

Catalogue of American Amphibians and Reptiles.

STORM, ROBERT M., AND EDMUND D. BRODIE, JR. 1970. *Plethodon vehiculum*.

Plethodon vehiculum Cooper

Western red-backed salamander

Ambystoma vehiculum Cooper, 1860: pl. 31, fig. 4. Type locality, "Astoria, Oregon." Type not known to exist. No description accompanies the figure but there is little doubt as to the salamander's identity even though the number of costal grooves is drawn incorrectly (Highton, 1962).

Plethodon intermedius Baird in Cope, 187:209-210. Type locality, "Fort Tejon, California." Holotype, U.S. Natl. Mus. 4732-a, an adult female collected by J. Xantus. The type-locality is undoubtedly an error.

Plethodon vehiculum: Bishop, 1934:171. New combination.

Plethodon vehiculum: Slater, 1940:43. Emendation of specific name.

• CONTENT. No subspecies are recognized.

• DEFINITION AND DIAGNOSIS. A medium-sized (to 115 mm in total length) *Plethodon* with 2 phalanges in the fifth hind toe, a modal number of 17 trunk vertebrae, and an even-edged dorsal stripe. The stripe may be red, orange, yellow, green, or tan. Melanism and reduced melanism are not uncommon in some populations. The stripe extends to the tip of the tail. The dark brown to black ground color is darkest along the stripe and lightens gradually ventrally. The sides are not invaded by the band color. The dark venter is sprinkled with small white iridophores, the gular area and ventral tail surface being lighter and often having small patches of stripe color. The iris is dark brown with heavy gold flecking above the pupil and light flecking below. The largest individual measured is 62 mm in snout to vent length; the smallest is 13 mm (snout-vent measurements to posterior margin of vent). The toes are unwebbed. Costal grooves number 14 to 18, and are usually 16. There are 5 to 14 vomerine teeth; three to five and one-half (usually 4 to 4.5) folds between adpressed limbs. Sexual maturity is reached at a snout to vent length of about 45 mm. Males possess a more pointed lower jaw, short rounded free flaps at the posterior end of the vent (Stebbins, 1951), and a mental gland (Brodie, 1968). Females have a pleated vent margin (Stebbins, 1951). The dorsal stripe of juveniles has less melanistic pigmentation than does that of adults.

Plethodon vehiculum is distinguished from congeneric sympatric species by the following characteristics of those species: *P. dunni*, dorsal stripe lacks an even margin and does not extend to tail tip, flecks of stripe color on sides of trunk, shape of mental gland (Brodie, 1968); *P. elongatus*, shorter legs and more elongate body with 6 to 8 and one-half costal folds separating the adpressed limbs; *P. larselli*, red-orange venter, short 5th toe, no mental gland (Brodie, 1968); *P. vandykei*, 13 to 16 (usually 14) costal grooves, webbed toes, uneven stripe.

• DESCRIPTIONS. Published descriptions are those of Bishop (1943), Cope (1867), Dunn (1926), Gordon (1939), Highton (1962), Slevin (1928), and Stebbins (1951, 1954, 1966). Those by Bishop, Dunn, and Stebbins (1951) are the most detailed

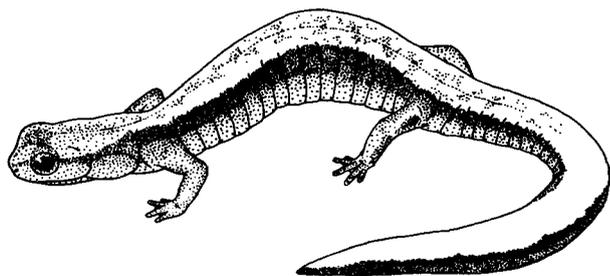
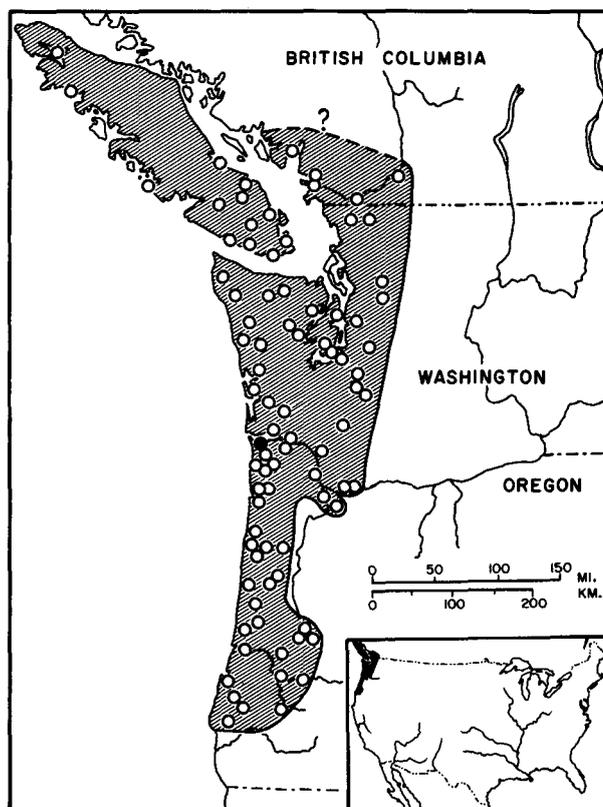


