Influence of presence of fish on breeding efforts of amphibians in a field experiment in central Illinois

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Introduction:
Introduced species often have negative impacts on populations of native taxa. The presence of introduced predatory fish may reduce breeding success of native amphibians. A management strategy of eliminating predatory fish from breeding ponds may promote native amphibian populations. This study examines amphibian communities at four neighboring woodland ponds in central Illinois before and after extermination of introduced fish populations from two of those ponds.

Methods:
Warbler Woods Nature Preserve is a recently established forest reserve managed by the Illinois Department of Natural Resources. There are four neighboring ponds on the reserve which are all used by amphibian species as breeding sites. The ponds have been monitored since May 2000 using screen wire drift fences and pit trap arrays. Traps are located on both sides of the fence, spaced 7.5 m apart. I monitored traps every 2 to 3 days throughout the activity season of local amphibians. I toe-clipped all new animals to indicate the year of initial capture and released them on the opposite side of the fence.

Fish Removal:
In December 2001, IDNR officials applied Rotenone™ to ponds B and C to eliminate the fish species from those two ponds (*Ameiurus melas* from B and *Lepomis mackiechirius* and *L. cyanellus* from C). The application appears to have been successful for the eradication of centrarchids in pond C. However, several live *Ameiurus* have been noted in pond B since application, though markedly fewer individuals than noted prior to Rotenone application.

Results:
Fisher’s exact tests by life history stage (Breeding adult / Neonate) and year of capture revealed differences in *Ambystoma texanum* numbers between treatment years at ponds A (*P* = 0.005), and C (*P* < 0.001) and in *Bufo americanus* numbers between treatment years at ponds A (*P* = 0.002), B (*P* < 0.001), and C (*P* < 0.001). Differences between treatment years in most other cases were not apparent due to low sample sizes.

Conclusions:
* Prior to removal, *Ameiurus melas* had a negative impact on *Bufo* reproduction.
* Prior to removal, presence of centrarchid predators (*Lepomis* spp.) had a negative impact on *Ambystoma* reproduction.
* *Bufo americanus*, *Ambystoma texanum*, and *Rana sylvatica* are capable of successfully hatching and completing metamorphosis in ponds treated with Rotenone®.
* Amphibian species may benefit from eradication of fish from breeding ponds by pesticide application.

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![Figure 1: Number of breeding season adults and emerging neonates.](image1)

![Figure 2: Number of breeding season adults and emerging neonates.](image2)

![Figure 3: Reproductive success as a proportion of emerging neonates to breeding adults.](image3)

![Table 1: Numbers of adult and neonatal individuals captured by species, pond and year.](table1)

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* indicates ponds containing fish.