

1. Historical versus Current Distribution.

Tennessee cave salamanders (*Gyrinophilus palleucus*) exhibit a spotty distribution associated with cave systems throughout central Tennessee, northern Alabama, and northwestern Kentucky (Brandon, 1967a,b; Cooper, 1968; Cooper and Cooper, 1968; Redmond and Scott, 1996). Two subspecies of Tennessee Cave salamanders are recognized: Sinking Cove Cave salamanders (*G. p. palleucus*) and Big Mouth Cave salamanders (*G. p. necturoides*). The current distribution of Tennessee cave salamanders is probably similar to the historical distribution—there is no evidence that populations have been lost.

winter (Simmons, 1975; see also Petranka, 1998).

ii. Breeding habitat. The sinkhole-type caves characteristic of adult habitats.

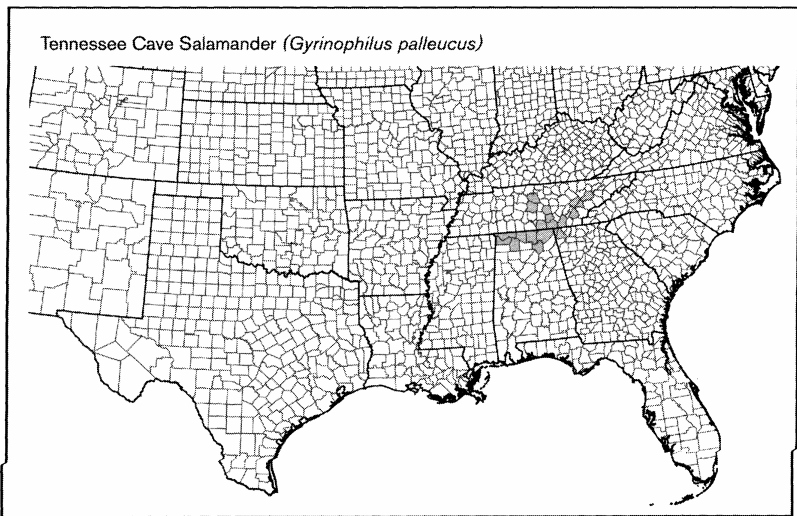
B. Eggs.

i. Egg deposition sites. Unknown. It is expected that eggs will be deposited in a manner similar to that of spring salamanders (*G. porphyriticus*), that is attached to the undersides of large rocks. Ova (from one female) averaged 3.2 mm in diameter.

ii. Clutch size. Unknown. Clutch size/SVL relationships for spring salamanders provide a basis for estimating clutch size in Tennessee cave salamanders (Bruce, 1972).

C. Larvae/Metamorphosis.

i. Length of larval stage. Unusually long, which led to their genus name, which in Greek means “tadpole loving” (Brandon, 1967a). Naturally metamorphosed ani-



2. Historical versus Current Abundance.

Petranka (1998) notes that population surveys rarely reveal >10–20 animals/cave visit, suggesting that populations are small. Population estimates from various caves reveal sizes of 25, 32, 48, and 88 animals, with densities ranging from 0.06–0.15 animals/m². The abundance of animals in some populations has been affected by siltation and increased water flows associated with deforestation (see Petranka, 1998). Most populations appear to be declining (Simmons, 1975; Caldwell and Copeland, 1992; Redmond and Scott, 1996).

3. Life History Features.

A. Breeding.

i. Breeding migrations. Do not occur. The presence of males with spermatophores in August (Lazell and Brandon, 1962) and the occurrence of small hatchlings in caves in December–February suggest that females lay eggs in autumn or early

spring (Simmons, 1975, 1976; Yeatman and Miller, 1985); populations typically consist of only neotenic forms (Lazell and Brandon, 1962; Brandon, 1966c, 1967a; Simmons, 1975, 1976; Caldwell and Copeland, 1992).

ii. Larval requirements.