FIGURE. Drawing of *Plethodon vehiculum*, lateral aspect.

and accurate. Eggs laid in the laboratory are described by Stebbins (1951). Brodie (1968) described the mental gland in the male, and Hilton (1951) mentioned the presence of a nasal gland. The same albino is recorded by Hensley (1959) and Brame (1962).

• ILLUSTRATIONS. Photographs of adults are shown by Bishop (1934, 1943). Brame (1962) presents a photograph of a partial albino. Drawings are given by Cooper (1860, the original description) and Stebbins (1951, 1954, and 1966, in color). We include a drawing (by Dianne Brodie) showing a more lateral aspect of the animal and more clearly depicting differences from *P. dunni* (see Storm and Brodie, 1969). The mental gland is figured by Brodie (1968), and the distribution of teeth by Gordon (1939). Hilton (1951) presents drawings of the nasal glands of several plethodontids, not including *P. vehiculum*, but implies a similarity in his text. Stebbins (1951) presents a drawing of the egg with its jelly envelopes.

• DISTRIBUTION. The species occurs on Vancouver Island (Guppy, 1953) north at least to Kyuquot and in southwestern British Columbia. The northern limits of the range in British Columbia are uncertain. Logier and Toner (1961) give details of Canadian distribution and cite relevant publications. To the south *P. vehiculum* ranges through western Washington (Slater, 1955) and eastward to an altitude of between 2000 and 2500 feet in the Washington Cascades. The easternmost record in the Columbia Gorge is 2.5 miles east of Stevenson, Skamania County. In Oregon, the species is absent from the northern Cascades, except for a record near Boring, east of Portland. It occurs in the Cascades south of about Oakridge, Lane County, but only to the North Umpqua River in Douglas County, where it has been collected near Steamboat at 4100 feet, the only record for any northwestern *Plethodon* over 2500 feet. Coastally, the southern range limits are 2 miles south of Canyonville, Douglas County, and 3 miles southwest of Powers, Coos County. Brown and Slater (1939), Slater and Brown (1941), and Slater (1955) give records for the coastal islands of Washington. In the Coast Range of Oregon this species is most often associated with rocky outcrops and talus of fine-



MAP. Distribution of *Plethodon vehiculum*. The solid spot marks the type-locality; open circles indicate other records.

grained sandstones and shales (Dumas, 1956), but during moist seasons it can be found under the bark of and in decaying logs, under ground cover, and within cleavage planes among dead leaves (Stebbins, 1951). Dumas collected animals at sites with temperatures between 5° and 19°C (mean = 10.4°).

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. The most complete account of *P. vehiculum* in the literature is that of Stebbins (1951). Highton (1962) diagnoses and describes the species, compares it with other western *Plethodon*, and includes remarks on phylogeny and zoogeography. Burns (1954) presents some comparative ecological information. Dumas (1956) analyzes several ecological parameters for *P. vehiculum* where it is sympatric with *P. dunni*. Brattstrom (1963) gives information on body temperatures, temperature preferences, and critical thermal maximum.

In addition to the references cited, the species is briefly mentioned by Slater (1964a, b) and Thurow (1968). The Literature Cited is thought to contain all the scientifically pertinent literature on the species.

• ETYMOLOGY. The specific name is apparently based on the Latin "*vehiculum*," which pertains to a vehicle.

• REMARKS. Graf, Jewett, and Gordon (1939) recorded *P. vehiculum* from Fernwood (= Fernview) Forest Camp on the South Santiam River, Linn County, Oregon. At that time some confusion existed as to the specific distinctness of *P. vehiculum* and *P. dunni*. Graf's specimens cannot be located and further efforts at Fernview and nearby localities have produced over 50 specimens of *Plethodon*, all *P. dunni*.

