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***Eurycea multiplicata* (Cope)
Many-ribbed salamander**

Spelerpes multiplicatus Cope, 1869:106. Type-locality, "Red River, Arkansas"; restricted to "near Fort Towson, Choctaw County, Oklahoma" (Dundee, 1950). Specimens collected by Loomis & Webb (1951) confirm its occurrence at the restricted type-locality. Syntypes, U.S. Natl. Mus. 4038 (5 specimens) collected by Dr. L. A. Edwards between 11 September 1852 and 8 May 1854.

• CONTENT. Two subspecies are recognized: *multiplicata* and *griseogaster*.

• DEFINITION. Metamorphosis is usual, but some individuals remain neotenic. Transformed animals are between 30 and 52 mm in snout-vent length and may reach at least 97 mm in total length; neotenic ones may be slightly larger. Costal grooves number 19-20. Intercostal spaces between addressed limbs number 7-10. The adult pattern consists of a broad brown to chocolate brown median stripe on the head and trunk, often bordered by a dark line on each side; occasionally a narrow dark vertebral line is also present, and thin brown chevrons may mark the costal grooves. The lower sides have silvery flecks. The venter is pale gray to yellow, with or without punctate melanophores. The subcaudal surface is lemon yellow. Neotenic individuals often are pale gray stippled with darker pigment.

• DESCRIPTIONS. Metamorphosis typically occurs in this species, but some individuals that inhabit caves, or streams issuing from caves, may remain neotenic. Average snout-vent length of transformed animals is 35 mm in some populations; in others it is 45 mm or more. As little growth occurs after transformation, some larvae and neotenic animals may exceed transformed individuals in size, attaining 54 mm in snout-vent length and 160 mm in total length. The sacrum typically is the 22nd vertebra, occasionally the 23rd. Advanced larvae resemble adults except for the absence of yellow color and melanophores on the venter.

Dunn (1926) and Bishop (1943) describe adults and larvae. Bishop (1944) gives structural comparisons with other neotenic and larval salamanders. Details of coloration and structure are given for *E. m. multiplicata* by Loomis & Webb (1951), while Dundee (1947) describes pigment variation in *E. m. griseogaster*. A melanistic *E. m. multiplicata* is mentioned by Bragg & Hudson (1951a). Deposited eggs are unknown, but gravid females are described by Dundee (MS).

• ILLUSTRATIONS. Adults and larvae are pictured by Bishop (1943) and Dundee (MS). A neotenic specimen is illustrated in Bishop (1944). An adult and the type-locality are depicted in Moore & Hughes (1941).

• DISTRIBUTION. This salamander is widely distributed over the Springfield Plateau and Boston Mountains in the Ozarks and enters the Salem Platform of west south-central Missouri. It is widely distributed in the Ouachita Mountains and the rocky lowlands to the south of the Ouachitas of Oklahoma. Published records include Missouri, Oklahoma, and Arkansas. Cope (1889) reports it from southern Kansas, but no specimen is available to authenticate this record. Bishop (1943) mentions a specimen from near Bono, Arkansas, but this is well into the Mississippi Alluvial Plain (or on Crowley's Ridge) and isolated from other known localities. The species is found from 107 to 763 m (350-2500 feet) above sea level. In the Ozarks it is known from caves. For some specific localities see Dunn (1926), Black & Dellinger (1938), Bishop (1944), Dundee (MS, 1947), Bragg & Hudson (1951b), Loomis & Webb (1951), and Dowling (1957).

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. A major but unpublished study of the life history of *E. m. griseogaster* is presented by Dundee (MS). It includes data on reproduction, growth, food habits, behavior, habitats, and illustrations of adults, larvae, and habitats. Loomis & Webb (1951) give details of the habitat of

the Ouachita form. Bragg (1955) and Dundee (1947) comment on habits.

• REMARKS. Neoteny occurs in *E. m. griseogaster*, especially in animals from caves on the Salem Platform. All individuals in a cave may be neotenic; they are pale in color and lack much of the normal pattern. Also in the vicinity of certain caves adult individuals may be neotenic and retain normal larval coloration. The largest animals occur near caves in the Ozark region of Missouri; those from the western Ozarks rarely exceed 40 mm in snout-vent length. Individuals from the Ouachita Mountains in the southern part of the range are intermediate in size.

