



Pygmy Salamander | *Desmognathus wrighti* | BY WALLY SMITH

Out of all 40 or so salamander species found within the Appalachian Trail corridor, the pygmy salamander is perhaps the one species hikers will be least likely to notice on their hike across the southern mountains. Despite its longer scientific name, the pygmy is tiny—one of the smallest vertebrates along the entire Trail—averaging a scant two inches or less in length as an adult.

Pygmies are recluses in the truest sense, their range restricted to high elevations, mostly above 5,000 feet along the Trail's southernmost section, and almost entirely contained within the Trail corridor. As a result, the species is common on many of the Trail's most well known peaks, such as Standing Indian, Wayah Bald, Roan Mountain and Mt. Rogers, among others. Usually colored a ruddy brown and marked with a reddish-brown dorsal stripe, pygmy salamanders reach their highest densities in the Appalachians' rapidly disappearing spruce-fir forests. They can be found during daylight hours between moist strips of bark on standing and dead trees (often up to seven feet off the ground), under moss mats on the forest floor, and beneath stones and other debris near seeps and springs.

As with many other salamanders, courtship between pygmy salamanders is made up of a complex (and even bizarre) mixture of violence and dance. Males attract females in late summer to early fall by biting and holding them with their jaws, tugging their heads backward repeatedly and "gnawing" side-to-side. While this seems like the worst possible way to attract a mate, this biting stimulates the female and allows for chemicals—a kind of salamander aphrodisiac—produced by the male to reach her body. If the female is receptive, the male salamander then begins a rhythmic dance. This dance continues until the male deposits a packet of sperm on the ground that the female picks up to fertilize her eggs. Females then retreat to small, underground crevices to deposit their eggs, which can number up to 8 or 10 in a clutch. Females will stay with their eggs until they hatch several months later. This breeding strategy takes place out of sight in the secretive world of the forest floor.

Although it seems unlikely to someone hiking along the Trail, pygmy salamanders and species like them make up much of the living material in Appalachian forests. Pygmies alone, for example, have

been estimated to number up to 3,700 individuals per hectare (roughly the size of two and a half football fields) in some areas of North Carolina. Add that up with all the other salamander species hiding under logs or in nearby streambeds, and the forest surrounding the Trail is literally wriggling with salamanders, nearly all of them just out of sight.

Despite their numbers, though, pygmy salamanders and other high-elevation amphibians may be threatened by the same forces currently responsible for the destruction of the Trail's spruce-fir forests, as is evident in the region surrounding Clingman's Dome in the Smokies. Pygmies belong to a larger group known as plethodontid, or lungless, salamanders, which make up for a lack of lungs by exchanging oxygen and carbon dioxide across their skin and mouth lining. Moisture is essential to this process, and as a result, the destruction of cool, moist forests by acid rain, air pollution and invasive insects such as the balsam woolly adelgid removes a crucial habitat for the species.

The evolutionary history of the pygmy salamander is extremely complicated and, in many ways, is just beginning to be understood. The Pygmy's genus, *Desmognathus*, refers to a group known as dusky salamanders, which reaches its most diverse point in and around the margins of small streams

in the southern mountains. The high amount of coves, deep river gorges, and a moist, moderate climate present in the region are thought to be responsible for this diversity, and several new species of dusky salamanders have even been described in recent years. Several studies, in fact, have suggested that populations of pygmies north and south of the French Broad River in North Carolina likely represent two distinct species. The low elevations and warmer temperatures present in the French Broad Valley likely act as a barrier to gene flow and migration, making the deep river gorges crossed by the Trail as important to pygmies as the high-elevation habitats they prefer.

Even with their unassuming stature and covert lifestyle, pygmy salamanders make up a special part of the Trail's heritage that often goes unnoticed. Their ecological importance, in addition to their use as an indicator of environmental change, make them a vital part of the A.T. corridor—one possibly as unique as the Appalachians themselves.

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