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Syntopic Occurrence of Eurycea lucifuga (Cave salamander), E. longicauda longicauda (Long-tailed salamander), and E. guttolineata (Three-lined salamander) in the Piedmont of Virginia

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In an abandoned mine shaft near Riverville, Amherst County, Virginia, we have found three species of *Eurycea* during four recent surveys, including two cave salamanders (*E. lucifuga*), three long-tailed salamanders (*E. longicauda longicauda*) and four, three-lined salamanders (*E. guttolineata*). These findings represent new county records as well as range extensions for *E. lucifuga* and *E. l. longicauda* of approximately 60 km (Mitchell and Reay, 1999). This new location is in the Piedmont physiographic region whereas all other Virginia locations for these two species are from the Ridge and Valley and Blue Ridge Mountain physiographic regions (Mitchell and Reay, 1999). For the long-tailed salamander, this locality in the Piedmont extends its distribution into an area typically occupied by the three-lined salamander and is the first known syntopic occurrence of these two species in Virginia (Mitchell and Reay, 1999).

The mine is a horizontal shaft about 100 m long, 3 m high and 3 m wide, with two short side shafts. Water often drips from the ceiling and stalactites are developing. There is a small, spring-fed pool in the mine about 0.5 m deep. Larvae of *E. lucifuga* and *E. longicauda* complex (*E. longicauda* and *E. guttolineata*; Petranka, 1998) were first seen in the pool in January, 2000. Adult salamanders have been found throughout the mine.

How the cave and long-tailed salamanders dispersed to this location is unclear. The mine is approximately 100 m from the James River. During high waters some animals might have been washed downstream and fortuitously been deposited in the vicinity of the mine. Land dispersal is also possible since both species are not restricted to caves (Petranka, 1998). Areas between the mine and the Ridge and Valley and Blue Ridge Mountain physiographic regions should be surveyed to determine if the salamanders in the mine represent disjunct populations or whether these

two species are more broadly distributed in the Piedmont.

In addition to the intriguing biogeographic aspects of the site, there is the potential for hybridization between *E. guttolineata* and *E. l. longicauda*, which are considered by some biologists to be subspecies (Conant and Collins, 1998), whereas others (Carlin, 1997; Petranka, 1998) consider them full species. Intermediates have been observed in contact zones in Alabama, Georgia, Mississippi and Tennessee (Petranka, 1998). We examined in the field two specimens with color patterns intermediate between *E. guttolineata* and *E. l. longicauda* and assigned one individual to each of these species using Carlin's (1997) criterion of the longest mid-dorsal stripe length relative to the snout-vent length. Electrophoretic analysis should be done on the three-lined and long-tailed salamanders to determine whether hybridization is occurring in this potentially disjunct locality for the latter species.

Voucher specimens of one long-tailed and one cave salamander were deposited in the Virginia Museum of Natural History (VMNH 9384 and VMNH 9383, respectively). Additional work on the population dynamics of the salamanders found in this mine is being funded in part by the Virginia Department of Game and Inland Fisheries.

Literature Cited

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