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Ryan Hunt
Indiana University - Purdue University Fort Wayne

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Ambystoma species and the A. jeffersonianum-hybrid complex: a comparison of abundance in established and restored wetland habitats

Ryan Hunt and Mark A. Jordan

Introduction

- In the Midwestern United States, many wetland complexes have been converted to farmland or housing developments. This loss and/or degradation of habitat affects the persistence of Ambystoma populations.
- Ambystoma use ephemeral forests to breed and upland forests for foraging and hibernation. Both of these habitat types are an integral part of Ambystoma ecology. Barriers can also influence Ambystoma populations by preventing movement between habitats.
- The extensive loss of natural habitat has led to restoration efforts for wetlands and the benefits of such efforts to salamanders are not well known.
- Allen County, IN historically is part of the range of four Ambystoma species: A. maculatum, A. opacum, A. texanum, and A. tigrinum as well as hybrids of the Ambystoma jeffersonianum complex.

Objectives

- Information about the ecology of Ambystoma occurring in disturbed landscapes provides the foundation for effective management of available habitat.
- Comparison of the response of Ambystoma salamanders to restored emergent wetlands as breeding habitats could provide insight as to which species/hybrids will benefit most.
- The effectiveness of a barrier, a railroad track, was also determined for this site’s Ambystoma assemblage.

Methods

- All salamanders were trapped using pitfall traps.
- Traps (N=20) were used to study two forested habitats and one emergent habitat as well as the potential routes of movement between them.
- Salamanders were individually tagged using VIAlpha tags.
- Tissue samples were taken by removing tail tips and used to identify the hybrids with microsatellite analysis.

Hybrid Identification

- All hybrid animals that were captured were genotyped using microsatellite analysis to identify the hybrid genome.
- The study population consisted of 87 triploid Ambystoma LTJ (laterale-texanum-jeffersonianum) (Figure 1) and 6 tetraploid LTTJ. Two specimens could not be fully typed (LTJ). The LTJ hybrid is well documented in northwestern Ohio but is uncommon in Indiana.

Results

- All species/hybrids showed decreased numbers in emergent and border habitats. Ambystoma tigrinum was the most prevalent species found in the emergent wetland of Eagle Marsh. A. tigrinum and A. LTJ were captured more frequently close to the railroad than A. texanum (Figure 2).
- The railroad seems to be an incomplete barrier. Both A. tigrinum and A. LTJ will use open and/or disturbed breeding pools. A. texanum tend to avoid barriers, edges and open habitats. The hybrids (LTJ) crossed barriers, and use open breeding pools. The railroad seems to be an incomplete barrier. Both A. tigrinum and hybrids were trapped near the railroad track on either side.

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Contact Information: Ryan Hunt, IPFW Department of Biology, huntra01@ipfw.edu

Figure 1. Hybrid genome consisted of three species. From left to right: A. laterale, A. texanum, A. jeffersonianum.

Figure 2. Counts for all three salamanders in each habitat type.

Figure 3. Map of the field site showing trap placement and the grouping of traps into habitats and migration corridors.

Figure 4. Comparison of the emergent wetland traps and forested wetland traps in Eagle Marsh.

Figure 5. Comparison of the forested traps of Eagle Marsh and Fox Island.

Figure 6. Comparison of abundance in established and restored wetland habitats.

Figure 7. Comparison of the response of Ambystoma salamanders to restored emergent wetlands as breeding habitats.