Title: Exploring the impact of body size variation on trophic cascades using mole salamanders (*Ambystoma talpoideum*)

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Abstract: Trophic cascades are important in structuring diverse ecosystems, from terrestrial to aquatic systems. However, trophic cascades vary in strength both within and among ecosystem types. Recent theoretical and modeling research suggests that intraspecific variation could be a factor in varying strengths of trophic cascades. In particular, body size variation within a species has implications for species’ prey choice, behavior, and niche breadth. Exploring the role of intraspecific variation of a top predator can further our understanding of the complex dynamics that occur in a trophic cascade.

In this project, we manipulated the body sizes in populations of mole salamanders (*Ambystoma talpoideum*) to investigate the role of intraspecific variation in a top predator on trophic cascades. *A. talpoideum* are aggressive predators in fishless ponds and exhibit a wide range of body sizes due to their unique paedomorphic life history. We hypothesized that populations of similarly sized *A. talpoideum* would exhibit strongest trophic cascades due to overlap in niches and predation on similar prey items. As body size variation in a population increased, we predicted reduced top-down predation pressure due to smaller overlaps in niches and cannibalism. To test these questions, we constructed 54 1000-L mesocosms at Hancock Biological Station in Murray, Kentucky, which were populated with one of three salamander size-structure treatments. We monitored changes in the ecosystems through a suite of abiotic and biotic parameters over a period of six months.

Results show that presence of salamanders significantly increased chlorophyll-*a* concentrations, suggestive of a trophic cascade. Preliminary results suggest that the cascade is not mediated by a traditional pathway through zooplankton and macroinvertebrates, but instead by tadpoles which act as strong herbivores and limit concentrations of primary producers. These tadpoles were opportunistically deposited to the mesocosms by female tree frogs, which have been shown to selectively oviposit in ponds that do not contain *A. talpoideum*. This suggests that *A. talpoideum* could mediate a trophic cascade via indirect fear-based interactions.