

Catalogue of American Amphibians and Reptiles.

UZZELL, THOMAS. 1967. *Ambystoma jeffersonianum*.

Ambystoma jeffersonianum (Green)
Jefferson salamander

Salamandra jeffersoniana Green, 1827: 4. Type locality, "Near Chartier's creek in the vicinity of Jefferson College [formerly] at Cannonsburg, [Washington County, Pennsylvania]." Type material probably included U. S. Natl. Museum No. 3968. Type material collected by Jacob Green. Date of collection unknown.

Ambystoma jeffersoniana: Baird, 1849: 283. Transfer of *Salamandra jeffersoniana* to *Ambystoma*.

Ambystoma fuscum Hallowell, 1858: 355. Type locality "Indiana, near Hanover College [at Hanover, Jefferson Co.]." Holotype Acad. Nat. Sci. Philadelphia No. 1379. Collected by "Prof. King." Date of collection unknown. Junior synonym of *Salamandra jeffersoniana* Green.

Ambystoma jeffersonianum Baird: Cope, 1867: 195. Emendation of generic name; recognition of *A. fuscum* and *A. laterale* as varieties.

Ambystoma jeffersonianum: Minton, 1954: 174; Uzzell, 1964: 292. Present usage.

- CONTENT. No subspecies are recognized.

- DEFINITION AND DIAGNOSIS. A bisexual, diploid species ($2n = 28$) of the *Ambystoma jeffersonianum* complex. Females are generally similar to females of *A. platineum*. The digits are long. The plicae of the tongue radiate from the posterior margin of the tongue. The maxillary and premaxillary teeth form a single row, and are bifid but not hooked. The vomerine teeth form a single row posterior to the internal nares, usually separated into three groups by breaks behind the nares.

The dorsum of adults is brownish-gray, darker than the venter. In living individuals, there are often small scattered bluish flecks, mainly on the limbs and lower sides of the body; these often fade in preservative. The area around the vent is usually gray. Mature males are 62 to 95 mm snout to vent, 110 to 186 mm in total length. Mature females are 76 to 101 mm snout to vent, 129 to 196 mm in total length. The distance between the external nares is 5.0 to 6.2 mm in mature males, 5.2 to 6.3 mm in mature females. The adpressed limbs of mature males overlap by as many as five (smaller individuals) to as few as one (larger individuals) costal folds. The enlarged ovarian eggs number 147 to 288.

- DESCRIPTIONS. Egg masses have been described by Smith (1911); supplemental data were added by Uzzell (1964). The masses are about 2 to 3.5 cm in diameter and 2 to 5 cm long, and contain 1 to 35, mean 14, eggs. They are laid along slender twigs, and are not attached to debris on the bottom of the pond. The eggs themselves have not been described.

The larvae of *Ambystoma jeffersonianum* were described by Brandon (1961). Adults were described by Smith (1911), Minton (1954), and Uzzell (1964). Courtship was described by Mohr (1930, 1931).

- ILLUSTRATIONS. Egg masses were figured by Smith (1911); larvae, by Brandon (1961); adults, by Smith (1911), Minton (1954), Conant (1958), and Uzzell (1964).

- DISTRIBUTION. *Ambystoma jeffersonianum* is found from southern Indiana and central Kentucky northeastward through most of Ohio to the southern half of New York, southern Vermont, western Massachusetts, northwestern New Jersey, and south through the ridge and valley province of Virginia to the New River in Virginia and West Virginia. In the western part of its range, most records are from south of the Wisconsin glacial border; in the eastern half of the range, many records are from well to the north of the maximum extent of Wisconsin glaciation. All records are from the eastern deciduous forest formation. At some localities, north of the Wisconsin glacial border, and at two localities (Hamilton County, Ohio) just south of it, *Ambystoma jeffersonianum* occurs with the very similar triploid species, *Ambystoma platineum*.

- FOSSIL RECORD. None.

- PERTINENT LITERATURE. Many references to this species were based at least in part on other members of the *Ambystoma jeffersonianum* complex (see REMARKS). The following papers certainly deal with the species: Brandon (1961) described the larvae. Humphrey (1958) noted the chromosome number. Minton (1954) clearly distinguished this species from *A. laterale*, and provided morphological data on both species; Mohr (1930, 1931) described courtship in this species. Mohr (1930) and Smith (1911) reported high percentages of egg development; Mohr's population had more males than females. Uzzell (1964) discussed morphological features, sex ratio in populations, migration dates of sexes, sex ratio of progeny, range, triploid hybrids between this species and *A. laterale* (*A. tremblayi*, *A. platineum*), courtship, cell size, and spermatophore production. Uzzell & Goldblatt (1967) discussed certain serum proteins, the origin of the triploid hybrids between this species and *A. laterale*, and the role of mating preference in the *Ambystoma jeffersonianum* complex. Other references are cited in the remainder of the text.

