

Catalogue of American Amphibians and Reptiles.

Means, D. Bruce. 1993. *Desmognathus apalachicola*.

***Desmognathus apalachicola* Means and Karlin
Apalachicola Dusky Salamander**

Desmognathus fuscus: Rafinesque, 1820 (part).

Desmognathus apalachicola Means and Karlin, 1989:38. Type-locality, "Big Sweetwater Creek steephead ... 60 m elevation, in SE 1/4 Sec 35, T 3 N, R 7 W, Liberty Co., Florida." Holotype, National Museum of Natural History (USNM) 269079, an adult male collected by D. Bruce Means and G. Harlan Means, 11 July 1973 (examined by author).

• **Content.** No subspecies have been described.

• **Definition.** *Desmognathus apalachicola* is a small plethodontid salamander similar in general appearance to *D. ochrophaeus* from the southern Appalachian Mountains of northern Georgia, but differing from Georgia *D. ochrophaeus* by larger body size (Means and Karlin, 1989) and protein electromorph frequencies (Karlin and Guttman, 1986). Larvae metamorphose by about 14 mm SVL. Sexually mature adults range in SVL from 40.0 to 52.0 mm (males) and 33.0 to 47.0 mm (females). The complete tail is longer than the body, round in cross section at the base, but tapers to a laterally compressed filament at the tip. Adult males possess a sinuate jaw commissure (line between the jaws with mouth closed) and an edentulous, posteriorly notched mandible.

The dorsal color pattern of juveniles and adult females consists of 5-7 pairs of round or diamond-shaped, lightly pigmented (yellow, cream, tan, or reddish) blotches fringed laterally by dense black or brown pigment. The blotches, present on larvae, usually coalesce down the midline of the back of transformed individuals to form a middorsal light stripe bordered laterally by a bold line of dense black or brown pigment. The blotches may be opposite or alternate so that the lateral margins of the mid-dorsal light area are boldly scalloped or zig-zagged. The dorsal pattern of adult males becomes overlain by dark brown pigment that obscures the juvenile blotched pattern. Juveniles and adults of both sexes can change intensity of dark color against differently colored substrates and often appear nearly black when first caught on black decomposing organic matter. On white sand, clay, or limestone substrates, individuals may be tan, cream, yellowish, or reddish, but the overall coloration often is strikingly pale. The ventral pattern is white with a wash of dark brown pigment of variable intensity.

• **Diagnosis.** *Desmognathus apalachicola* is larger than *D. ochrophaeus* from northern Georgia, larger and more robust than *D. fuscus conanti* from the Choctawhatchee River and westward in Florida, and smaller than either *D. auriculatus* or *D. monticola*. The tail of *D. apalachicola*, when complete, is slightly longer than the body, round in cross section at the base, and tapers to a thin filament which is laterally compressed at the tip, exactly as in north Georgia *D. ochrophaeus*. By comparison, the tail of *D. auriculatus* is more