• ETYMOLOGY. The name *multiplicata* comes from the Latin *multus* meaning "many" and *plicatus* meaning "folded." This refers to the numerous costal folds. The word *griseogaster* is from Latin *griseus* meaning "gray," while *gaster* is Greek meaning "belly." The epithet is an allusion to the grayish cast of the venter, caused by the presence of numerous melanophores.

**1. *Eurycea multiplicata multiplicata* (Cope)
Many-ribbed salamander**

Spelerpes multiplicatus Cope. See species account.

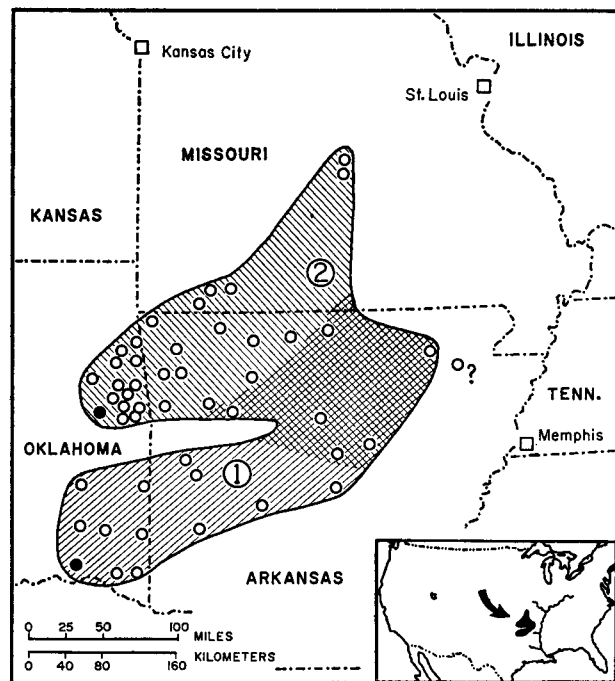
Geotriton multiplicatus: Garman, 1884:39. Transfer of *S. multiplicatus* to *Geotriton*.

Eurycea multiplicata: Stejneger & Barbour, 1917:20. Transfer of *S. multiplicatus* to *Eurycea*.

Eurycea multiplicata multiplicata: Schmidt, 1953:54. New combination; based on personal communication with H. A. Dundee.

• DEFINITION. The middorsal brown stripe is bordered by indistinct dark lines or the lines are absent. Few to a moderate number of silvery white flecks are present on the sides. The venter is lemon yellow and essentially devoid of melanophores. Maximum snout-vent length is 43 mm, total length 91 mm. This subspecies is not known to be neotenic.

• REMARKS. This southern form occurs in the Ouachita Mountains and adjacent lowlands to the south and extends northward to the Arkansas River floodplain and the uplands



MAP. Solid symbols mark the type-localities. Hollow symbols represent all other known localities. The extralimital symbol marks a questionable locality. The presumed distributional range shown is based on known records and physiographic factors.

north of Little Rock, Arkansas. It intergrades with the Ozark race in the southeastern part of the Arkansas Ozarks.

2. *Eurycea multiplicata griseogaster* Moore & Hughes Gray-bellied salamander

Eurycea griseogaster Moore & Hughes, 1941:139. Type-locality, "Swimmer's Creek, near its junction with the Illinois River, 10 miles north of Gore, Sequoyah County, Oklahoma." Holotype, Chicago Nat. Hist. Mus. 37832, adult female, collected by Aaron Seamster, 3 May 1940.

Eurycea multiplicata griseogaster: Schmidt, 1953:55. New combination; based on personal communication with H. A. Dundee.

• **DEFINITION.** The middorsal brown stripe is bordered by a well-defined dark line on each side. The sides have numerous silvery-white flecks. The venter is pale gray to lemon yellow and is more or less covered with punctate melanophores or with dark pigment in extensive patches. Maximum size of transformed individuals: 52 mm in snout-vent length and 97 mm in total length. Larvae and neotenic individuals reach 54 mm in body length and 106 mm in total length. Occasionally neotenic.

• **REMARKS.** This northern form occurs in the southwestern Ozarks and intergrades with the Ouachita race in the southeastern part of the Arkansas Ozarks.

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