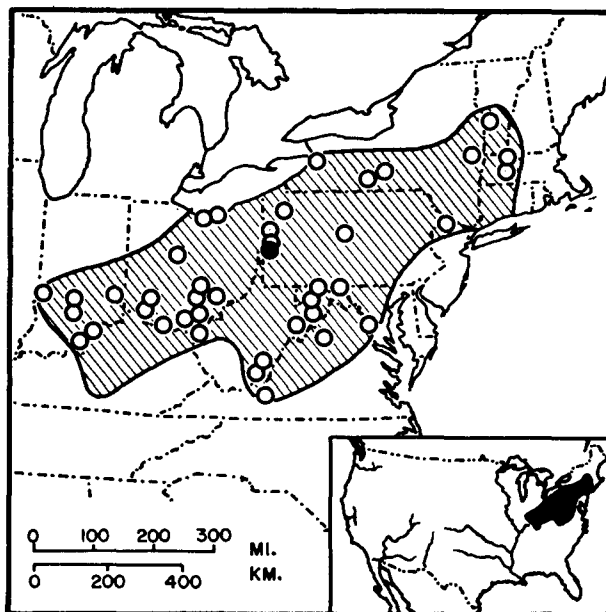
- REMARKS. Erythrocytes and erythrocyte nuclei probably have about two-thirds the volume of erythrocytes and erythrocyte nuclei of the two triploid species of the complex, *A. platineum* and *A. tremblayi*, and approximate the volume of those of *A. laterale* (Uzzell, 1964).

Meiotic and mitotic figures from testis squashes show that $n = 14$ (Humphrey, 1958); epidermal cells of larvae of this species have $2n = 28$ chromosomes (Uzzell, 1963).

In the laboratory, progeny of *A. jeffersonianum* females include about 60 per cent females (Uzzell, 1964).

Males of this species produce small numbers of spermatophores each breeding season (Uzzell, 1964). In breeding migrations, the males arrive at the pond relatively earlier than females, although there is some overlap (Uzzell, 1964). In populations that contain only *A. jeffersonianum*, the males outnumber the females (Uzzell, 1964). In a population with more males than females in Centre County, Pennsylvania, Mohr (1930) found that less than 5 per cent of the eggs deposited failed to develop. Smith's (1911) report of high percentage of egg success in Onondaga County, New York, probably represents a similar population; a similar success in eggs of this species in Delaware County, Ohio and Morgan County, Indiana, has been observed (unpublished).

Mating preference has been tested by confining, as bisexual pairs, various combinations of the two kinds of males and four kinds of females in the *Ambystoma jeffersonianum* complex in breeding cages. Measured by frequency of deposition of eggs that develop, *A. jeffersonianum* males mate preferentially with females of *A. jeffersonianum*, but they will



MAP. The solid circle marks the type-locality. Hollow symbols indicate other localities.

also court females of *A. platineum* fairly readily (Uzzell & Goldblatt, 1967).

Courtship of *A. jeffersonianum* has been described by Mohr (1930, 1931) and by Uzzell (1964). The most striking features are clasping of the female in the axillary region by the male with his forelimbs. The period of clasp varies in length. As courtship approaches a climax, the male relaxes his grasp slightly, and moves forward, moving his head to left and right, thus rubbing the top of the head and the snout of the female with his chin. At the climax of these activities, the male moves ahead of the female and deposits one or two spermatophores shortly in front of her snout. Outside of the *Ambystoma jeffersonianum* complex, clasping by the male as part of courtship is also known in *Ambystoma gracile* and *A. macrodactylum* (Knudsen, 1960; Anderson, 1961), but is unknown in other species of the genus.

This species exhibits the tail-waving defense display that Rand (1954) observed in some species of the *Ambystoma jeffersonianum* complex (unpublished).

Stable triploid hybrids of this species and *Ambystoma laterale* have been described. See accounts of *A. platineum* and *A. tremblayi*.

• ETYMOLOGY. This species is dedicated to Jefferson College.

COMMENT

The application of the name *Ambystoma jeffersonianum* to this species is largely a matter of convenience. At present, it seems unlikely that the triploid species *Ambystoma platineum* occurs at the type locality of *A. jeffersonianum*, near Cannonsburg, Pennsylvania.

Cope (1867) surmised that U. S. Natl. Mus. No. 3968 probably come from Green's material, and referred to this specimen as the type on this basis. Since the identity of U. S. Natl. Mus. No. 3968 cannot be determined at present, designation of it as type of *Ambystoma jeffersonianum* does not stabilize the name.

The holotype of *Ambystoma fuscum*, a large female without enlarged ovarian eggs, resembles females of *Ambystoma jeffersonianum*. *A. fuscum* is considered a synonym of *A. jeffersonianum* because it is probable that *A. platineum* does not occur at the type locality (near Hanover College, Indiana).

Although the alleged syntypes of *Salamandra granulata* (U. S. Natl. Mus. No. 3981) may be specimens of *A. jeffersonianum*, the species described by De Kay (1842) is not a member of the family Ambystomatidae.

Among preserved specimens that resemble *A. jeffersonianum*, males can almost certainly be assigned to *A. jeffersonianum* rather than *A. platineum*. Some females can be tentatively identified because they come from areas that probably are outside the range of *A. platineum* (see map of that species). Where both forms occur together, egg number relative to body length and snout width relative to body length may provide clues for identification (cf. Uzzell, 1964: figs. 9, 10).

Living individuals are more readily identified. Ploidy can be determined by examination of erythrocytes. Erythrocytes of *A. jeffersonianum*, suspended in isotonic saline, are two-thirds the area in optical section through the two longer axes, of erythrocytes of *A. platineum*.

Many specimens identified by cell size are preserved at the University of Michigan Museum of Zoology, Ann Arbor.

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