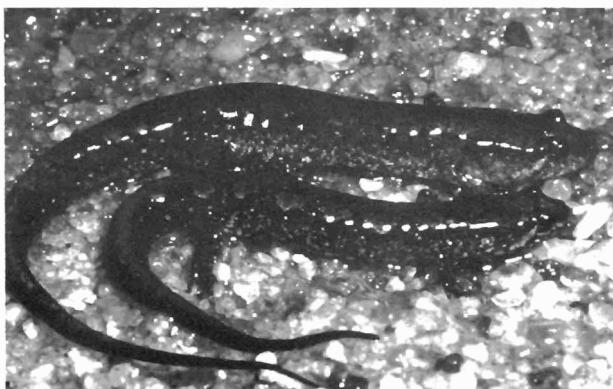
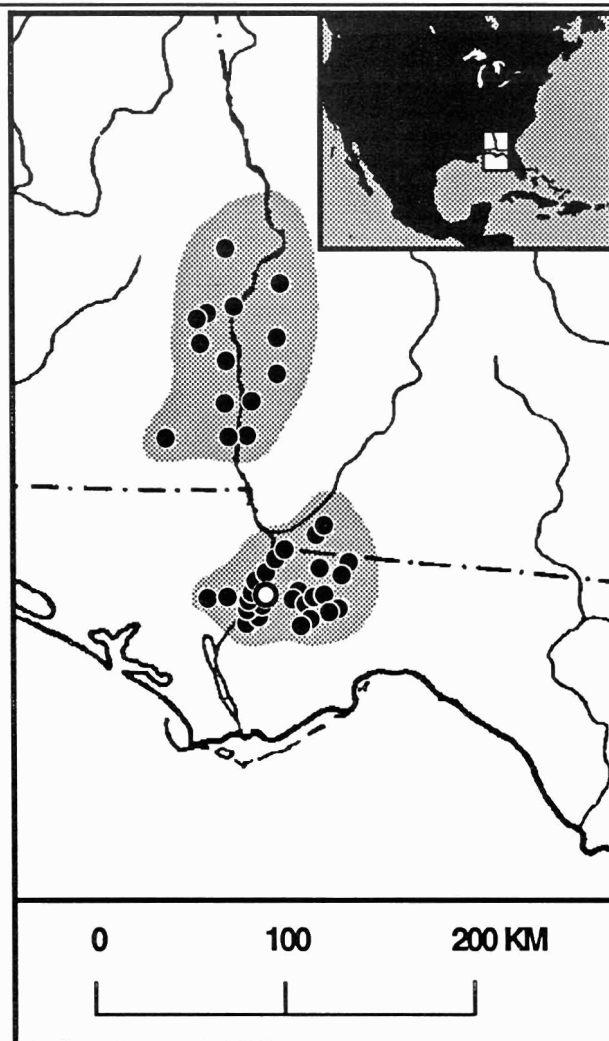


Figure. Male and female *Desmognathus apalachicola* (DBM 2420) from Gadsden County, Florida. Females retain the spotted juvenile pattern. Photograph by D. Bruce Means.



Map. The distribution of *Desmognathus apalachicola*. The large open circle indicates the type-locality, solid circles represent known collection sites. Northern and southern segments of the range are separated by a real hiatus in the Doherty Plain, which is karstic and does not erode into the steep ravines occupied by this species.

robust and blade-like with a distinct dorsal keel; the tail of *D. f. conanti* is also more blade-like, but is not so strongly keeled as in *D. auriculatus*. Adult male *D. apalachicola* and *D. ochrophaeus* have more sinuate jaw commissures than do *D. f. conanti*, *D. auriculatus*, and *D. monticola*. The dorsal color pattern of 10-14 round, usually coalesced blotches is more vividly outlined by a dense band of fringing melanophores than are the dorsal patterns of *D. auriculatus*, *D. f. conanti*, or Florida *D. monticola*. The black pigment laterally fringing the dorsal light blotches is slightly more bold in north Georgia *D. ochrophaeus* when comparing series of preserved specimens. Adult male *D. apalachicola* that have lost their dorsal blotching because of ontogenetic melanization are decidedly more brownish than the intensely black *D. auriculatus*, but identical in this respect with *D. ochrophaeus* and *D. f. conanti*. Under magnification, the ventral pattern of *D. apalachicola* is white with a wash of melanophores whose melanin can be in any state of dispersion from punctate to stellate. The belly may appear, to the unaided eye, immaculately white or white smudged with a thin veneer of dark pigment. Bellies of *D. f. conanti*, *D. monticola*, and *D. ochrophaeus* are similar, but light color occurs only as white flecking on the densely black venter of *D. auriculatus*. Laterally, *D. apalachicola*, *D. ochrophaeus*, and *D. monticola* are bicolored, being darkly pigmented dorsally but lighter ventrally; *D. auriculatus* is uniformly dark in lateral aspect. *Desmognathus apalachicola* further differs from north Georgia *D. ochrophaeus* by having less rugose skin on the anterior dorsum of the head, smaller papillae fringing the edge of the

upper lip, and a slightly less distinct pattern of dorsal blotches. The species also differs from *D. f. conanti*, its west Florida ecological analog (especially populations in steepheads on Eglin Air Force Base), by its larger adult body size, more vivid pattern of dorsal blotches, sinuate versus straight commissure, and in possessing a dentary which is edentulous and strongly notched posteriorly (Means, 1974; Means and Karlin, 1989).

