

## The Range of *Plethodon yonahlossee* in Virginia: defined at last?

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Among the basic things that need to be learned about the biology of any organism is the extent of its geographic range, from which it is often possible to identify environmental factors limiting or facilitating distributional dynamics, and to deduce whether the species is in an expanding or condensing phase of its life cycle. Some species are better suited to such studies than others, particularly if they happen to be stenotopic, of limited vagility, and above all, easy to collect where they do occur.

Terrestrial plethodontid salamanders admirably meet all three of the criteria mentioned, and a number of studies devoted to distributional phenomena have appeared, notably those by Dr. Richard Highton on species of *Plethodon* (1971, for example). For many years I have maintained a low-key interest in various Virginia species of plethodontids (which occur in the same habitats I search for millipeds and ground beetles), and have opportunistically accumulated data on the local distribution of several kinds.

Probably the favored subject of this activity has been the elegantly colored *Plethodon yonahlossee*, which I first encountered in 1950 during a collecting trip with James A. Fowler. At that time, *yonahlossee* was reported in Virginia only from White Top Mountain, so that our discovery of an adult northwest of Independence amounted to a modest eastward extension of the range. Now, forty years later and after many new populations have been located, I think that the distribution of this animal in Virginia has been fairly well established, and that a historical narrative might hold some interest to students of local herpetofauna.

### Sequence of Events

*Plethodon yonahlossee* was described by E.R. Dunn in 1917 from specimens he collected the previous year along the Yonahlossee Road, Grandfather Mountain, N.C. The species had been found much earlier (1902) in the same area by the entomologist Franklin Sherman, but his material had apparently lost much of its coloration before being sent by C.S. Brimley to the U.S. National Museum where it was identified as

*Plethodon glutinosus* - contrary to Brimley's own perception of it as an undescribed species (this was not the last time a "large eastern *Plethodon*" would be uncritically misidentified as *glutinosus*, as Prof. Highton's researchers have so clearly established.)

Shortly after his initial discovery of the animal, Dunn located it at White Top Mountain, Va., publishing the record in 1920. Thereafter various herpetologists obtained material at this northernmost point in the range, but no other Virginia localities were known until the summer of 1949 when Clifford H. Pope conducted a study of *yonahlossee* and found populations at Comer's Rock and Buck Mountain, in Grayson Co. On June 20, 1950, J.A. Fowler and I obtained a large adult in a rhododendron thicket beside Peach Bottom Creek, 3 miles northwest of Independence and a few miles east of Pope's Buck Mountain site. Just a few months later, a major range extension was established by malacologist Leslie Hubricht, who in October of 1950 obtained a small, dorsally-spotted individual thought to be *yonahlossee* (but not excluded from possibly being a small *P. wehrlei*) at the "Pinnacles of Dan" in western Patrick County. A successful attempt to confirm this record was made in July of 1951 by Walter B. Newman and me, with a much larger and quite typically marked individual of *yonahlossee* captured at Hubricht's site. As Newman later remarked (1954) this find extended the range of the species 45 miles to the east of Buck Mountain, and well across the New River, implicated as a barrier by Pope (1950: 82). The question of how far northeast into Virginia *yonahlossee* occurs again became relevant.

On July 6, 1967, I had the good fortune to locate the species in the gorge of Big Reed Island Creek in the north-central sector of Carroll County. This discovery extended the known range of *yonahlossee* along the northern side of the upper Kanawha River Plateau commensurate with the Pinnacles locality, as shown in my paper on Virginia plethodons (1967, Fig. 2). Not long after this information was published Douglas W. Ogle obtained a specimen at the western end of Mack's Mountain in southernmost Pulaski County, and also located colonies near the base of the Blue Ridge near Lambsburg, Carroll County (Ogle, 1977).

