

AMPHIBIA: CAUDATA: PLETHODONTIDAE

PLETHODON DORSALIS

THUROW, GORDON R. 1966. *Plethodon dorsalis*.
Catalogue of American Amphibians and Reptiles, p. 29.

***Plethodon dorsalis* Cope**
Zigzag salamander

Plethodon cinereus dorsalis Cope, 1889:138. Type locality, "Louisville, [Jefferson Co.], Kentucky." Lectotype U.S. Natl. Mus. 3776A, designated by Highton, 1962:277; other syntypes include U.S.N.M. 3776B-3776D. Collector and collecting date not known.

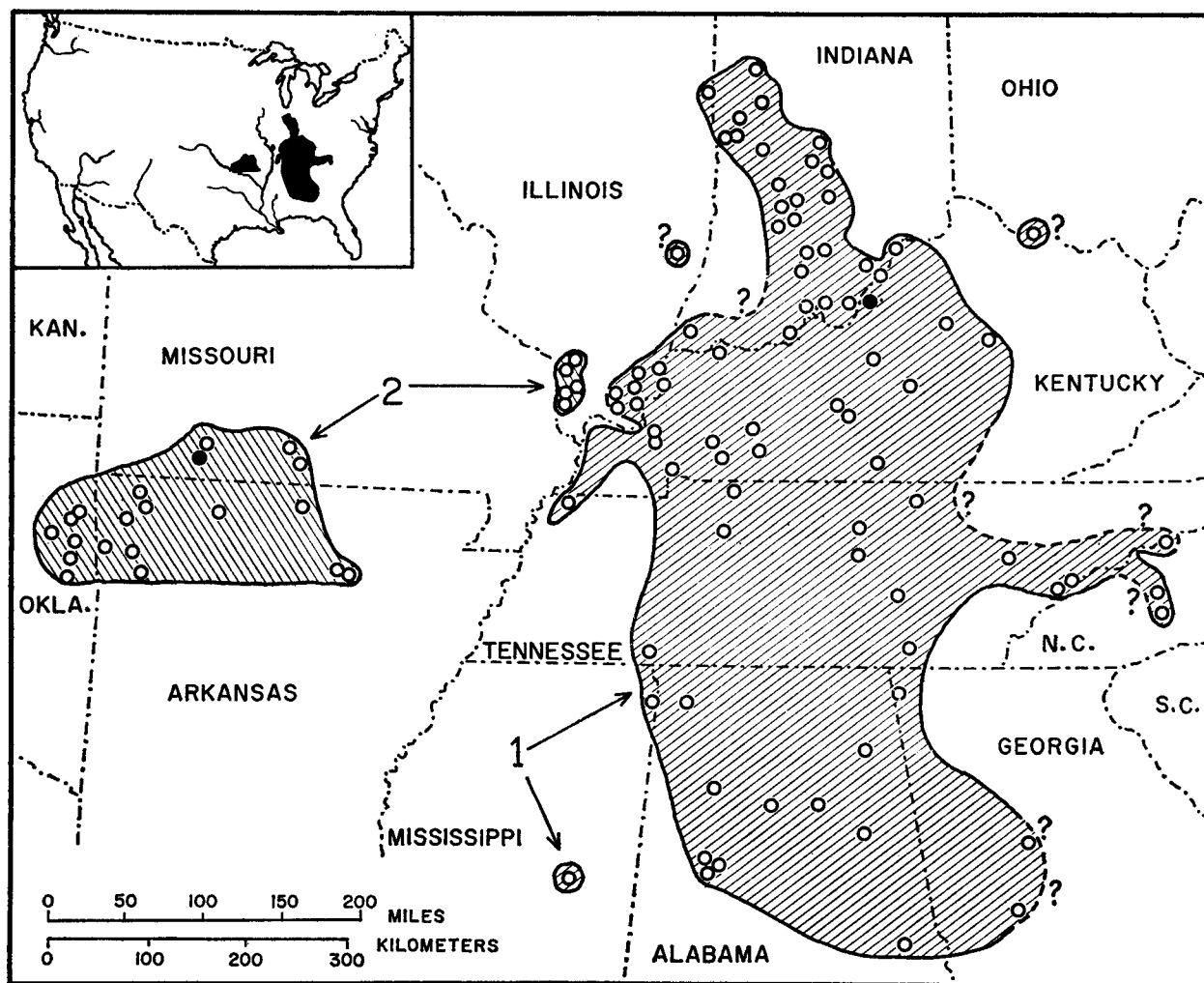
Plethodon dorsalis: Stejneger & Barbour, 1917:15. Elevation to species rank.