a. Food. Tennessee cave salamanders consume benthic invertebrates and are constrained primarily by gape limitations (Brandon, 1966c; Simmons, 1975).

b. Cover. Animals can be found under rocks. However, most animals are found by direct observation without removal of cover objects (see Simmons, 1975). It is likely that cover is not used. Simmons (1975) describes the “disconcerting” habit of Tennessee cave salamanders to be found in exactly the same spot as months earlier.

iii. Larval polymorphisms. Unknown.

iv. Features of metamorphosis. Metamorphosis does not occur in Tennessee cave

salamanders. Animals can be stimulated to metamorphose with thyroxin treatment (Dent and Kirby-Smith, 1963), and animals occasionally will metamorphose after collection and transport to the laboratory.

v. Post-metamorphic migrations. Unlikely.

vi. Neoteny. Most populations of Tennessee cave salamanders consist of only neotenic animals. Naturally metamorphosed specimens are found occasionally (e.g., Simmons, 1975, 1976; Yeatman and Miller, 1985).

D. Juvenile Habitat. Juvenile habitats are the same as adults.

E. Adult Habitat. Tennessee cave salamanders are found in sinkhole-type caves or phreatic cave systems in the vicinity of sinkholes. This association is due to the nutrients that flow into these systems and the prey base they support. Caldwell and Copeland (1992) suggest that inflow (sinkhole) caves versus outflow caves may provide the best habitat. Animals are found under rocks in rocky and sandy substrates in quiet, shallow pools (McCrady, 1954; Simmons, 1975; see also Petranksa, 1998).

F. Home Range Size. Petranksa (1998) notes that individuals are highly sedentary, rarely moving >3–4 m between surveys, with many individuals repeatedly found in the same locations (Simmons, 1975).

G. Territories. Unknown.

H. Aestivation/Avoiding Desiccation. Unknown and unlikely.

I. Seasonal Migrations. Unknown and unlikely.

J. Torpor (Hibernation). Unknown.

K. Interspecific Associations/Exclusions.

There are no other amphibian species in habitats where Tennessee cave salamanders are found.

L. Age/Size at Reproductive Maturity.

Growth rates are slow, and animals may be larvae for many years (Brandon, 1967a,b; Petranksa, 1998). Males reach sexual maturity at 66 mm SVL (Petranksa, 1998); in Sinking Cove cave salamanders, size at sexual maturity is 70–100 mm SVL (Brandon, 1967b). The inner contour of the vent is sexually dimorphic (Brandon, 1967a).

M. Longevity. Unknown.

N. Feeding Behavior. Tennessee cave salamanders feed on invertebrates and conspecifics. Invertebrates include amphipods, annelids (oligochaetes and earthworms), cladoceran zooplankton, crayfish, and insects such as coleopterans, plecopterans, ephemeropterans, trichopterans, dipterans (chironomid larvae), and thrips. The invertebrate (potential prey) fauna associated with caves has been described by Cooper and Cooper (1968).

O. Predators. Known predators include conspecifics (Lazell and Brandon, 1962; Simmons, 1975) and American bullfrogs (*Rana catesbeiana*), which can inhabit the

mouths of cave entrances (Lee, 1969b). Petranksa (1998) suspects that crayfish feed on small larvae.

P. Anti-Predator Mechanisms. Being troglodytic assists in the avoidance of most amphibian predators.

Q. Diseases. Unknown.

R. Parasites. Unknown.

4. Conservation.

The current distribution of Tennessee cave salamanders probably is similar to the historical distribution, although populations have been affected by the indirect effects of deforestation and most appear to be declining. Petranksa (1998) makes a plea for conservation through water quality and protective land management initiatives. The Tennessee Wildlife Resources Agency (1994; see also www.state.tn.us) has listed Tennessee cave salamanders as Threatened. Although the U.S. Fish and Wildlife Service (1994c) listed Tennessee cave salamanders as a Category 2 candidate for federal listing, they were not included in a more recent federal list (USFWS, 1996a).