About this time, Steven Q. Croy advised me that he and Donald W. Linzey had found, photographed, and released a specimen of *yonahlossee* near the southern base of Buffalo Mountain, Floyd County. This locality

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extended the range about six miles north of the Pinnacles site along the Blue Ridge. In August of 1983 Charles M. Neal, Eugene V. Gourley, and I visited the place kindly spotted on a map by Mr. Croy, and were successful in obtaining a half-grown specimen (now USNM). A second locality in Floyd County was established on May 19, 1987, when I found an adult (USNM) on the SE slope of Mack's Mountain, 4 miles west of Indian Valley (Hoffman, 1988), and a third, about 2.5 miles west-southwest of Indian Valley along Berry's Creek, on 26 May 1990, when several mostly immatures were seen along the top edge of a rocky roadside embankment.

The preceding narrative traces the gradual eastward progression of the known range of *yonahlossee* in Virginia over the past four decades. The New (Kanawha) river valley has proven to be no barrier, nor is the gorge of Big Reed Island Creek. During this time period a large number of localities have been recorded, chiefly in the Iron Mountains through the work of Prof. Highton, and all are mapped in Figure 1. With such a history of on-going discoveries, some temerity may be required to assert, as I do now, that we have come to an end of the process.

What Figure 1 does not show, of course, is the intensity with which neighboring regions have been scoured for woodland salamanders during the past forty years. Many places, deemed to be likely habitat for *yonahlossee*, have been searched repeatedly: at different seasons, day and night, before, during, and after rains. I am now reasonably confident that the species does not occur on Walker or Clinch Mountains, not on Pond-Brushy-Glade Mountain(s) south of Marion or Lick-Sand Mountain(s) south of Wytheville despite its abundance on Iron Mountain only a few miles to the south of the two massifs just named.

Floyd County, in particular, has come in for close scrutiny. Figure 2 indicates the sites at which only *Plethodon cylindraceus* (formerly considered a white-spotted phase of *glutinosus*) has been found, although they embodied all of the obvious features I have come to associate with Virginia localities for *yonahlossee*.

Many of these sites have been sampled repeatedly, nearly all of them on rainy nights, and several on the same night that *yonahlossee* had been found nearby. It is now my belief that *yonahlossee* was actively expanding its range eastward up until two hundred years ago when Floyd

County was settled and its forest cover disrupted. The known localities for the species thus probably represent the actual eastward extent of dispersal up to that time.

### Habitat

As pointed out already by Pope, *P. yonahlossee* lives among high mountains but prefers moderate elevations, and rarely occurs in the spruce-fir biome at 5000 ft. and above. Within its range the species may occupy a variety of habitats, but in my experience moist wooded slopes in an oak-hickory (originally oak-chestnut-hickory) community are preferred, at elevations in the 3000-4000 ft. range. On the lower slopes adjacent to streams the broadleaf community grades into another composed dominantly of Canada hemlock and *Rhododendron maximum* and this habitat is particularly favored by *yonahlossee*. I have enjoyed the greatest success with night collecting along roads or trails in or near rhododendron copses, when individuals are either out actively foraging or at the entrance of burrows. During the day, specimens may be obtained by the usual technique of turning flat stones, slabs of bark, and logs in oak-hickory woods.

Apparently this species is subject to extreme changes in local population structure - a given locality may not consistently support large numbers of individuals over a period of years. In my 1967 paper, I noted the discovery of a dense population of *yonahlossee* on Three-Top Mountain, Jefferson Co., North Carolina, where daylight collecting produced yields of about 35 specimens per collector/hour. In June, 1986, the same site was investigated for an hour or more by Prof. Highton and me, with completely negative results! To my eye and recollection, there was no perceptible alteration of the environment, and both ground cover and moisture appeared to be comparable with conditions prevailing at the earlier visit. So far, a follow-up return to the site has not been made, and the status of that population remains uncertain. Quite possibly, however, extreme fluctuations in population densities may occur in the Virginia segment of the species' range.