• CONTENT. Two subspecies are described, *P. d. dorsalis* and *P. d. angusticlavius*.

• DEFINITION. This is a small *Plethodon* that rarely exceeds 46 mm (about 44 mm preserved) in snout-vent length, though occasional individuals reach 50 mm. Maximum head width characteristically does not exceed 6 mm, and this goes into the snout-vent length 6 or more times except in small juveniles. The length of the unregenerated tail in adults is about equal to the body length when both are measured to the anterior margin of the vent. There are usually 18 costal grooves and 19 trunk vertebrae. Some orange (yellow to red) pigment characteristically is present on the dorsum, flanks, and venter, although it may be more or less hidden by melanophores on the flank and dorsum. A narrow red, orange, or yellow dorsal stripe is usually present, though sometimes hidden by a

melanophore suffusion. The dorsal stripe may have lateral lobes along its length, or only anteriorly, or not at all; in the last two cases the stripe appears to widen onto the tail base. Iridophores form brassy or silvery flecks or "frosting" dorsally; sometimes they aggregate to form small white spots. Iridophores coalesce into larger groups ventrolaterally, and ventrally join in a mottling of small white, orange, and black pigment areas. Neither maxillary and premaxillary teeth nor their cusps are irregularly elongated in adult males. Some old males may show slight tooth enlargement, but the teeth curve backward and the marginal tooth row remains inside the lip edge so no teeth protrude from the closed mouth. During the breeding season adult males show a rounded hedonic gland mental pad that is sometimes slightly longer than wide and fails to reach the jaw rami laterally. Hedonic glands of another kind, distinguishable from the numerous mucous glands by larger ducts and a seasonal orange-gold secretion in life, clusters around the vent and on the proximoventral surface of the tail in adult males. The glands may extend well onto the tail, and occasionally may be scattered thinly over the rest of the venter.

• DESCRIPTIONS. Adult *P. d. dorsalis* are described by Cope (1889), Dunn (1926), and Bishop (1943), and supplementary descriptions are provided by Thurow (1956a), Smith (1961), and Highton (1962). Adult *P. d. angusticlavius* are described by Grobman (1944), Thurow (1956a, 1957), and Highton (1962). Juvenile *P. dorsalis* are described by Dunn (1926), embryos and hatchlings by Mohr (1952) and Highton (1962), and eggs by Mohr (1952). The spermatophore has not been described.



MAP. Solid symbols mark type-localities; hollow symbols are other localities. Question marks indicate doubtful distributional boundaries or questionable localities.

• **ILLUSTRATIONS.** For illustrations of the adult see Bishop (1943, dorsal and ventral views of *P. d. dorsalis*), Conant (1958, dorsolateral view of *P. d. dorsalis* in color), Smith (1961, dorsal view), Thurow (MS, dorsal and ventral views of Illinois *P. d. angusticlavius* and a *P. d. dorsalis* X *angusticlavius* intergrade, and a dorsal view of an Indiana population sample in which some individuals show the *angusticlavius* pattern on one or both sides), Thurow (1955, dorsal view of normal and albinistic specimens), Thurow (1957, a diagram of stripe variation). Mohr (1952) shows an adult with an egg clutch, and also illustrates embryos. Thurow (MS) shows an egg and its membranes.

• **DISTRIBUTION.** The range of *P. d. dorsalis* centers on the Interior Low Plateaus Physiographic Province in Indiana, Kentucky, Tennessee, and Alabama. However, the range reaches beyond this province to the north, along a prong of the Cincinnati Anticline into extreme east-central Illinois; to the east it does so mainly near the Tennessee River and its tributaries through the Appalachian Plateau, and the Valley and Ridge Provinces, even into the lower parts of the Blue Ridge Province as far as North Carolina; to the south it reaches extensively into the piedmont of Alabama and Georgia; and to the west it occurs along the bluffs of the Mississippi River to the vicinity of Reelfoot Lake, Tennessee. *P. d. angusticlavius* has a disjunct range. It occurs almost entirely within the Ozark Plateaus Province, and includes two areas: a small one along the Mississippi River bluffs in extreme southwestern Illinois, and a larger area in northwestern Arkansas and adjacent Missouri and Oklahoma. Several collectors have so far obtained *P. cinereus* but no *P. dorsalis* in the Salem Plateau between the two *P. d. angusticlavius* areas.

