

Key to the Salamanders of Tennessee

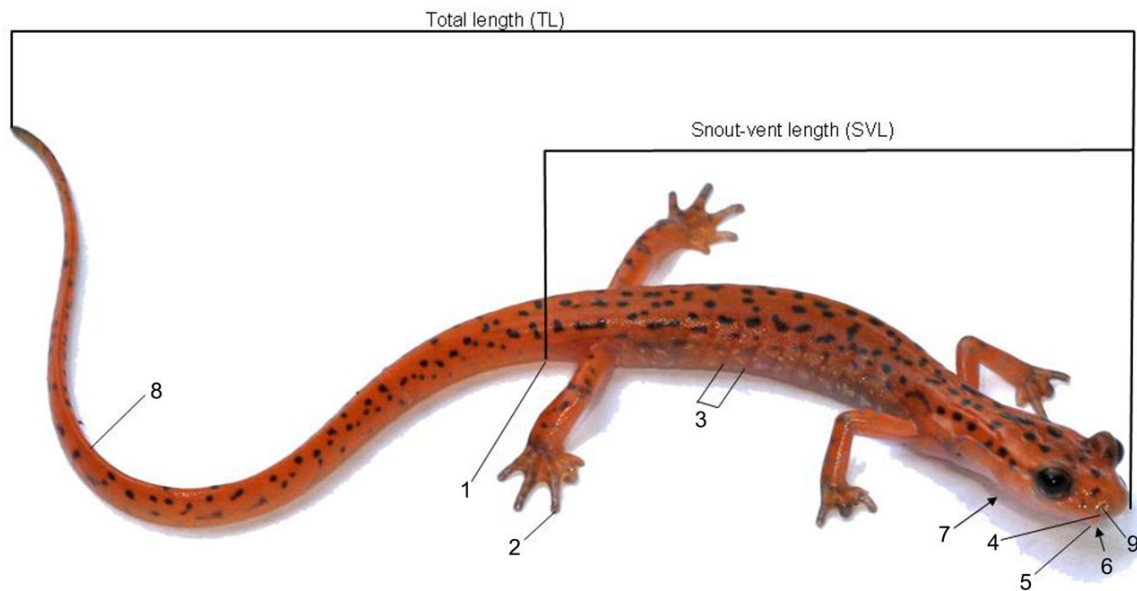


Fig. 1. Generalized salamander external anatomy. Key characteristics for identifying salamanders include the total length (TL) and snout-vent length (SVL), 1) vent, 2) toe tips, 3) costal grooves, 4) nasolabial groove, 5) cirri (males only), 6) mental gland underneath the chin (males only), 7) gular fold underneath head, 8) tail keel, and 9) nares.

1a. One pair of limbs; external gills present; hind limbs absent—**Western Lesser Siren (*Siren intermedia nettingi*), Family Sirenidae**

1b. Two pairs of limbs; external gills present or absent → 2

2a. External gills absent; limbs reduced with three or fewer toes on each foot; body eel-like—**Three-Toed Amphiuma (*Amphiuma tridactylum*), Family Amphiumidae**

2b. External gills present or absent; limbs not reduced with four or more toes on each foot → 3

3a. External gills present; four toes on each hind foot; laterally compressed tail; permanently aquatic—**Common Mudpuppy (*Necturus maculosus*), Family Proteidae**

3b. Five toes on each hind foot, or if four, tail round with basal constriction → 4

3a. Gill slits present; body dorsoventrally compressed; highly folded and wrinkled skin along sides—**Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*), Family Cryptobranchidae**

4b. Gill slits absent; body not dorsoventrally compressed and lacking folded, wrinkled skin → 5