• **Descriptions.** Means and Karlin (1989) described the holotype and living juveniles, adults, and larvae. Means and Karlin (1989) and Conant and Collins (1991) incorrectly reported "10-14 pairs of light, round, coalescing dorsal blotches"; instead 5-7 pairs, or 10-14 separate blotches, are present. Means (1974) described several osteological characters of the cranium and external morphology of this form as *D. "fuscus"* from ravines in the Apalachicola, Ochlockonee, Flint, and Chattahoochee river drainage basins.

• **Illustrations.** Black and white photographs of a larva, first-year juveniles, and two series of adults appear in Means (1974). Line drawings of the lateral aspect of the normal head and of a skull, and x-ray plates of the bones of the tail are also in Means (1974). A color photograph of a juvenile appears in Means (1991).

• **Distribution.** *Desmognathus apalachicola* ranges throughout the lower Chattahoochee River drainage basin from the Fall Line at Columbus, Georgia, south to the northern edge of the Dougherty Plain physiographic region of Georgia and Alabama to about the Miller-Early county line in Georgia. A presumed hiatus in the range of *D. apalachicola* occurs below this point across the flat Dougherty Plain to the head of the Apalachicola River at the confluence of the Flint and Chattahoochee rivers. The species is abundant throughout the ravines developed in the eastern valley wall of the Apalachicola River downriver from the town of Chattahoochee, Florida, to Outside Lake near the town of Estifanulga. *Desmognathus apalachicola* ranges to about 30 miles upstream from Chattahoochee along the Pelham Escarpment. The species is common in ravines along the Ochlockonee River and its two major tributaries, Little River and Telogia Creek, in the Tallahassee Red Hills of Florida. A few populations are known from the lower Chipola River in ravines above its confluence with the Apalachicola River (Means, 1974). Populations in the lower Choctawhatchee River in Florida are apparently *D. f. conanti*, but southern Alabama populations in the upper Choctawhatchee River north of the Marianna Lowlands-Dougherty Plain are *D. apalachicola*, as judged from electrophoretic data (Karlin and Guttman, 1986). Known localities are plotted accurately on maps in Means (1974) and Means and Karlin (1989). A general map was published in Conant and Collins (1991).

• **Fossil Record.** None.

• **Pertinent Literature.** Aspects of the morphology of *Desmognathus apalachicola* were discussed as follows: inter- and intraspecific body size variation (Means, 1974; Means and Karlin, 1989); sexual dimorphism in body size and mandibular characters (Means, 1974; Means and Karlin, 1989); metachrosis (Means, 1974); and comparative inter- and intraspecific osteology of teeth, tail, and cranial bones (Means, 1974). Tail muscle amino acids were examined via paper chromatography by Dean (1959). Variation in 15 gastrointestinal tract proteins was examined by Blouin (1986) among Florida, Georgia, and Alabama populations. Electromorph variation in 21 muscle and gastrointestinal tract proteins was compared among populations and congeners by Karlin and Guttman (1986). Vertebrate habitat associates and seasonal distribution of gravid females, egg clutches, and larvae are discussed in Means and Karlin (1989). Biogeography, dispersal, interspecific and interpopulational habitat occurrences and regional distribution are found in Means (1974, 1975) and Means and Karlin (1989). Means (1975) hypothesized that *D. apalachicola* competitively excluded *D. auriculatus* from ravine habitats through aggressive interference. The number of successful inseminations in inter- and intraspecific courtship trials was used to test compatibility of sexual behavior among *D. apalachicola*, *D. fuscus*, and *D. ochropbaeus* by Verrell (1990).

• **Etymology.** *Desmognathus apalachicola* was named for the Apalachicola River, the Florida portion of an important U.S. Gulf Coast drainage basin downstream from the confluence of the Flint and Chattahoochee rivers (Means and Karlin, 1989).