LITERATURE CITED

- Bishop, Sherman C. 1934. Description of a new salamander from Oregon, with notes on related species. *Proc. Biol. Soc. Washington* 47:169-171.
- 1943. Handbook of salamanders: the salamanders of the United States, of Canada, and of Lower California. Comstock Publ. Co., Ithaca, New York, xiv + 555 p.
- Brame, Arden H., Jr. 1962. A survey of albinism in salamanders. *Abh. Berichte Nat. Vorgesichte* 9 (3):65-73.
- Brattstrom, Bayard H. 1963. A preliminary review of the thermal requirements of amphibians. *Ecology* 44 (2):238-255.
- Brodie, Edmund D., Jr. 1968. Observations on the mental hedonic gland-clusters of western salamanders of the genus *Plethodon*. *Herpetologica* 24 (3):248-250.
- Brown, W., and J. R. Slater. 1939. The amphibians and reptiles of the islands of the state of Washington. *Occ. Pap. Dept. Biol. College Puget Sound* (4):6-31.
- Burns, Douglas M. 1954. A new subspecies of the salamander *Plethodon vandykei*. *Herpetologica* 10 (2):83-87.
- Cooper, J. G. 1860. Report on reptiles collected on the survey. p. 292-306. *In Reports of explorations and surveys. . . from the Mississippi River to the Pacific Ocean*. 36th Cong., 1st Sess., House Ex. Doc. 56, 12(4).
- Cope, Edward D. 1867. A review of the species of the Amblystomidae. *Proc. Acad. Nat. Sci. Philadelphia* 19:166-211.
- Dumas, Philip C. 1956. The ecological relations of sympatry in *Plethodon dunni* and *Plethodon vehiculum*. *Ecology* 37 (3):484-495.
- Dunn, Emmett R. 1926. The salamanders of the family Plethodontidae. *Smith College 50th Anniversary Publ., Northampton, Massachusetts*. viii + 441 p.
- Gordon, Kenneth L. 1939. The Amphibia and Reptilia of Oregon. *Oregon State Monogr., Stud. Zool.* (1):1-82.
- Graf, William, Stanley G. Jewett, Jr., and Kenneth L. Gordon. 1939. Records of amphibians and reptiles from Oregon. *Copeia* 1939 (2):101-104.
- Guppy, R. 1953. Some notes on Vancouver Island salamanders. *Victorian Nat.* 10 (2-3):13-15, 25-27.
- Hensley, Max. 1959. Albinism in North American amphibians and reptiles. *Publ. Mus. Michigan State Univ. Biol. Ser.* 1 (4):133-159.
- Highton, Richard. 1962. Revision of North American salamanders of the genus *Plethodon*. *Bull. Florida State Mus. (Biol. Sci.)* 6 (3):235-367.
- Hilton, William A. 1951. A nasal gland in plethodontid salamanders. *Copeia* 1951 (1):75-76.
- Logier, E. B. S., and G. C. Toner. 1961. Checklist of the amphibians and reptiles of Canada and Alaska. *Roy. Ontario Mus. Life Sci. Div. Contrib.* 53:1-92.
- Slater, James R. 1940. Salamander records from British Columbia. *Occ. Pap. Dept. Biol. College Puget Sound* (9):43-44.
- 1955. Distribution of Washington amphibians. *Ibid.* (16):120-153.
- 1964a. A key to the adult amphibians of Washington State. *Ibid.* (25):235-236.
- 1964b. County records of amphibians for Washington. *Ibid.* (26):237-242.
- and Walter C. Brown. 1941. Island records of amphibians and reptiles for Washington. *Ibid.* (13):74-77.
- Slevin, Joseph R. 1928. The amphibians of western North America. *Occ. Pap. California Acad. Sci.* (16):1-152.
- Stebbins, Robert C. 1951. Amphibians of western North America. *Univ. California Press, Berkeley*. ix + 539p.
- 1954. Amphibians and reptiles of western North America. *McGraw-Hill Book Co., New York*. xxii + 528p.
- 1966. A field guide to western amphibians and reptiles. *Houghton-Mifflin Co., Boston*. xiv + 279p.
- Storm, Robert M., and Edmund D. Brodie, Jr. 1969. *Plethodon dunni*. *Cat. Amer. Amphibians Reptiles*: 82.
- Thurow, Gordon R. 1968. On the small black *Plethodon* problem. *West. Illinois Univ. Ser. Biol. Sci.* (6):1-48.
- R. M. STORM, OREGON STATE UNIVERSITY, CORVALLIS, OREGON 97331, AND E. D. BRODIE, JR., CLEMSON UNIVERSITY, CLEMSON, SOUTH CAROLINA 29631.

Published 16 January 1970 by the American Society of Ichthyologists and Herpetologists. Publication is supported by National Science Foundation grant G24231.

Primary editor for this account, James D. Anderson.