

Amphibian Breeding Dates in Vigo County, Indiana

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Abstract

Spring amphibian breeding has been observed for four years in Vigo County, Indiana. The first spring breeder is *Ambystoma tatanum* which may breed during warm spells in January and February and peaks in early March. *A. maculatum* and *A. tigrinum* breed through March with the peak in mid-March. The first frogs, *Pseudacris triseriata* and *Hyla crucifer*, begin calling at the end of February with *Rana pipiens*, *R. sylvatica*, and *R. areolata* joining in that order during March. The breeding association in April is dominated by *Hyla versicolor*, *Bufo woodhousei*, and *Acris crepitans*. *Rana clamitans* breeds in May and June and *R. catesbeiana* breeds later in the summer.

For each species, varying conditions of temperature and rain may slightly alter the time of the breeding season. In particular, large numbers of males may call late in the season after periods of heavy rain. *Scaphiopus holbrookii* breeds when there is a combination of high night temperatures and heavy rains and may not breed every year if the proper stimuli do not occur. In *Scaphiopus*, all breeding activity takes place within one or two days and may occur at any suitable time in spring or summer.

Amphibian breeding has been observed during the springs of 1964-67 at ponds five miles NE and eight miles NE of Terre Haute, Vigo County, Indiana. It is felt that a report on observed breeding dates may facilitate efforts by other Indiana herpetologists to collect certain species of amphibians which can be collected in large numbers only during their breeding seasons.

The pond five miles NE of Terre Haute is especially interesting because all of the species of pond breeding amphibians that have been collected in Vigo County in recent years utilize it as a breeding pond. Thus the succession of breeding amphibians in the spring has been easily observed. Three reptiles have been collected in the pond (*Chelydra serpentina*, *Chrysemys picta*, *Natrix sipedon*) and four more in close proximity (*Terrapene carolina*, *Clonophis kirtlandi*, *Coluber constrictor*, *Heterodon platyrhinos*). The pond is a farm pond situated in an area where the lowlands (valley train deposited by a diversion channel of the Wabash River during Wisconsin glaciation) meet the uplands (Illinoian drift deposits). The surrounding soil is very sandy. The pond covers approximately $\frac{1}{8}$ acre, half of which dries in late summer after filling with aquatic vegetation, particularly arrowleaf (*Sagittaria* sp.). It reaches a depth of about four feet but contains no fish. South of the pond is a pasture which floods with the rains of March and April and to the southeast there is an open woods which harbors some flood pools after heavy rains. The flooded pasture is used by some of the early breeders and by the spadefoot toad, *Scaphiopus*. The spadefoot occasionally uses the pools in the woods. There is a series of larger, permanent ponds in the farmland to the north.

The pond eight miles NE of Terre Haute is located in the uplands and only a few species utilize it for breeding purposes. Information obtained there supplemented the knowledge of breeding dates for a few species, *Ambystoma texanum* and *Rana sylvatica* in particular. This pond is small, temporary, and has a lot of brush in it. It is surrounded by woods and brush.

The small-mouthed salamander, *Ambystoma texanum*, is the earliest spring breeder. It has a peak of breeding activity in early March but may breed during warm spells in January and February. An adult salamander and fresh eggs were taken on February 20, 1965, and Blatchley (1) recorded an egg mass from which the larvae were escaping on February 16, 1890. A few *A. texanum* may be found in the ponds through the first week of April. The spotted salamander, *A. maculatum*, and the tiger salamander, *A. tigrinum*, enter the breeding ponds in early March and, while individuals may be found throughout March, the peak of activity is in early and mid-March. In collecting salamanders, a seine is of great help. Salamanders were often collected by seining after careful search in the shallower parts of the pond revealed none.

The first frogs to appear in the pond and start calling are the chorus frog, *Pseudacris triseriata*, and the spring peeper, *Hyla crucifer*. They appear at the end of February or about March 1 and some individuals remain through May but the bulk of the breeding activity occurs in mid to late March. *Rana pipiens* begins calling in early March and peaks in mid to late March but a few calling leopard frogs remain throughout the spring. *Rana sylvatica*, the wood frog, calls from late March through the beginning of April and the crayfish frog, *Rana areolata*, calls from mid-March through mid-April.

In mid-April, the breeding association changes. The early breeders gradually disappear and the common tree-frog (*Hyla versicolor*), Fowler's toad (*Bufo woodhousei*), and the cricket frog (*Acris crepitans*) enter the breeding association in that order and continue to call through the beginning of June. It is during this change in the breeding association that the emergent vegetation starts to come up over the surface of the water and it is interesting to note that *Hyla versicolor* seems to prefer calling from on top of arrowleaf leaves. The green frog, *Rana clamitans*, starts calling in late April and continues to call through June while the bullfrog, *Rana catesbeiana*, breeds later during the summer.

Periods of cold weather during the breeding season tend to reduce or eliminate frog breeding activity until warm weather returns. This is true of both early and late breeders except that "cold weather" is relative to the usual temperatures for that time of spring. Cold weather does not seem to have as much effect on salamander activity as it does on frog activity. On March 4, 1965, the pond five miles NE of Terre Haute was visited. Water temperature was 1°C and air temperature was 20°-25°F. The pond was nearly half covered with ice. No frogs were calling. The pond was seined resulting in the capture of 12 *Ambystoma texanum*, 5 *A. tigrinum*, 1 *A. maculatum*, 3 *Notophthalmus*

viridescens, 1 *Pseudacris triseriata*, and 3 *Rana pipiens*. The frogs had been calling earlier in the week when it was warmer.

On the other hand, male frogs may continue to call late in the season, especially after heavy rains. In particular, *Hyla crucifer*, *Pseudacris triseriata*, *Rana areolata*, and *Rana pipiens* tend to linger at the breeding pond. With the first three species, it is just males that linger so that if samples with females are to be collected, they must be taken during the peak of activity for that species. *Rana pipiens*, however, may breed well after the peak of breeding activity. This is inferred because seining of the pond in mid and late spring reveals *R. pipiens* tadpoles of two distinct size groups. The smaller ones are obviously young of the year; the larger ones apparently not. *R. pipiens* is not supposed to overwinter as a tadpole but it seems logical that offspring from late-breeding parents would. A mass of hatching frog eggs was collected near Denison, Clark County, Illinois in September, 1967. They did not survive long enough to be identified by mature tadpole characteristics, but the size and shape of the egg mass and the number of hatching individuals indicated that they were *R. pipiens*.

The spadefoot toad, *Scaphiopus holbrooki*, does not have a limited breeding season. It breeds when there is a combination of high night temperatures (65°F +) and heavy rainfall (1½" + in 24 hours). If the spring has been wet, a medium (approx. ½") rainfall may trigger breeding. If the proper conditions do not occur in a given year, the spadefoots may not breed at all that year. *Scaphiopus* also differs from the other pond breeders in that all breeding takes place in from one to three days. The eggs hatch in two to three days and fully transformed toadlets have been collected just 37 days after breeding occurred. This cycle is extremely short compared to the other frogs and is probably a result of the desert origin of the genus *Scaphiopus*. In 1964, spadefoot breeding occurred in the pond and in the flooded pasture on April 19-21. In 1965, a few spadefoots bred in the flooded pasture on July 9. In 1966, spadefoots bred in the pools in the woods on April 27-28. No breeding activity was observed for *Scaphiopus* in 1967.

Literature Cited

1. BLATCHLEY, W. S. 1891. Notes on the batrachians and reptiles of Vigo County, Indiana. Journ. Cincinnati Soc. Nat. Hist. 14:22-35.