more information about adopting a fish at the end of the semester.