

Report to Illinois Wildlife Preservation Fund

**Reproductive success of *Ambystoma platineum*
Kickapoo State Park, Vermilion County, Illinois**

submitted by Jennifer M. Mui & Christopher A. Phillips

1) Breeding migration of adult *Ambystoma*

Introduction

We used a drift fence/drop can array to compare the breeding migration of *Ambystoma* adults at 2 ponds in Kickapoo State Park, one in the Middle Fork Woods Nature Preserve (MFWNP) and a man-made pond just outside the preserve in 2001.

Materials and Methods

The study site consists of one man made ephemeral pond just outside of Middle Fork Woods Nature Preserve which was excavated in December of 1996 and one natural ephemeral pond within MFWNP. We constructed a drift fence using aluminum screening with drop cans placed every 4.5 metres on 8 February 2001. Traps were covered with plywood coverboards and held down with shelf brackets to prevent depredation. Traps were checked daily for the first month. Beginning in March, the traps were checked following precipitation events or every second day, whichever was more frequent.

Adults were removed from the cans and identified to species based on gross morphological characteristics. For bisexual species, sex was determined and recorded. The number of each species and sex captured in each can was recorded. At the new pond the trespass rate for the fence was very high, therefore individuals found inside the fence were hand-caught. All *A. texanum* and polyploid *Ambystoma* individuals (*A. platineum* and individuals resulting from fertilization of *A. platineum* embryos by *A. texanum*) were brought back to the lab, anesthetized, measured, and marked by clipping the outer front toe. The measurements taken were snout vent length and inter-narial distance. Precipitation data was obtained from the Illinois State Water Survey station at the Danville Sewage Plant and temperature data was recorded using data loggers placed in the leaf litter of the natural pond. A t-test was used to compare the size of adults at the two ponds. A X^2 test was used to compare the proportion of each species at each pond.

Results

At the natural pond in the nature preserve, we collected 587 polyploids, 51 *A. texanum* (16 females, 34 males and 1 juvenile), and 82 *A. maculatum*. In the new pond, we collected 23 polyploids, and 7 *A. texanum* (1 female, 4 males, and 2 juveniles) (Table 1).

At the new pond, 76.7% of adults captured were polyploids, 23.3% were *A. texanum* and 0% were *A. maculatum*. At the natural pond, 81.5% were polyploids, 7.1% were *A. texanum* and 11.4% were *A. maculatum*. At the new pond, the proportion of *A. texanum* captures were greater than would be expected ($p=.001$).

There was no difference between the average snout vent lengths of polyploids at the two ponds ($x_{\text{new}}=92.4$, $x_{\text{old}}=90.7$, $p>.05$). There was no significant difference between the average snout vent lengths of *A. texanum* at the two ponds ($x_{\text{new}}=71.6$, $x_{\text{old}}=84.0$, $p>.05$).

2) Survival of *Ambystoma* embryos

Introduction

Egg masses of *A. texanum* and polyploid *Ambystoma* were flagged and counted to determine their survival in a man made pond just outside of Middle Fork Woods Nature Preserve. This pond was excavated in December of 1996 to provide additional, more stable breeding habitat for the state endangered *A. platineum* and its sexual host *A. texanum*. In spring 2000, these two species bred in the man-made pond for the first time. This pond was studied to compare the success of breeding in a man made pond to that in natural ponds. The natural ponds within MFWNP did not fill in 2001. For this reason, a comparison between the natural ponds and man made pond was not possible.

Materials and Methods

The study site consists of one man made ephemeral pond just outside of Middle Fork Woods Nature Preserve which was excavated in December of 1996 and one natural ephemeral pond in MFWNP. In February of 2001, *Ambystoma* egg masses were found in the new pond. We located and flagged 18 masses. Other egg masses were located but could not be counted due to the manner or place in which they were oviposited. The eggs were counted and identified as *Ambystoma* polyploids or *A. texanum* based on the size of embryos. Embryos of *A. platineum* are larger than those of *A. texanum* (Downs 1989 a, b). No egg masses of *A. maculatum* were encountered. These 18 egg masses were assessed weekly until hatching to estimate their survival.

Results

Of the 18 egg masses flagged in the man made pond, 6 were identified as *A. texanum* and 12 as polyploid *Ambystoma*. Egg masses of *A. texanum* averaged 28 eggs per mass and ranged from 7 to 91 eggs. Those of polyploids averaged 22 eggs per mass and ranged from 7 to 49 eggs. 62% of the *A. texanum* embryos survived to hatching compared to 34% of polyploid embryos. The natural pond did not hold water in the spring of 2001 and thus no comparison of embryonic survival could be made.