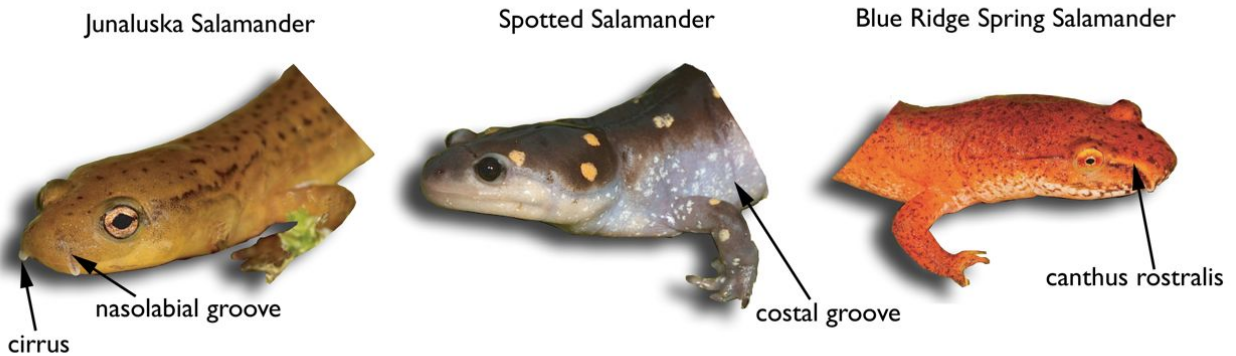


Fig. 2. Anterior anatomical features of salamanders. Note the lack of nasolabial grooves on the Spotted Salamander (*Ambystoma maculatum*) and the canthus rostralis, which is unique to Spring Salamanders (*Gyrinophilus porphyriticus*).

5a. Nasolabial grooves absent → 6

5b. Nasolabial grooves present → 13 (Family Plethodontidae)

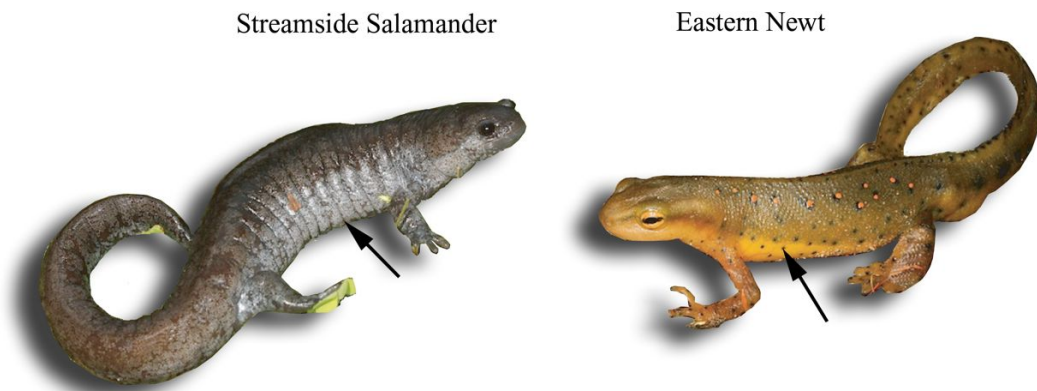


Fig. 3. Streamside Salamanders (*Ambystoma barbouri*) possess costal grooves along each flank, while Eastern Newts (*Notophthalmus viridescens*) have no costal grooves.

6a. Costal grooves absent; gular fold absent → 7 (Family Salamandridae)

- 6b. Costal grooves present; gular fold present → **8 (Family Ambystomatidae)**
- 7a. Red spots that are outlined with black present—**Eastern Newt** (*Notophthalmus viridescens viridescens*)
- 7b. Normally without spots or, if present, spots small and only partially outlined in black—**Central Newt** (*Notophthalmus viridescens louisianensis*)
- 8a. Body pattern of white or silvery crossbands—**Marbled Salamander** (*Ambystoma opacum*)
- 8b. Body pattern without crossbands → **9**
- 9a. Body patterned with yellow or orange spots or blotches → **10**
- 9b. Body patterned without yellow or orange spots or blotches → **11**
- 10a. Dorsolateral irregular spots, blotches, or bars present that are light yellow to olive in color; venter and lower lateral surface often with markings—**Eastern Tiger Salamander** (*Ambystoma tigrinum*)
- 10b. Dorsolateral spots situated in irregular rows present that are rounded and yellow to orange in color; venter typically gray—**Spotted Salamander** (*Ambystoma maculatum*)
- 11a. Head small and generally narrower than neck; snout short and rounded → **12**
- 11b. Conspicuously large head that is wider than neck and broader than trunk; 10–11 costal grooves—**Mole Salamander** (*Ambystoma talpoideum*)
- 12a. Maxillary and premaxillary teeth with long, pointed cusps; from the Nashville Basin in Tennessee; 14–15 costal grooves—**Streamside Salamander** (*Ambystoma barbouri*)
- 12b. Maxillary and premaxillary teeth more rounded—**Small-Mouthed Salamander** (*Ambystoma texanum*)
- 13a. Tail with basal constriction; all limbs with four toes; venter white with black spots—**Four-Toed Salamander** (*Hemidactylium scutatum*)
- 13b. Tail without basal constriction; hind limbs with five toes → **14**

