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Status of an Exotic Salamander, *Desmognathus monticola* (Caudata: Plethodontidae), and Discovery of an Introduced Population of *Cottus immaculatus* (Perciformes: Cottidae) in Arkansas

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Running title: *Desmognathus monticola* (Caudata: Plethodontidae) and *Cottus immaculatus* (Perciformes: Cottidae) in AR

Desmognathus monticola Dunn

Arkansas currently has 2 species of native *Desmognathus*: *D. brimleyorum*, the Ouachita dusky salamander, and *D. conanti*, spotted dusky salamander (Trauth et al. 2004). However, *D. conanti* may be extirpated from Arkansas as populations sampled by Kozak et al. (2005) were identified as *D. brimleyorum*. In 2003, a disjunct population of *D. monticola* was discovered in Benton County, in extreme northwestern Arkansas (Trauth et al. 2004). Further genetic investigation determined that the population was exotic and was introduced from northern Georgia (Bonett et al. 2007). Juveniles and adults (including a gravid female) were discovered in this population, indicating recruitment (Bonett et al. 2007). The purpose of the present study was to determine if the population still existed or if the introduced population was extirpated.

On 16 November 2012, we sampled both known historic sites. The original locale is a small spring in Benton County that erupts from a dirt bank and flows into Spavinaw Creek (Fig. 1). We also sampled the other known locale (ca. 2.5 km upstream of the original site), but did not find any individuals. Numerous individuals (>10) of *D. monticola* were found at the original locale of various sizes and we collected 4 males and 3 females with a snout-vent length (SVL) = 29-66 mm (mean \pm 1 SD = 40.4 \pm 13.0 mm; Fig. 2). We also obtained samples on 13 Feb 2013 and 17 June 2013 to augment our dataset. On 13 Feb, our sample consisted of 7 males and 5 females with a snout-vent length (SVL) = 33-63 mm (mean \pm 1 SD = 46.8 \pm 12.4 mm). We only collected a single adult (52 mm) on 17 June. Voucher specimens were subsequently deposited in the Arkansas State University Museum of Zoology (ASUMZ 32424-32430).

Specimens were placed in individual bags on ice



Figure 1: Photo showing the habitat where the introduced *Desmognathus monticola* were collected in Benton County, Arkansas. Photo by H. W. Robison.



Figure 2: Seven *Desmognathus monticola* collected from a single site on a single day from Benton County, Arkansas, showing size variation of individuals. Photo by H. W. Robison.

and returned to the laboratory within 48 hr for necropsy. Salamanders were overdosed with a

concentrated Chloretone solution. A mid-ventral incision was made to expose the thoracic and abdominal organs. The entire gastrointestinal tract from the mouth to cloaca was examined for helminths and for reproductive status. Nematodes were cleared in a drop of glycerol and examined by light microscopy. Voucher specimens are deposited in the United States National Parasite Collection (USNPC), Beltsville, MD.

This population seemed to be viable and had been sustaining from the original discovery. Two females (SVL 62, 64 mm) collected on 13 Feb contained ova, suggesting being reproductively active. We also saw very small individuals (< 25 mm SVL) on all 3 occasions that we did not collect or necropsy due to small size. Both of these observations suggest that continued breeding and recruitment of this introduced population exists.

Only one species of nematode, *Omeia papillocauda* Rankin, was discovered in the small intestine of 20 (5%) individuals that were necropsied. A single adult (52 mm) collected on 17 June 2013 contained 2 male and 7 female *O. papillocauda* (USNPC 106999). This nematode has been reported from *D. monticola* previously in West Virginia (Joy et al. 1993). It has also been reported previously from Arkansas in *D. brimleyorum*, many ribbed salamanders (*Eurycea multiplicata*) and grotto salamanders (*Eurycea spelaea*), and numerous other plethodontid salamanders from Alabama, Kentucky, North Carolina, Ohio, and Tennessee (McAllister et al. 1995; 2006; 2010).

The ecological significance of this introduced population is still unknown. Potential competition may negatively impact the native species of salamanders. We discovered a single *Eurycea longicauda melanopleura*, dark-sided salamander, and two *E. tynesensis*, Oklahoma salamander, from the spring bank. This does suggest that *D. monticola* sympatrically exist with at least two other species of salamander, but the extent of these relationships is still unknown.

Cottus immaculatus Kinziger and Wood

Two cottids are native to Arkansas: the banded sculpin, *Cottus carolinae*, and knobfin sculpin, *Cottus immaculatus*. Originally, *C. immaculatus* was described as *C. hypselurus* and occurred in the mountainous streams of southern Missouri and northern Arkansas (Robins and Robison 1985). However, recently *C. hypselurus* was split into *C.*

hypselurus, which now only occurs in Missouri, and *C. immaculatus*, which occurs in northern Arkansas and southern Missouri (Kinziger and Wood 2010).