Survival of ambystomatid embryos

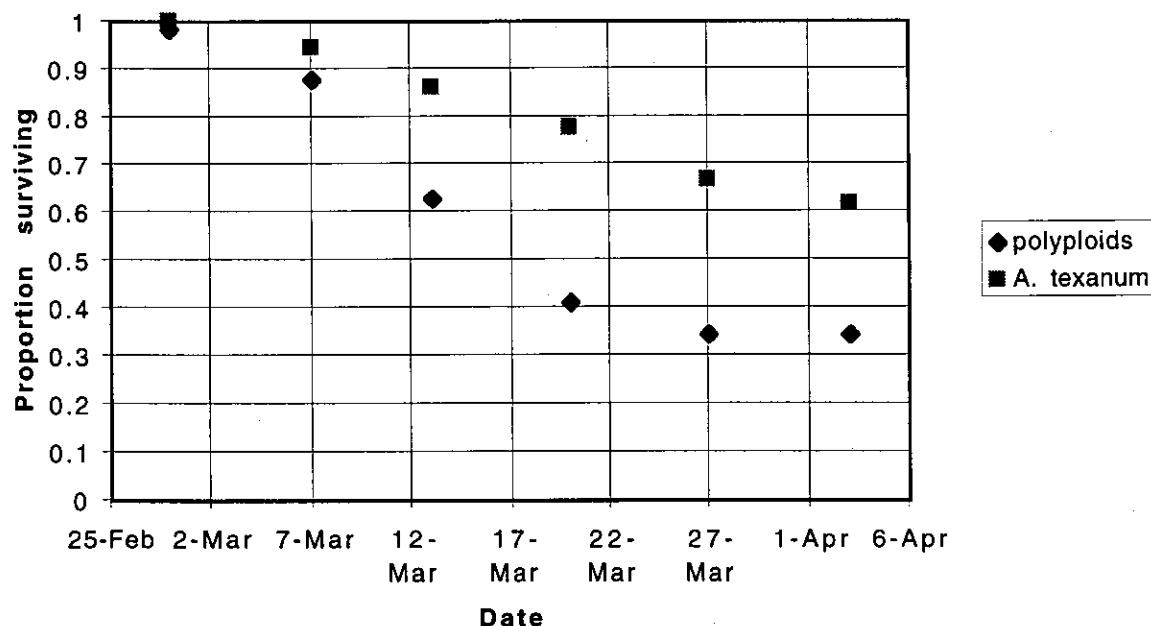


Figure 1. Survival of *Ambystoma* embryos in a man-made pond at Kickapoo State Park, Vermilion County, Illinois, Spring 2001.

3) Survival of *Ambystoma* larvae

Introduction

Larvae were sampled weekly from 11 April until 1 May 2001 to estimate their abundance and survival in the man made pond outside of Middle Fork Woods Nature Preserve.

Materials and Methods

We constructed a plywood box that measured 0.5m by 0.5m by 0.5m. The pond was divided into 1m by 1m quadrats using forestry flagging. Once a week we selected ten random quadrats, placed the box sampler randomly in the quadrats, and removed all *Ambystoma* larvae with a dip net. Once all ten quadrats were sampled, the larvae were counted for each of the 10 quadrats and then released. The diameters of the pond were measured and used to calculate the area of the pond. The number of larvae encountered in the 2.5 square meters was extrapolated to the total area of the pond to estimate the total density present on a given day.

We were unable to positively distinguish the larvae of *A. texanum* from those of polyploid *Ambystoma*, so identifications were not made. The estimated population sizes were compared using 95% confidence intervals. When the pond had decreased to less than 10m², no further larval samples were made.

Results

The initial population estimate for ambystomatid salamander larvae was 735 on 11 April 2001. The estimate on 1 May 2001, the last date sampled, was 409. There was no significant difference in number of larvae present between 11 April and 24 April, however there was a significant decrease in larvae present between 24 April and 1 May (95% CI $645.2 < x_{24apr} < 1235$ and $259 < x_{1May} < 559$). On 16 May, when the pond had dried, 17 dessicated larvae were found.

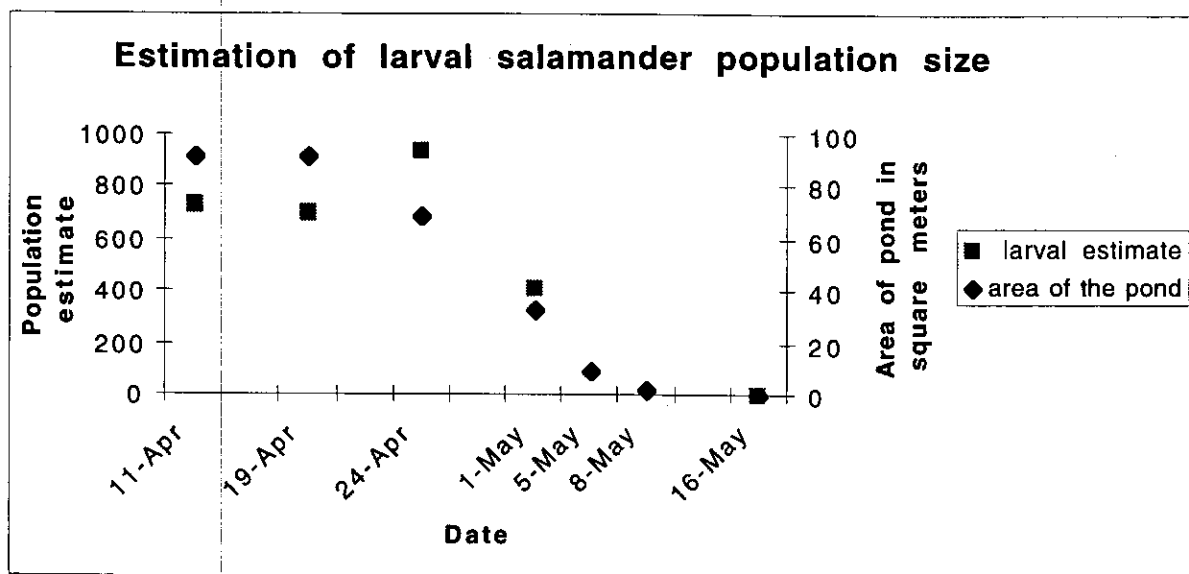


Figure 2. Estimate of larval *Ambystoma* population and decrease in surface area of the pond over time in a man made pond at Kickapoo State Park, Vermilion County, Illinois, Spring 2001.