

The Outside Story

The Many Lives of the Eastern Newt

By Kenrick Vezina

You're probably familiar with the basic amphibian life plan: start as a wriggly water-breathing tadpole, transform into an adult that breathes air. This is the pattern followed by all our frogs and toads, and our mole salamanders as well. Enter the eastern newt, an amphibian with three different forms, whose ability to transform its body and its lifestyle makes its peers look like amateurs.



All eastern newts begin life as jelly-coated eggs scattered in stagnant or sluggish bodies of water. Larval newts emerge in spring as tiny, drab olive tadpoles with feathery external gills and an appetite for even tinier invertebrates.

Over the course of about three months, they grow first forelimbs then hindlimbs, trade their gills for lungs, and develop pebbly skin that's good at retaining moisture. They also turn a vivid orange-red, with a line of black-ringed dots down their back. This is the red eft stage, which is so distinct from their larval and adult forms that they were once thought to be a different species. In the fall, they move onto land and begin an amphibian version of the Amish *rumspringa* that may last anywhere from three to seven years.

They can tolerate dry conditions briefly, but they are by far most active at night and during cool or wet conditions. If you get caught in the woods during a sudden summer cloudburst, you might see dozens of efts emerge from the leaf litter as the threat of dehydration is momentarily deferred. Their traffic-cone coloring makes them easy to spot, but it's also a warning: they secrete a potent, foul-tasting toxin from their skin.

Eventually, urged by factors we still don't understand, the efts migrate back to their breeding sites and begin *another* metamorphosis. Back in the water, their tails broaden vertically into paddles, their skin becomes slick and permeable like a frog's (to better absorb oxygen from water), and their color fades back to olive with a yellowish belly and a lingering line of red warning spots down their back. They also become sexually mature, and in late winter or early spring – sometimes even under a thin layer of ice – they'll mate and lay eggs.

Eastern newts are found across the entire eastern half of the United States and well into Canada, with five regional subspecies. In the Northeast, we have the “red-spotted” subspecies. Their huge range speaks to their ability to exploit many habitats, with the only strict requirement being water in which to breed. This flexibility is possible because of their ability to adapt their life cycles to their environment.

The three forms mentioned earlier is actually an understatement. After the aquatic larval stage, all bets are off. If aquatic habitat is plentiful and reliable, as it usually is for the “peninsula newt” subspecies of the Florida panhandle, tadpoles may skip the eft stage entirely and quickly develop into sexually mature adults. On the other hand, if access to water is very unreliable, they may take on an eft-like adult form and only return to water temporarily to breed. The degree of variability in each population, is, itself variable: populations that have evolved in stable habitats seem to have stable life cycles, whereas populations in areas of frequent drought or other disturbance may change their life cycles dramatically. Virtually all our “red-spotted” newts go through an eft stage, but members of the same subspecies on the Atlantic Coastal Plain may not – seemingly in response to factors like local flooding or droughts. Even the manner in which different populations circumvent the eft stage varies: some metamorphose into “true” adults with lungs, some may keep their external gills.

Eastern newts can also adjust their development in response to the presence of predators. One experiment found that eggs raised in the same body of water as dragonfly nymphs hatched into larvae with statistically larger tails, presumably to power a swift escape. They are incredible models of *polyphenism*: the ability to produce several distinct forms from a single genetic blueprint. And even if they get injured, they have some of the best regenerative abilities of any vertebrates, able regrow severed limbs and even damaged organs.

There is still much to be discovered about the exact mechanisms underlying their incredible physical malleability. But one thing is sure: no animal you encounter in the woods lives as many different lives as the eastern newt.

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