I am still unaware of confirmed syntopy of this species with *Plethodon wehrlei*, even though the two have now been found within a mile of each other at Buffalo Mountain and at the Pinnacles of Dan, and nearly that close near Lambsburg and on Mack's Mountain. By inference, the

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ranges of the two overlap over most of Carroll County, and a subjective comparison of collection sites yields no obvious differences in habitat selection. The situation is clearly one that invites more thorough (and quantified) investigation.

As shown on Fig. 2, the three known records for *yonahlossee* in Floyd County are confined to its southwestern margin, and within the drainage basin of Reed Island Creek (indicated by the dashed line). There is certainly no reason to suppose a functional correlation, there being no corresponding factors in forest cover, and a low watershed would scarcely impede dispersal of a woodland animal which had obviously crossed more formidable barriers to get where it now is. The fact that the species is apparently not rare at its easternmost range limits suggests active movement up until the arrival of settlers and the fragmentation of forest cover that subsequently occurred. This process is still taking place, as Floyd County is increasingly impacted by residential development and virtually none of it enjoys formal protection.

Regrettably, we can never know how far *yonahlossee* might have spread northeastward had its progress not been stalled two centuries ago by an environmentally disruptive species.

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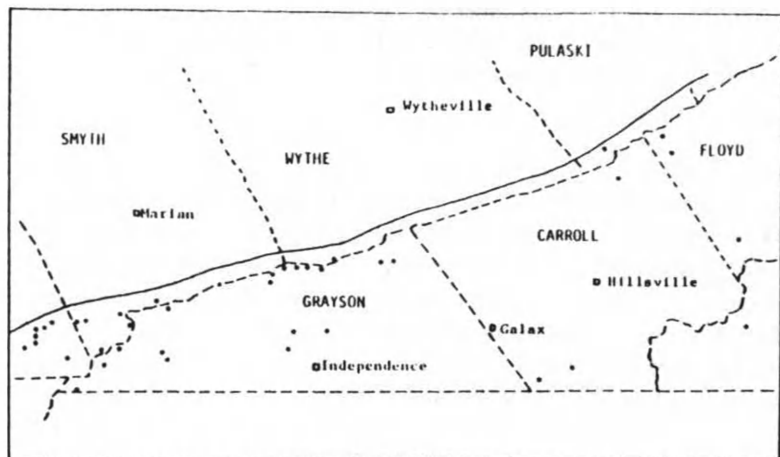


Fig. 1. Grayson, Carroll, and Floyd counties (and parts of some others adjacent) showing all known localities at which *Plethodon yonahlossee* has been discovered.

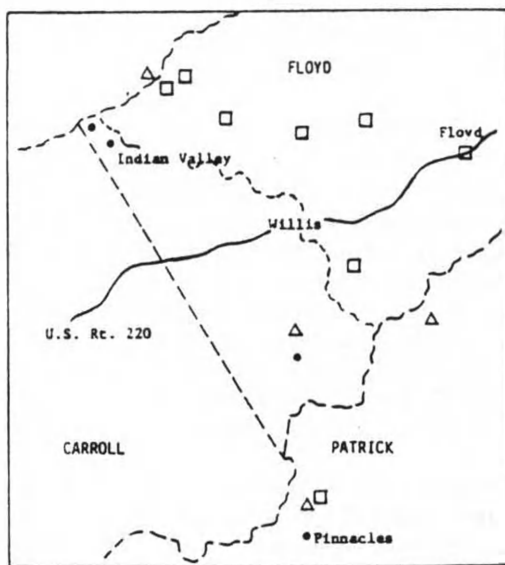


Fig. 2. Eastermost Carroll County and extreme western Floyd County, showing known localities for *Plethodon yonahlossee* (dots), *P. wehrlei* (triangles), and *P. cylindraceus* (squares). The watershed between Reed Island and Indian Creek drainages is indicated by the dashed line.