

Investigation into Guppy Intelligence

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Guppy (*Poecilia reticulata*) Intelligence?

- Previous studies show increased female preference for males with quick learning ability
- Ability to learn correlates with male foraging ability
- Learning=Foraging=Increased Fitness in offspring



Picture from http://www.grizzlyrun.com/Files/Images/Image_Gallery/fancy_guppy.jpg.

The Test

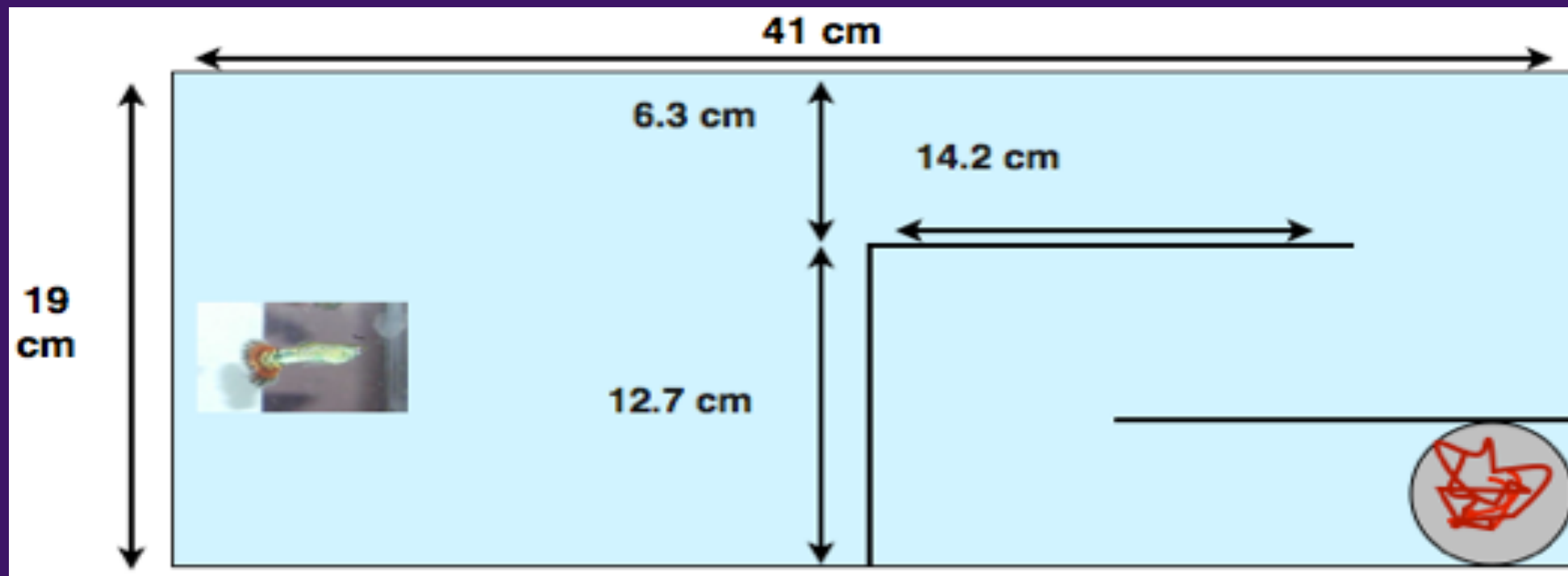
Male guppies tested in maze with food as incentive!

Experimental Design

- Guppies run through maze over 8 day period with dish of bloodworms at end of maze
- Guppies given 5 minutes to acclimate in tank with a divider blocking entrance to maze
- Guppies given 10 minutes to run maze
- After 10 minutes, guppies led through maze with net.
- Maze set up based on Shohet (2009) design



Guppy #4



- Tests conducted over 7 consecutive days
- Guppies labeled 1-8
- Guppy order randomized each day
- Guppies starved 24 hours before start of testing
- Bloodworms placed in plastic dish at end of maze

Figure 4. Maze design with measurements, gray circle with red lines depicting bloodworm dish. Guppy photo from: <http://fins.actwin.com/species/index.php?t=9&l=183>

Results and Data Analysis

Guppy Number	Avg. Time in Maze (sec)
1	537
2	497
3	521
4	600
5	600
6	600
7	600
8	570

Figure 1. Average time of each guppy. Only half the guppies during tests completed the maze.

