



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

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Project Title
What Effect Does Dissolved Oxygen Level Have on Viviparis malleatus (Trapdoor Snail) Behavior?

Abstract

Objectives/Goals
My goal was to see if dissolved oxygen levels affect Viviparis malleatus (trapdoor snail) behavior. From the Year One Study (2003-2004), I learned that trapdoor snails do display predictable behavioral patterns. Given this, I was able to design a set of tests to see what effect varying dissolved oxygen levels have on behavioral tendencies such as movement patterns, learned behaviors, weight gain or loss, and reproduction counts.

Methods/Materials
The snails came from a local fish pond. Only mature snails of similar size were chosen, again due to data obtained from the Year One Study in which I found that the more mature the snail, the more predictable the behavior. I set up two basic populations: one in a bowl with high dissolved oxygen levels and one in a bowl with low dissolved oxygen levels. Aerators were used throughout the study to maintain or increase dissolved oxygen levels. Fish bowls of varying sizes were also used depending on the behavioral test being conducted. Colorimetric snap tests were used for dissolved oxygen testing.

Results
Results showed that snails in the non-oxygenated environment were more active. Their behavioral patterns followed that of the predictable nature established in the Year One Study. Snails in the oxygenated bowl were mostly at the bottom, inactive, and completely inside their shells. The non-oxygenated snails gained weight (+3.55%) while the oxygenated snails lost weight (-3.19%). Also, the non-oxygenated snails showed an increase in reproduction count from 4 to 47 while the oxygenated snails showed a birth count beginning at 2 and going to 24.

Conclusions/Discussion
Normal activity must be conducted by the snails in order for them to mate, feed, and give birth. The non-oxygenated environment was more conducive to snail activity. The Year One Study shows that these snails, unlike others, have anatomically designed bodies to withstand the bottoms of ponds. This year's study leads me to see that their behavior is far more life-supporting in the non-oxygenated environment. Since trapdoor snails do not like surface disturbances and they congregate where oxygen levels are lower, trapdoor snails at the water line should signal a drastic pond imbalance and should be responded to immediately by pond caretakers.

Summary Statement
Trapdoor snails in lower dissolved oxygen environments have greater weight gain, display predictable behavioral patterns, and have more young.

Help Received
Teacher as facilitator.