14a. Hind limbs conspicuously larger than fore limbs; light diagonal line running from eye to angle of jaw → 15

14b. Hind and fore limbs about the same size; light diagonal line absent → 32

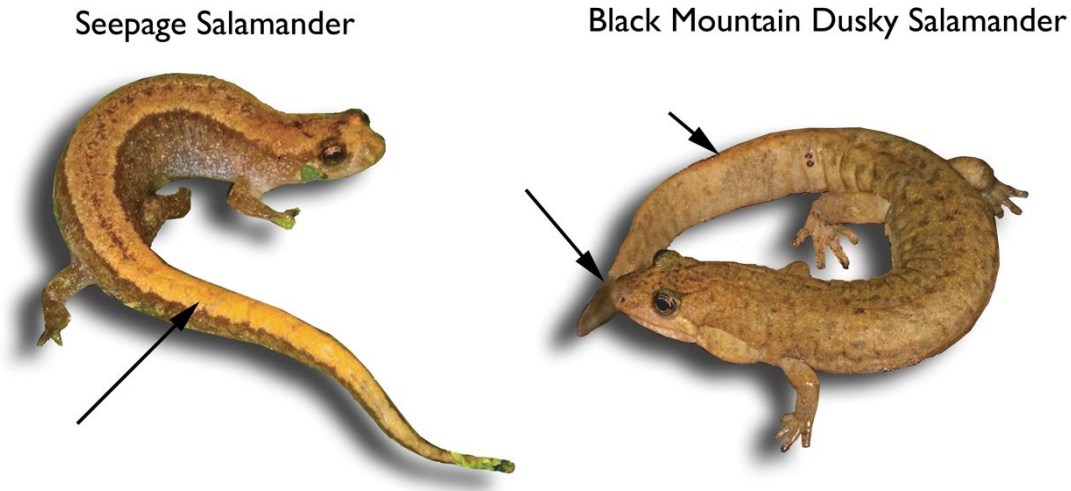


Fig. 4. Tennessee salamander tail shapes range from round to triangular in cross section at the base of the tail and from un-keeled to strongly keeled and dorsolaterally compressed towards the posterior end of the tail. The terrestrial Seepage Salamander (*Desmognathus aeneus*) possesses a tail that is round in cross section and no keel, while the more aquatic Black Mountain Dusky Salamander (*D. walteri*) has a tail that is triangular in cross section at the base and becomes strongly keeled towards the tip. This individual also has a regenerating tail tip.

15a. Basal third of tail round or oval in cross section; posterior half of tail not laterally compressed and without a distinct keel → 16

15b. Basal third of tail triangular in cross section; posterior half of tail laterally compressed and often with a distinct keel → 26

16a. Dorsum variable but usually lacking chevron pattern or Y-shaped marking on the head behind the eyes; adults usually > 30 mm SVL → 17

16b. Dorsum usually with a chevron pattern or Y-shaped marking on the head behind the eyes; adults usually < 30 mm SVL → 24

17a. Occurring in the Cumberland Plateau or Cumberland Mountains → 18

- 17b. Occurring in the Blue Ridge Mountains → 20
- 18a. Larval spotting almost always evident on dorsum; dorsal patterning usually a strongly undulating stripe; tail round throughout length—**Cumberland Dusky Salamander** (*Desmognathus abditus*)
- 18b. Larval spotting may or may not be evident on dorsum; dorsal pattern usually with a straight-edged or wavy, blotched patterning; tail round through length or with slight keel along posterior third → 19
- 19a. Tail usually round in cross section throughout length; from northern Cumberland Plateau and Cumberland Mountains—**Allegheny Mountain Dusky Salamander** (*Desmognathus ochrophaeus*)
- 19b. Tail usually with slight keel along posterior third; from southern Cumberland Plateau on Walden's Ridge—**Ocoee Salamander** (*Desmognathus ocoee*)
- 20a. Red or yellowish cheek patch present; from Great Smoky and Balsam mountains—**Imitator Salamander** (*Desmognathus imitator*)
- 20b. Cheek patch absent → 21
- 21a. Dorsum usually without straight-edged or wavy, blotched patterning; from Great Smoky and Balsam mountains—**Imitator Salamander** (*Desmognathus imitator*) **dark phase**
- 21b. Dorsum usually without straight-edged or wavy, blotched patterning → 22
- 22a. From Roan Mountain in Carter County northeast to Virginia state line—**Blue Ridge Dusky Salamander** (*Desmognathus orestes*)
- 22b. From southwest of Roan Mountain in Carter County → 23
- 23a. From Round Mountain in Cocke County northeast to Birchlog Creek in Unicoi County—**Carolina Mountain Dusky Salamander** (*Desmognathus carolinensis*)