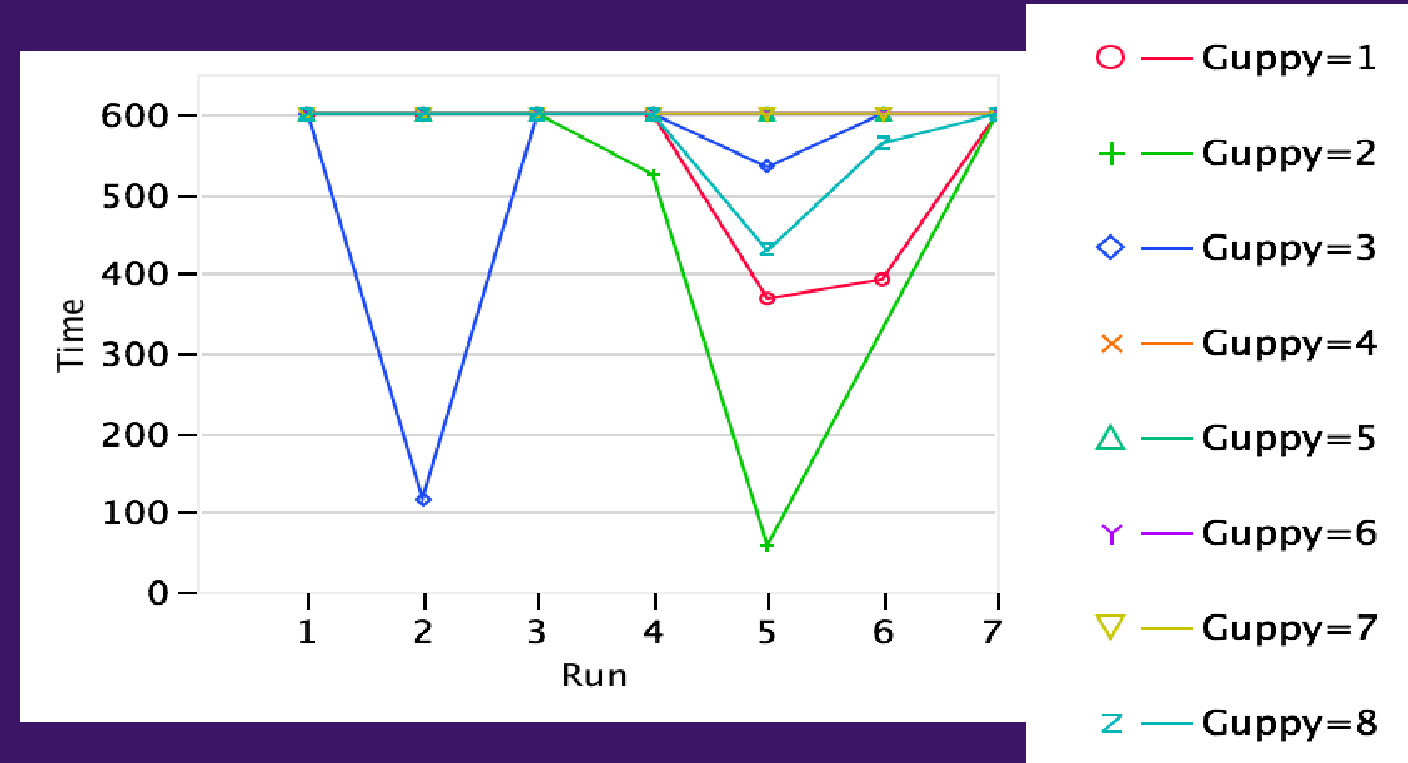


Figure 2. Time of each guppy over the 7 runs.

