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SWEET, SAMUEL S. 1977. *Eurycea tridentifera*.

Eurycea tridentifera Mitchell and Reddell
Comal Blind Salamander

Eurycea tridentifera Mitchell and Reddell, 1965:14. Type-locality, "Honey Creek Cave [elevation 335m, 7.7 km SW Spring Branch], Comal Co[unty], Texas." Holotype, U.S. Nat. Mus. 153780, adult female, collected by James R. Reddell and Robert W. Mitchell, 14 January 1965 (examined by author).

Typhlomolge tridentifera: Wake, 1966:64. Transfer of *E. tridentifera* to *Typhlomolge*. See COMMENT.

• CONTENT. No subspecies are recognized, but see COMMENT.

• DEFINITION. This paedogenetic, advanced troglobitic *Eurycea* has 14 (rarely 13 or 15) trunk vertebrae, greatly reduced pigmentation, and reduced, nonfunctional eyes which frequently lack lenses. Eye size increases little during ontogeny, with the result that the ratio of eye diameter to head width at the level of the eyes decreases from 0.15 to 0.03 with increasing body size. These salamanders hatch at about 7 mm standard length (SL: snout to posterior margin of cloaca). Males mature at 25–27 mm SL, and exhibit 1–3 pairs of testis lobes, the number of lobes increasing with body size. Females mature at 28–32 mm SL, and usually contain from 7–18 unpigmented ova up to 3.5 mm in diameter (some data from Brandon, 1971). Both sexes attain large size; the largest specimen from the type locality is 37 mm SL and 68 mm in total length. Maximum known size is 46 mm SL and 85 mm total length (Badweather Pit). The tail is shortest at hatching, comprising 35–50% of the total length (45–50% in mature individuals). The limbs are slender, their relative length varying both ontogenetically and among populations, with the result that the toes may vary from being separated by 2 costal folds to overlapping by 2 costal folds when the limbs are adpressed. The carpals are normal, but tarsals 4 and 5 are usually fused. The head is proportionately large and broad, with a truncate, flattened snout, and a profile which rises abruptly but smoothly behind the eyes. Tooth counts range as follows: premaxilla, 15–33; vomer, 23–45; palatopterygoid, 14–30; dentary, 34–68; and coronoid, 8–26. The premaxillary, vomerine and dentary tooth counts increase with size, palatopterygoid tooth counts are independent of size, and coronoid tooth counts decrease with increasing body size. Tooth counts are not available for hatchlings. The skull resembles that of *E. neotenes* and other larval or paedogenetic *Eurycea*, but is relatively larger and more depressed, with the suspensorium enlarged and rotated anterolaterally, and the palatopterygoid broadened, often articulating with an anteromedial process of the quadrate. An orbitosphenoid generally ossifies in large individuals.

The coloration in life is cream to pale yellow dorsally, overlain with diffuse brown or gray mottlings or lineations, which are often interrupted by 4–15 irregular pairs of dorsolateral melanin-free areas on the trunk and tail base surrounding the lateral line organs. Melanin occurs in faint longitudinal reticulations laterally, ending abruptly at the level of the limbs. The venter is unpigmented and sufficiently translucent that the viscera are visible through the lateral and ventral body wall, enabling direct determination of sex. There is a faint dark line from the eye to the nostril. The limbs are pigmented on the dorsal surfaces only. The dorsal peritoneum, testes and vasa deferentia, and the meninges of the brain and spinal cord are pigmented with melanin. Carotenoid pigments occur dorsally as a yellow wash, the color augmented by fat deposits surrounding the thymus gland and the vertebral column, particularly in the tail. Neuromast organs are numerous on the head, and distributed in three pairs of irregular rows on the trunk, one ventrolateral and two dorsolateral, with a single dorsolateral row continuing onto the tail; these organs are usually marked by silvery iridophores. Iridophores are often present above the eyes, on the labial folds, and scattered on the dorsal and lateral trunk and on the bases of the limbs. Larvae tend to be darker than adults, and less often yellow; large individuals are often relatively pale, and show a yellow wash less frequently than do subadults and adults. Fats, carotenoid pigments and iridophores fade rapidly in preservative.

The diploid number of chromosomes is normally 28. A minority of individuals in the Honey Creek Cave and Badweather Pit populations possess an additional nondisjunct chromosome which passes meiosis (Bogart, 1967).

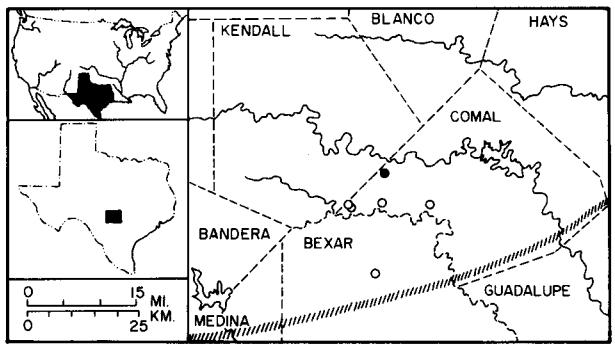
• DIAGNOSIS. *Eurycea tridentifera* is distinguished from other troglobitic *Eurycea* by the following set of characters: a modal number of 14 trunk vertebrae (others 16–18); eye frequently misshapen, its diameter less than 0.15 times coplanar head width (others, eyes normal, diameters 0.28–0.16 times coplanar head width); eyes lacking lenses in 5–55% of individuals per population (others, lenses present); and by the toes of the adpressed limbs overlapping, or separated by 2 or fewer costal folds (others have adpressed toes separated by 2–6 costal folds).