The ecological and physiographic factors influencing the range of *P. dorsalis* have been analyzed in detail (Thurow, 1957). In brief, *P. dorsalis* is usually found close to a moist retreat in a rock formation. Near Reelfoot Lake, Tennessee, the consolidated loess serves as the rock shelter. Thus the species may be found near moist escarpments, incised rivers, talus piles, caves, and similar places.

Conant (1958) gives 760 m (2,500 feet) as the maximum altitude recorded. Over most of its range *P. dorsalis* is taken below 305 m (1,000 feet), and some of the localities mentioned by Thurow (1957) are as low as 122 m (400 feet).

An isolated Ohio record (see map) appears to be based on one specimen (U.S. Natl. Mus. 3825) collected before 1889 (Cope, 1889). This specimen resembles the dark phase of *P. cinereus* except for its low costal groove count. The record should be regarded as questionable until confirmed. Recent attempts in the area have been unsuccessful. More collecting is needed to define better the range boundaries in Georgia. The isolated population in Mississippi (Ferguson & Rhodes, 1958) probably is a remnant of a pluvial-period range extension (Ferguson, 1961). Additional specimens should be sought between there and Tuscaloosa, Alabama. I have not seen the specimen from Richland County, Illinois. Smith cites it in his 1948 paper but omits it in his 1961 paper because he considers the locality data to be in error.

• **FOSSIL RECORD.** None.

• **PERTINENT LITERATURE.** Extensive or recent discussions of *P. dorsalis* are given by Dunn (1926), Bishop (1943), Grobman (1944), Thurow (MS, 1956a, and 1957), Conant (1958), Smith (1961), and Highton (1962).

• **REMARKS.** Although Cope (1889) credits the name of *P. dorsalis* to Baird, it is Cope who provides the first known description of the species and is, in reality, the author of the name. Stejneger & Barbour (1917) declared the 1869 mention of *P. dorsalis* by Cope (where he also associated Baird's name with the taxon) a *nomen nudum*.

• **ETYMOLOGY.** The name *dorsalis* means "of the back," from the Latin *dorsum*, and presumably was applied in reference to differences in the dorsal patterns of *P. dorsalis* and *P. cinereus*, when the former was considered a race of *P. cinereus*. The name *angusticlavius* is from Latin and means "wearing a narrow stripe."

1. *Plethodon dorsalis dorsalis* Cope Zigzag salamander

Plethodon cinereus dorsalis Cope, 1889. See species account.

Plethodon dorsalis: Stejneger & Barbour, 1917. See species account.

Plethodon dorsalis dorsalis: Thurow, 1956a:179.

Plethodon erythronotus (Green) [? or Rafinesque] Garman, 1894:38.

Plethodon c. cinereus (Green) McAtee, 1907:14 (all, or in part).

Plethodon cinereus (Green) Hahn, 1908:553 (all, or in part).

• **DEFINITION.** Most individuals have lobes on at least the anterior part of the dorsal stripe (see Thurow, 1957:fig. 1C) though Highton (1962) reports that some *P. dorsalis* from Georgia and Alabama tend to have "a wide straight-edged dorsal stripe." The rostral continuation of the dorsal stripe is usually prominent. Adults are usually less than 90 mm in total length, but may reach 108 mm (Hirschfeld, 1962).

• **REMARKS.** Although individual variation is described in part, geographic variation is not yet adequately treated.

2. *Plethodon dorsalis angusticlavius* Grobman Ozark red-backed salamander

Plethodon cinereus angusticlavius Grobman, 1944:266. Type-locality "at Mud Cave, near Fairy Cave, Stone County, Missouri." Holotype, Amer. Mus. Nat. Hist. 40366, adult male, collected by B. C. Marshall, 1 October 1927.

Plethodon dorsalis angusticlavius: Thurow, 1956a:177. Transfer from *P. cinereus* to *P. dorsalis*.

Plethodon cinereus: Black & Dellinger, 1938:7 (in part).

Plethodon dorsalis: Black & Dellinger, 1938:7.

Plethodon dorsalis dorsalis: Conant, 1958:231 (in part).

• **DEFINITION.** The dorsal stripe is without well-developed lobes and therefore narrow and often roughly straight-edged. It may be reduced to only a long diamond-shaped spot on the posterior trunk and tail base, or suffused with black pigment and almost obscured, or lost completely. A rostral continuation of the stripe is usually not developed. The maximum recorded preserved total length is 87 mm (91 mm in life). Average size is less than in *P. d. dorsalis*.