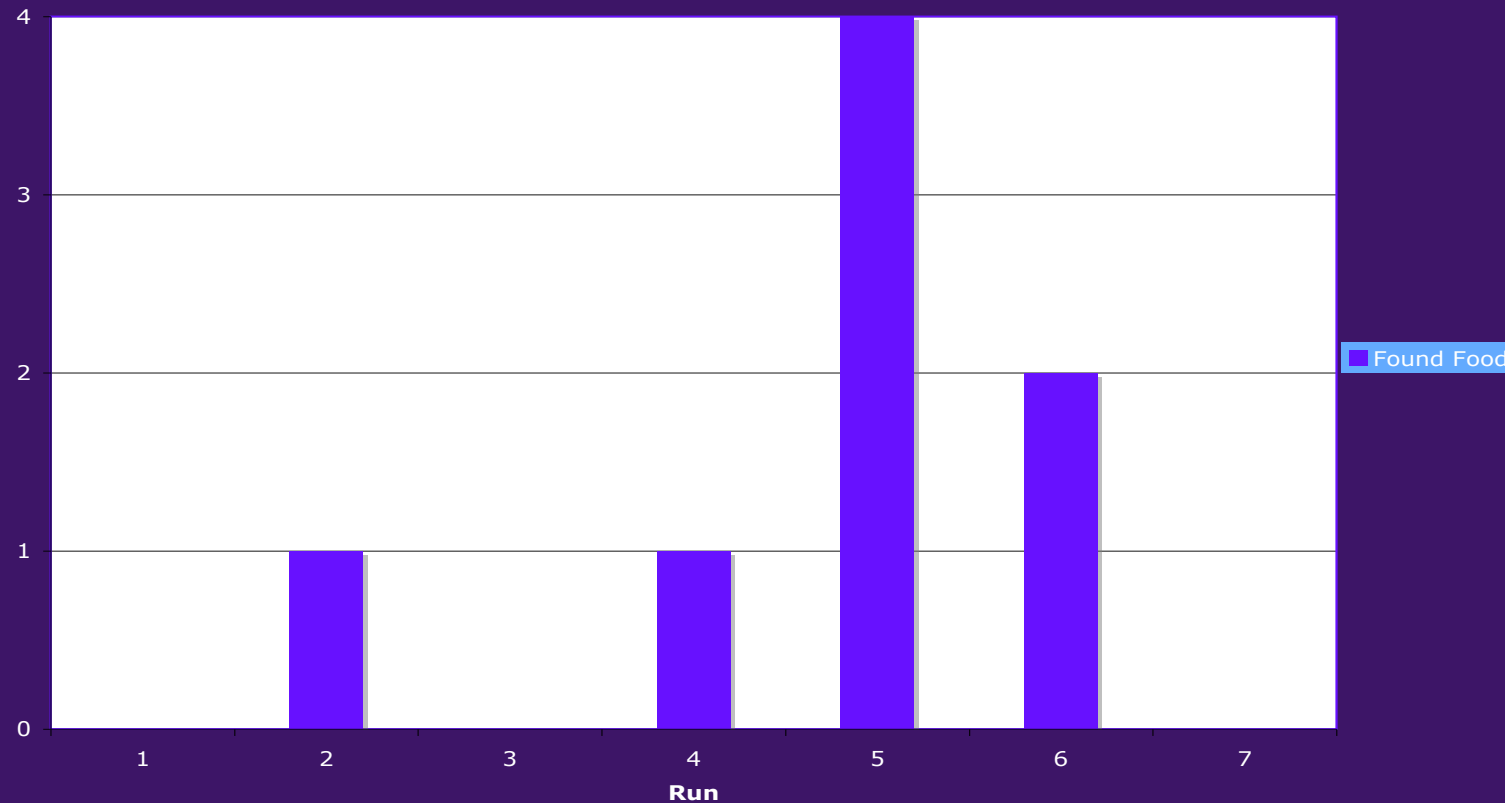


Figure 3. Number of guppies that found food over each run. With a logistic regression test, found that there was no significance during which day the guppies were tested (P-Value= 0.2, Slope= 0.25, Std. Error= .2).