Eurycea tridentifera is distinguished from *Typhlomolge rathbuni* by the following set of characters: a modal number of 14 trunk vertebrae (*rathbuni*, 13); orbitosphenoid bones, extrinsic eye muscles and carotenoid pigments present, at least in adults (*rathbuni*, all lacking); and by the toes of the adpressed limbs overlapping by 2 or fewer costal folds (toes overlapping by 4–7 costal folds in *T. rathbuni*). The skull of *T. rathbuni* is elongate and broadened anteriorly, whereas the skull of *E. tridentifera* is broadened only in the suspensorial region, and is not elongate in comparison to the skulls of other *Eurycea*.

• DESCRIPTIONS. External morphology, hyobranchial apparatus, and the habitat of *E. tridentifera* are described by Mitchell and Reddell (1965); Wake (1966) notes aspects of skull, hyobranchial, vertebral and tarsal structure. Mitchell and Smith (1972) describe and illustrate a series of skulls and the vertebral column, demonstrating the occasional presence of orbitosphenoids and considerable variability in the vertebral characters used by Wake (1966) in aligning *E. tridentifera* with *Typhlomolge*. Brandon (1971) analyzes external form, and presents tooth counts and reproductive data. Bogart (1967) describes and illustrates mitotic and meiotic karyotypes. Brief characterizations are given by Baker (1966), Blair (1968), Leviton (1970), and Conant (1975).

• ILLUSTRATIONS. Good dorsal and lateral photographs of the living holotype are presented by Mitchell and Reddell (1965); other black and white photographs are in Reddell (1966) and Bogart (1967). An unlabelled color photograph appears in Mohr and Poulson (1966:131). Mitchell and Reddell (1965) provide diagrammatic line drawings of dorsal aspect, head profile, and hyobranchial apparatus; Conant (1975) also presents a profile sketch. Good photographs and outline drawings of 6 cleared and stained skulls, and a photograph of midtrunk vertebrae appear in Mitchell and Smith (1972). Bogart (1967) illustrates 5 mitotic and 9 meiotic chromosome preparations, and provides good photographs of early and term capsular larvae.

• DISTRIBUTION. *Eurycea tridentifera* is restricted to cave waters of the southeastern margin of the Edwards Plateau of central Texas. In addition to the type-locality, Honey Creek Cave (Anon., 1959; Reddell 1964), populations which I refer to *E. tridentifera* (but see COMMENT) occur in Elm Springs Cave, Bexar County, and four sinkhole caves on the floodplain of Cibolo Creek, Comal County: Kappelman Salamander Cave (Reddell, 1964 and 1967); Grosser's Sinkhole and Badweather Pit (Reddell, 1971); and Calmbach Cave (3 km NW Bulverde). Additional lo-



MAP. The solid circle marks the type-locality; open circles indicate other localities. The hachures indicate the southeastern margin of the Edwards Plateau.

calities are expected in the Cibolo Sinkhole Plain, and in northern Bexar County.

At Honey Creek Cave *E. tridentifera* occurs in sympatry with *E. neotenes* (Mitchell and Reddell, 1965; Bogart, 1967), with limited hybridization (Sweet, 1974); in other localities *tridentifera* occurs alone.

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. The most comprehensive works concerning *E. tridentifera* are those of Mitchell and Reddell (1965), Wake (1966) and Mitchell and Smith (1972). Hendricks (1974) includes *E. tridentifera* in a factor analytic study of Texas *Eurycea*. Brame (1967), Raun and Gehlbach (1972), Gorham (1974) and Thomas (1974) record the species in checklists. The Literature Cited is thought to contain all primary references published to date.

• REMARKS. Expansion of the known range suggests revision of the common name (Honey Creek Cave Blind Salamander) suggested by Mitchell and Reddell (1965) and employed by Conant (1975); I suggest the name Comal Blind Salamander as descriptive of the region in which these salamanders occur.

• ETYMOLOGY. The specific epithet *tridentifera* ("a trident-bearer") refers to the triradiate second basibranchial (urohyal), which together with its rodlike attachment to the remainder of the hyobranchial apparatus is stated to be diagnostic of the species (Mitchell and Reddell, 1965:20); actually these features are common to larvae of all hemidactyliine plethodontids (see Wake, 1966), though the urohyal is variably calcified.

COMMENT

Following Wake (1966), *E. tridentifera* is frequently referred to *Typhlomolge* (e.g., Brame, 1967; Brandon, 1971; Leviton, 1970; Gorham, 1974). Mitchell and Reddell (1965) place *Typhlomolge* in the synonymy of *Eurycea*, and Mitchell and Smith (1972) provide further evidence for this view; the generic designation of the original authors is retained here pending completion of work in progress.

Populations here referred to *E. tridentifera* are felt to warrant nomenclatural standing by Mitchell and Reddell (1965), Bogart (1967) and Mitchell and Smith (1972). Documentation of the degree of independence of these populations is difficult, although most can be reliably diagnosed (Sweet, 1974); I feel that the weight of present evidence does not warrant the recognition of new taxa.

Hybridization with *E. tridentifera* or a similar form may contribute to the variability of *Eurycea troglodytes* in Valdina Farms Sinkhole, northwestern Medina County (Sweet, 1975).

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