

2022

Vernal Pool Showdown: Who Will Win?

Luke D.

Messalonskee Middle School, aripa@rsu18.org

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Recommended Citation

D., Luke (2022) "Vernal Pool Showdown: Who Will Win?," *Findings from the Field*: Vol. 5, Article 36.
Available at: <https://findings.gmri.org/journal/vol5/iss1/36>

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Vernal Pool Showdown: Who Will Win?

By Luke D.

Observation and Questions

I noticed that frogs were extremely more common than salamanders and most creatures in vernal pools. (same goes for eggs) I saw that the frog eggs were clustered together and were usually hidden under leaves and other objects in the water. Does keeping the eggs together and hidden make their survival higher? Is it connected to the number of frogs compared to other creature numbers (including eggs) if so then how? Also, why are frogs more common if or if not the reason previously discussed? (including eggs).

The Facts

With two vernal pools behind our school that we visited, along with a pond, there seems to be quite a bit of data to work with here. So let's start with the facts. At the nearest vernal pool (not pond) we found about 3 frog egg clumps when we last went. $\frac{2}{3}$ of that number were under leaves and stick clumps. We should note that the three I found had considerably fewer eggs than most. Over the course of this research study, we have found 2 frogs (at least when I was here). The Orianna society website says that in a decent-sized vernal pool there are usually 500-2000 eggs. A female wood frog lays 1000-3000 eggs in a breeding season according to The National Wildlife Federation.

Using this data we can infer that each clump had around 1000-1500 eggs. If we take into account other frogs we'll also take into account that we only searched some of the vernal pool. Leading us to the conclusion that there are about 1000-1500 eggs in each of our clumps (also wood frogs only breed once). With all this we have a lot to go off with.

The Explanation

Compared to seeing little to zero salamanders and fairy shrimp eggs, that's amazing. It may be because wood frogs just lay more eggs. The fairy shrimp can lay anywhere



between 10 to over 1000 eggs so the fairy shrimp should win right? Not actually, even though they lay an overwhelming amount of eggs it seems like the wood frog eggs still beat them in many ways a 15-1, because we did find one definitive fairy shrimp (not another mosquito larva). Now, let's assume that wood frogs lay a slightly smaller amount of eggs than a spotted salamander, which lays about 100 eggs in a cluster. The results are still shocking: in two vernal pools and one pond the ratio was 150-0 an incredible amount. So even when wood frogs

get less (because we took into fact that there are only $\frac{2}{3}$ spotted salamanders to wood frogs so we split the number in half). Doing more than we needed to we find that wood frog eggs just thrive better and are more commonly hidden. Put two and two together, we find that their eggs are safe because they're clumped together in hiding places. But is that the entire story? Have we taken into account the fact that there might not be any spotted salamander or fairy shrimp so let's take a look at the evidence shall we. As stated earlier frogs lay anywhere between 500-3000 for easy rounding, we'll multiply the minimum on all averages by 2 so we'll say that there are 1000 eggs in a wood frog clump. Each wood frog breeds once and there are 40+ wood frogs so we'll go with 40. Blue spotted salamanders breed 1-2 times at most. And lay 10-60 eggs. We'll even multiply the minimum by 3: there are around 32+ plus salamanders. So you're probably thinking the wood frogs have a huge advantage. So you know I'll take the percent of successful hatches between wood frogs and blue-spotted salamanders and here's what we got. Salamanders have anywhere between 30-100 success rates in differentiating ph level water. But wood frogs have a shocking 80-90 in freezing cold, burning hot, almost all ph levels that a spotted salamander can, and even in predator-filled or more dangerous water. So there you have it. If we use the minimum or the half of both, wood frogs win. Unless we put the spotted salamanders in special water, or at least cleaner water. So if we look at it on a global scale wood frogs win. Fairy shrimp don't even have a chance. I guess the lesson is to hide your eggs, don't just make them see through (which is what spotted salamanders do). So that's the end folks. Case closed.

Work Cited

The National Wildlife Federation.

<https://www.nwf.org/educational-resources/wildlife-guide/amphibians/wood-frog>)

Hunter, M., Calhoun, A., McCollough, M. Maine's Amphibians and Reptiles.

Orianna Society.

<https://www.oriannasociety.org/faces-of-the-forest/egg-mass-identification-great-northern-forests/?v=400b9db48e62>

Pennsylvania Natural Heritage Program. Vernal Pool Salamanders.

https://www.naturalheritage.state.pa.us/VernalPool_Salamanders.aspx#:~:text=Spotted%20salamanders%20generally%20lay%20their,a%20cluster%20