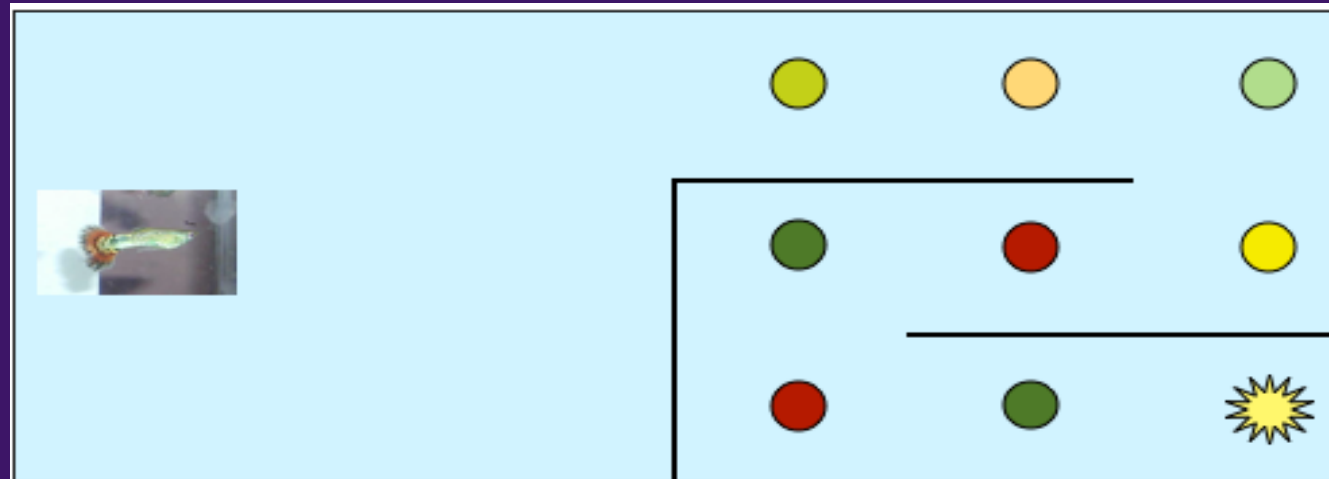


Figure 5. Set up with nine algae flakes through maze

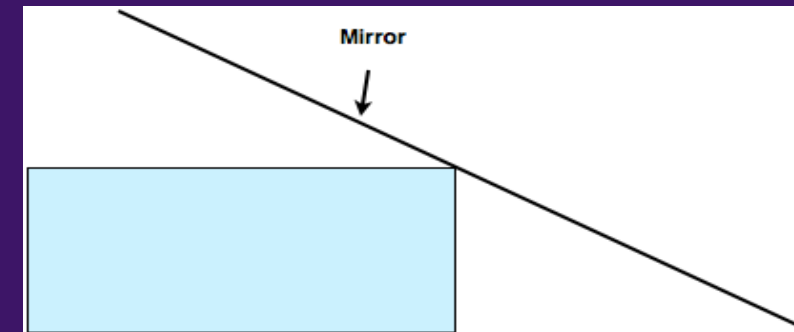


Figure 6. Maze with observation mirror

Was it food type, how guppies learned the maze, or distractions?

Potential Solutions:

- Flake food vs. Bloodworms
- Increased run time?
- Mirror for observation!

Selected References

Karino, K., T. Utagawa, et al. (2005). "Heritability of the algal-foraging ability: an indirect benefit of female mate preference for males' carotenoid-based coloration in the guppy, *Poecilia reticulata*." Behavioral Ecology and Sociobiology **59**(1): 1-5.

Shohet, A. J. and P. J. Watt (2009). "Female guppies *Poecilia reticulata* prefer males that can learn fast." Journal of Fish Biology **75** (6): 1323-1330.

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