• **Comment.** Until formally named in 1989, *Desmognathus apalachicola* had been called by various other scientific names: *D. fuscus* (Means, 1974, 1975, 1977; Stevenson, 1976; Ashton and Ashton, 1988); *D. "fuscus"* (Means, 1974); *D. fuscus fuscus* (Carr, 1940; Grobman, 1950; Neill, 1951; Carr and Goin, 1959); *D. f. brimleyorum* (Grobman, 1950); *D. f. conanti* (Conant, 1975; Behler and King, 1979); intergrades between *D. f. fuscus* and *D. f. auriculatus* (Folkerts, 1968; Mount, 1975); and *D. torreyi* (Dean, 1959).

Literature Cited

- Ashton, R.E. and P.S. Ashton. 1988. Handbook of reptiles and amphibians of Florida. Part Three. The amphibians. Windward Publ. Inc., Miami.
- Behler, J.L. and F.W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York.
- Blouin, M.S. 1986. Regional and local patterns of electrophoretic variation in *Desmognathus*: the importance of physical barriers to gene flow. M.S. Thesis, Florida State Univ., Tallahassee.
- Carr, A.F., Jr. 1940. A contribution to the herpetology of Florida. Biol. Sci. Ser., Univ. Florida Publ. 3:1-118.
- and C.J. Goin. 1959. Guide to the reptiles, amphibians and freshwater fishes of Florida. Univ. Florida Press, Gainesville.
- Conant, R. 1975. A field guide to reptiles and amphibians of eastern and central North America. 2nd ed. Houghton Mifflin Co., Boston.
- and J.T. Collins. 1991. A field guide to amphibians and reptiles of eastern and central North America. 3rd ed. Houghton Mifflin Co., Boston.
- Dean, H.D. 1959. The phylogenetic relationships of the sub-family Desmognathinae (Order Caudata). Ph. D. Thesis. Univ. Alabama, Tuscaloosa.
- Folkerts, G. 1968. The genus *Desmognathus* Baird, (Amphibia: Plethodontidae) in Alabama. Ph. D. Thesis. Auburn Univ., Auburn, Alabama.
- Grobman, A.B. 1950. The distribution of the races of *Desmognathus fuscus* in the southern states. Chicago Acad. Sci. Nat. Hist. Misc. 70:1-8.
- Karlin, A.A. and S.I. Guttman. 1986. Systematics and geographic isozyme variation in the plethodontid salamander *Desmognathus fuscus* Rafinesque. Herpetologica 42:283-301.
- Means, D.B. 1974. The status of *Desmognathus brimleyorum* Stejneger and an analysis of the genus *Desmognathus* (Amphibia: Urodela) in Florida. Bull. Florida State Mus., Biol. Sci. 18:1-100.
- . 1975. Competitive exclusion along a habitat gradient between two species of salamanders (*Desmognathus*) in western Florida. J. Biogeogr. 2:253-263.
- . 1977. Aspects of the significance to terrestrial vertebrates of the Apalachicola River drainage basin, Florida. Fla. Mar. Res. Publ. 26:23-67.
- . 1991. Florida's steepheads: unique canyonlands. Fla. Wildl. 45(3):25-28.
- and A.A. Karlin. 1989. A new species of *Desmognathus* from the eastern Gulf Coastal Plain. Herpetologica 45:37-46.
- Mount, R.H. 1975. The reptiles and amphibians of Alabama. Auburn Univ. Agr. Expt. Sta., Auburn, Alabama.
- Neill, W.T. 1951. A new subspecies of dusky salamander, genus *Desmognathus*, from south-central Florida. Publ. Res. Div. Ross Allen's Rept. Inst. 1:25-38.
- Rafinesque, C.S. 1820. Annals of nature or annual synopsis of new genera and species of animals, plants, etc. discovered in North America. Printed for the author, Lexington, Kentucky.
- Stevenson, H.M. 1976. Vertebrates of Florida. Univ. Presses of Florida, Gainesville.
- Verrell, P.A. 1990. Sexual compatibility among plethodontid salamanders: tests between *Desmognathus apalachicola*, and *D. ochropbaeus* and *D. fuscus*. Herpetologica 46:415-422.

D. Bruce Means, Coastal Plains Institute, 1313 N. Duval St., Tallahassee, FL 32303.

Primary editor for this account, Robert Wayne Van Devender.

Published 30 November 1993 and Copyright © 1993 by the Society for the Study of Amphibians and Reptiles.