

*The content below comes from two articles written by cave biologist Mick Sutton of the Cave Research Foundation. These articles were originally published in the MSS newsletter Liaison.*

### Identifying Salamanders

There are five or six species of salamander which somewhat regularly show up in Missouri Caves together with several others occasionally encountered. The adults are relatively easy to identify, as long as you know what to look for. Probably the commonest point of confusion is between the similar-looking cave and long-tailed/dark sided salamanders, respectively *Eurycea lucifuga* and *E. longicauda*. The two have similar ranges of coloration, and despite the name *longicauda*'s tail is not noticeable longer than *lucifuga*'s, but look more closely at the tails – the cave salamander on the left has



distinctly rounded dark spots, spaced rather widely. The tail of the long-tailed salamander (on the right) is a lot more variable, but never has distinct, widely spaced spots. The example shown here is the type subspecies, *E. longicauda longicauda*; through most of their Missouri range though you will see the dark-sided subspecies *E. longicauda melanopleura*, where the spots and splotches down the side and on the tail tend to merge into a dark smear, making it easier to distinguish from a cave salamander. Both cave and long-tailed salamanders typically have an orange background color but *longicauda* tends to be darker and often has a greenish tinge.

Most cavers have little problem recognizing the grotto salamander, *E. spelaea* – nothing else has a pale color (usually) with no pattern of dark spots, and in the case of adults, eyes with a skin covering. What may be a little confusing though is that many individuals, especially larvae, have more of a grayish color, which can be quite dark and those usually have somewhat faint *pale* spots in parallel rows down the back and tail.

Three other species commonly show up in near-surface situations. The slimy salamander, *Plethodon albagula*, is easily recognized, with its dark gray or black background color with many small white spots. Look out also for slimy salamander egg masses – unlike the vast

majority of salamanders which lay eggs in water, the slimy lays eggs in a secluded spot on dry land and guards them until they hatch.

The Ozark zig-zag salamander and the southern red-backed salamander are very similar in appearance – both have dark sides, limbs and head with a brick red stripe down the center of the back and the tail. Fortunately the species have ranges that overlap only slightly –the zig-zag is found only in the southwest of the state, the red-back throughout most of the Ozarks.



southern red-backed salamander: photo: Mark Jones



slimy salamander: photo: Max White

What about salamander larvae? These can range from tiny white tadpole-like creatures with inconspicuous legs –recent hatchlings – up to a grotto salamander close to transforming to an adult, which is actually larger than the adult it will become. The larger grotto salamander larvae are the only ones that can be reliably identified in the field, but for everything else you are generally safe calling them *Eurycea* species. It is useful to distinguish adult from larval grotto salamanders. If the creature is on dry land, it's a no-brainer – it's an adult. If it's in water though, you need to look more closely. The best field marks are the shape of the head and the presence or absence of gills. Look for the red gills



grotto salamander larva: photo Bill Elliott



grotto salamander adult

immediately behind the head of the larva (these may be hard to see). The larva also has an abrupt narrowing behind the head, giving the head a boxy shape, compared with the adult where the head tapers gradually into the body.



And the best hint of all? If you really want to improve your salamander identification skills, get yourself a copy of *Reptiles and Amphibians of Missouri* by Tom Johnson, an excellent guide published by the Missouri Department of Conservation and available for a bargain \$18.

## Identifying Cave Life: Part 2 – Other Amphibians

In the March-April 2016 issue we looked at the cave adapted lungless salamanders (Plethodontidae). This time we'll look at other amphibians you may come across in a cave. First are the **mole salamanders** (Ambystomidae). Mole salamanders as a group are reasonably easy to distinguish – they are much more heavily built than the typical cave-dwelling plethodontids (cave salamanders, grotto salamanders, etc.). Mole salamanders are adapted to life underground, typically inhabiting animal burrows, but are not well adapted to cave life and are regarded as accidentals, although they do turn up occasionally in deep cave sites especially in the sinkhole plain caves of Perry County. Five of the six Missouri species have been documented from caves (the exception is found only in the non-cavernous southeast lowlands).



Clockwise from top left: 1) spotted salamander (Ohio Department of Natural Resources); 2) ringed salamander (MDC); 3) marbled salamander (NPS); 4) tiger salamander (Jim Rathert, MDC).

Of these the most common is the spotted salamander (*Ambystoma maculatum*), recorded from 13 Missouri caves. Note the distinct yellow spots in two rows on the body and tail. Unfortunately, color patterns on the mole salamanders are quite variable, and the spots may be reduced or even absent. The spots on the head are usually orange but may be yellow. Also encountered fairly frequently is the ringed salamander, *A. annulatum*. This is an Ozark endemic, found nowhere else. The narrow yellow or whitish “rings” are usually distinct but may be broken at the mid-line, as in the example shown, where the marking behind the head is broken. The other look-alike is the tiger salamander (*A. tigrinum*, the most widespread and common mole salamander outside caves). It too has yellow spots, but it also has blotchy yellow stripes and patches along the sides, but again, the pattern and color are variable. You are less likely to encounter the other two mole salamanders: the small-mouthed salamander (*A. texanum*, not shown) is dark gray and unmarked; the marbled salamander (*A. opacum*) is black with white or silvery saddle markings down the back, grading to rings around the tail.

Another salamander-like creature that occasionally shows up in Missouri caves is the central newt (*Notophthalmus viridescens*), the only member of the newt family in Missouri. Unlike salamanders, adult newts have the tail tapered to a narrow fin. The aquatic adult has a two-color pattern – pale yellow below, reddish brown above – with numerous small black spots. Like salamanders, newts have aquatic larvae but that is followed by a terrestrial phase called an eft. Efts are quite distinctive - squat, lumpy and reddish brown with small black and red spots. Many cavers are familiar with the pickerel frog



Central newt adult (left) and eft (right) (MDC photos)

(*Lithobates palustris*), the frog most commonly seen in Ozark caves, but may have trouble distinguishing it from other frogs. The most likely confusion is with the southern leopard frog (*L. sphenocéphala*). Ground colors are variable, but note the squarish spots in two rows of the pickerel frog compared with the smaller round spots, more irregularly distributed, of the leopard frog. The dorsolateral fold (the raised ridge running from behind the eye) extends all the way to the rear in the leopard frog, but stops short in the pickerel frog. You are more likely to come across the pickerel frog, which routinely shelters



Pickerel frog (left) and southern leopard frog (right) (MDC photos)

in caves, sometimes in large numbers. They occur at all times of year, but more so in winter. Another pair of look-alikes are the bullfrog (*L. catesbianus*) and the green or bronze frog (*L. clamitans*).



Green frog (left) and bullfrog (right) (MDC photos)

Bullfrogs are generally larger, but a small bullfrog can easily be confused with a green frog. Both lack distinct patterns on the back and both have variable amounts of green around the head – usually that is more prominent in the bullfrog. But the best distinguishing feature is again the dorsolateral fold (arrowed in the green frog), which is lacking in the bullfrog. In southeastern Missouri caves, the green frog is replaced by a subspecies, the bronze frog, which lacks green around the face. In Perry County, bronze frogs encountered in caves were dead or appeared to be dying from starvation – they seem ill-suited to cave life.

by: Mick Sutton

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