

Spring 2016 Undergraduate Research Symposium

Effects of food resources on population dynamics of the Eastern Newt at Kingfisher Pond: A Long-term Field study

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Declines in amphibian populations have been noted worldwide since the 1960s. Proposed causes of amphibian population declines globally include extrinsic factors like habitat modification, disease and UV-B radiation. Intrinsic factors like food resource limitations and intraspecific competition would be expected to cause population oscillations. Long-term studies are needed to discern whether changes in population size are due to one or both of the above factors.

The Liberty University Ecology and Environmental Science classes have been conducting a population ecology study of the Eastern newts (*Notophthalmus viridescens*) in Kingfisher Pond annually since 1998 using a mark/recapture methodology. Newts captured through seining were given a permanent elastomer mark. Population size has oscillated from a low of 503 in 2005 to a high of 3033 in 2014. Hypothesizing food sources as the cause of these oscillations, the classes of fall 2015 calculated population size and condition indices for newts in four locations (cove, forest, beach and grass) and sampled macroinvertebrates using a ponar sampling device in two locations in the pond (forest and beach). Newt densities were highest in the forest area (density 5.3 newts/m²). Newts may have been attracted to the forest area due to high numbers of macroinvertebrates (16.8/sample) and avoided the beach (1.8 newts/m²) due to low number of macroinvertebrates (10.5/sample). Because of the high newt densities in the forest location, macroinvertebrates per newt were low (0.03 macroinvertebrates/newt) which may have contributed to the low newt condition index (-0.01). In contrast, macroinvertebrates per newt were high for the beach (0.09 macroinvertebrates/newt) which may have resulted in the high condition index for beach newts (0.09). To further understand the dynamics of newt population fluctuations with food resources a more in depth study was initiated in spring 2016.

Each month, starting January 2016, 10 newts, 5 female and 5 male, will be collected by seining. After capture, the newts are anesthetized. Once they cease movement their weight, length, and sex are recorded. If female, they are determined if gravid by a fiber optic light shown through the abdomen. Then their stomachs are pumped using dechlorinated water in a syringe with tubing attached. Water is pumped into the stomach which flushes out the stomach contents. After their stomach is pumped and contents collected in an empty petri dish, the newts are placed in a recovery tub. The contents from the stomach are then examined under a stereo microscope. To date the main prey are ostracods, copepods, and midges, of which only the midge coincidences with macroinvertebrates found in the ponar samples. Once the stomach contents are recorded and the newts regain consciousness, they are returned to the pond.

In the following months, our research will focus on how the newt's diet changes with the seasons (types and quantities of prey items). Prey population sampling will also be more targeted toward key species found in the newt's stomachs.