• **REMARKS.** Specimens from one Illinois canyon are unusual in their complete lack of iridophore pigment (Thurow, 1957). Although the recent transfer of *angusticlavius* from *P. cinereus* to *P. dorsalis* (Thurow, 1956a) has been accepted (Conant, 1958; Highton, 1962), there remains controversy concerning the proper designation of the straight-striped populations of southwestern Illinois (see below).

COMMENT

Several nomenclatural opinions are published concerning the small striped *Plethodon* of the Mississippi River bluffs in Southwestern Illinois. Thurow (1957) regards them as close enough to Missouri and Arkansas *P. d. angusticlavius* so that they are best called by the same name; Rossman (1960) concurs. However, some specimens taken along east-west State Highway 146 through Ware and Jonesboro, and also farther south, are regarded as intergrades with *P. d. dorsalis*. Two black specimens from Union County are identified as *P. c. cinereus* (Thurow, 1957). Smith & Minton (1957) regard all southwestern Illinois small plethodon as *P. cinereus*, but Smith (1961) regards them as an aberrant colony of *P. dorsalis*, or possibly a hybrid *P. cinereus* X *dorsalis* colony, but certainly not the same subspecies as the disjunct Missouri-Arkansas *P. dorsalis* population. Highton (1962) identifies the Illinois population as *P. dorsalis*, but says that they and some Georgia material have a "straight-edged wide stripe" and belong with *P. d. dorsalis*. He states that *P. dorsalis* west of the Mississippi River have an increased frequency of the "narrow-striped pattern" and have a stripe which is "usually less than one-third the width of the body." His maps suggest that he does not believe the southwestern Illinois material is geographically separated from *P. dorsalis* to the east. Actually, recent large-scale mapping (Smith, 1961:fig. 44) shows that the southwestern Illinois colony is isolated, and Highton's "less than one-third" criterion does not hold up in distinguishing Missouri-Arkansas *P. d. angusticlavius*. Measurements in which stripe narrowness is expressed as the ratio of stripe width over body width are given by Grobman (1944), Thurow (1957), Rossman (1960), and Smith (1961). The average widths obtained by Thurow, Rossman, and Smith for southwestern Illinois material (excluding southern intergrades) range from 29 to 32 percent. These all approach Grobman's 28 percent for Missouri-Arkansas material, and are less than one-third. Although the average stripe in many local south-

western populations is even narrower and more obscured than in southwestern Illinois, the latter population is morphologically most like *P. d. angusticlavius* and nomenclature should reflect this. None of the "intergrades" south of the Pine Hills looks like characteristic *P. d. dorsalis* of eastern Illinois; they only tend towards this condition. The *angusticlavius*-type stripe is reported as a rare pattern variant in *P. d. dorsalis* series from southern Indiana, Kentucky, and extreme western Tennessee (Thurrow, 1957), and stripe-obscuring melanism also crops up, particularly in central Kentucky and Tennessee.

Some points of similarity between *P. dorsalis* and *P. welleri* are suggested by Thurrow (1956b), who notes that both are primitive eastern small plethodons. Highton (1962) relates *P. dorsalis* most closely to *P. welleri*, citing similarities in male mental glands and premaxillary teeth, and in embryonic red pigment patterns. I feel that he gives the two sexual characters undue weight (see also Noble, 1931, and Hairston & Pope, 1948, for a discussion of varying sexual dimorphism and its taxonomic weight). The fact that red pigment in the embryo coalesces to form a band in *P. dorsalis* and *P. cinereus*, but disappears in *P. welleri*, can be cited as contrary to Highton's interpretation. Many vertebrate embryos show points of similarity, but the similarity between the resultant end products is usually taken as a better measure of close taxonomic relationship. *P. dorsalis* is morphologically so similar to *P. cinereus* that their separate identity has long been confused, and Dunn (1926), Bishop (1943), Grobman (1944), and I all feel that they probably developed from the same parental population. *P. dorsalis* is similar to *P. cinereus* and closer to it than *P. welleri* in the following characters: number of costal grooves or trunk vertebrae and the greater variability of these values; number of costal grooves between adpressed limbs; adult proportions as exemplified by 16 ratios derived from standard measurements; presence of widely distributed yellow, orange, or red pigment dorsally, laterally, and ventrally, although the last may be limited to a few flecks just anterior to the forelimbs; usual presence of two dorsolateral lines of melanophores over the pelvis and proximal part of the tail; abundant gaps in the melanophore rete of the belly and thighs; and continuity between areas of gular iridophore pigment. The close relationship of *P. dorsalis* to *P. cinereus* rather than *P. welleri* has been overemphasized in the past, but adequate opposing evidence has not been presented yet.

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