Four *Cottus immaculatus* were collected from the Little Red River near the outflow of the Heber Springs Trout Hatchery (Clebune County, Arkansas) by MBC on 01 December 2012. This is the first time *Cottus* have been collected in the Little Red River (Robison and Buchanan 1988). Baldwin (1983) made 70 collections of fishes from 32 collections from 1981-1983 in his thesis survey of the fishes of the Little Red River system without capturing any sculpins. In addition, 26 collections from 34 locations in the Little Red River by Northeast Louisiana University students did not reveal any *Cottus* specimens in the Little Red River (Neil H. Douglas, pers. comm.).

The specimens were initially identified by HWR as *Cottus immaculatus* and verified by Dave A. Neely, cottid expert from the Tennessee Aquarium-Chattanooga. In Arkansas *C. immaculatus* inhabits the White River system and portions of the Black River system. Neither the Black nor White river basins connect with the Little Red River, so the expansion of this species is likely the result of human activity. The Arkansas Game and Fish Commission (AGFC) did not stock or release sculpins into the Little Red River and were probably released by fisherman (Sherri Shouts, pers. comm.). It now appears someone did release sculpins into the Little Red River recently as they are not native to this drainage.



Figure 3: Typical form of *Cottus immaculatus*. Photo by D. Neely.

Acknowledgments

We thank K. Roberts for providing specimens of *D. monticola*. Thanks are extended to DA Neely for his verification of the *Cottus* specimens from the Little Red River and Fig. 3. Appreciation is also expressed to NH Douglas, University of Louisiana at Monroe, for checking information in graduate theses held in the ULM Museum library. GL Harp, ASU, provided important information on the Little Red River sculpin situation.

***Desmognathus monticola* (Caudata: Plethodontidae) and *Cottus immaculatus* (Perciformes: Cottidae) in AR**

The AGFC provided scientific collecting permits to MBC.

Literature Cited

- Baldwin GL.** 1983. A taxonomic study of the fishes of the Little Red River, Northcentral Arkansas [MS Thesis]. Monroe (LA) Northeast Louisiana University. 118 p.
- Bonett RM, KH Kozak, DR Vieites, A Bare, JA Wooten and SE Trauth.** 2007. The importance of comparative phylogeography in diagnosing introduced species: a lesson from the seal salamander, *Desmognathus monticola*. BMC Ecology 7:7.
- Dunn DM.** 1999. Determining the possible limitations by cottid species on brown trout populations in the Bull Shoals Lake cold tailwaters [MS Thesis]. State University (AR). Arkansas State University. 56 p.
- Joy JE, TK Pauley and ML Little.** 1993. Prevalence and intensity of *Thelandros magnavulvaris* and *Omeia papillocauda* (Nematoda) in two species of desmognathine salamanders from West Virginia. Journal of the Helminthological Society of Washington 60:93-95.
- Kinziger AP and RM Wood.** 2010. *Cottus immaculatus*, a new species of sculpin (Cottidae) from the Ozark Highlands of Arkansas and Missouri. Zootaxa 2340:50-64.
- Kozak KH, A Larson, RM Bonett and LJ Harmon.** 2005. Phylogenetic analysis of ecomorphological divergence, community structure, and diversification rates in dusky salamanders (Plethodontidae: *Desmognathus*). Evolution 59:2000-2016.
- McAllister CT, CR Bursey and MA Steffen.** 2010. Nematode parasites of the many-ribbed salamander, *Eurycea multiplicata* (Caudata: Plethodontidae), from Arkansas and Oklahoma. Proceedings of the Oklahoma Academy of Science 90:69-74.
- McAllister CT, CR Bursey, SE Trauth and DB Fenolio.** 2006. Helminth parasites of the grotto salamander, *Eurycea spelaea* (Caudata: Plethodontidae), from northern Arkansas and southern Missouri. Comparative Parasitology 73:291-297.
- McAllister CT, CR Bursey, SJ Upton, SE Trauth and DB Conn.** 1995. Parasites of *Desmognathus brimleyorum* (Caudata: Plethodontidae) from the Ouachita Mountains of Arkansas and Oklahoma. Journal of the Helminthological Society of Washington 62:150-156.
- Robins CR and HW Robison.** 1985. *Cottus hypselurus*, a new cottid fish from the Ozark Uplands, Arkansas and Missouri. American Midland Naturalist 114:360-373.
- Robison HW and TM Buchanan.** 1988. Fishes of Arkansas. Fayetteville: University of Arkansas Press. 536 p.
- Trauth SE, HW Robison and MV Plummer.** 2004. Amphibians and reptiles of Arkansas. Fayetteville: University of Arkansas Press. 420 p.