- 23b. From Georgia state line northeast to Indian Gap in Sevier County—**Ocoee Salamander** (*Desmognathus ocoee*)
- 24a. Dorsum without chevron pattern or faint if present; top of head smooth; Y-shaped marking usually present on head behind the eyes; mental gland of males kidney-shaped—**Seepage Salamander** (*Desmognathus aeneus*)
- 24b. Dorsum with chevron pattern; top of head rugose; eyelids and dorsum of legs bronze to copper in color; mental gland of males large and U-shaped → **25**
- 25a. Found north of the French Broad River in the Blue Ridge Mountains at elevations above 1,100 m—**Northern Pygmy Salamander** (*Desmognathus organi*)
- 25b. Found south of the French Broad River in the Blue Ridge Mountains at elevations above 950 m—**Pygmy Salamander** (*Desmognathus wrighti*)

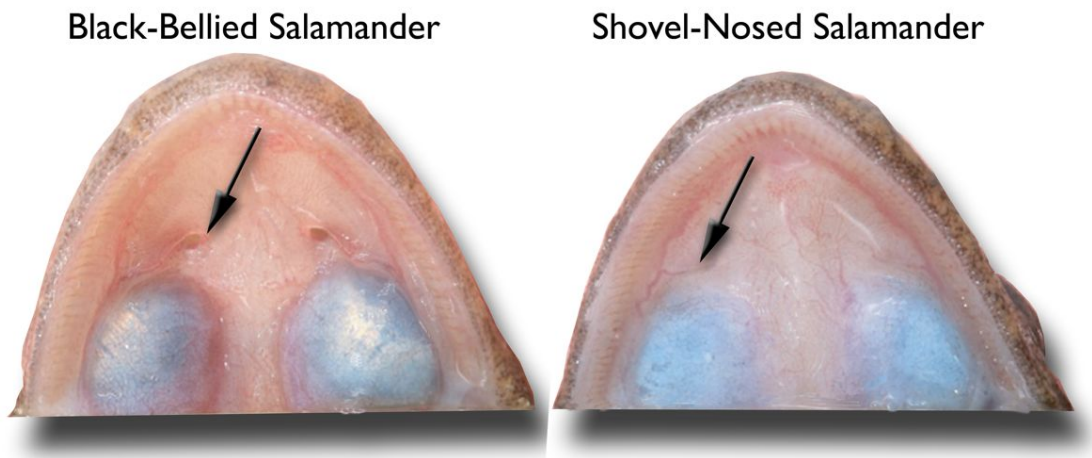


Fig. 5. Internal nares of Black-Bellied (*Desmognathus quadramaculatus*) and Shovel-Nosed (*D. marmoratus*) Salamanders. View is of the roof of the mouth, showing the rounded internal nares of Black-Bellied Salamander and the barely-visible slit-shaped internal nares of the Shovel-Nosed Salamander.

- 26a. Internal nares slit-like; head distinctly flattened sloping from behind small eyes to snout—**Shovel-Nosed Salamander** (*Desmognathus marmoratus*)

- 26b. Internal nares round; head not distinctly flattened; eyes large and froglike in appearance
→ 27



Fig. 6. Underside of hind limb of an adult Black Mountain Dusky Salamander, showing the dark cornified toe tips.

- 27a. Toe tips cornified and dark in appearance → 28
- 27b. Toe tips not cornified → 30
- 28a. Venter distinctly dark gray to black—**Black-Bellied Salamander** (*Desmognathus quadramaculatus*)
- 28b. Venter white, light gray, or mottled with brown → 29
- 29a. Venter uniformly colored white to light gray; sharp transition from dorsal to ventral ground coloration—**Seal Salamander** (*Desmognathus monticola*)
- 29b. Venter heavily mottled and brown; no sharp transition from dorsal to ventral ground coloration; base of tail laterally compressed—**Black Mountain Dusky Salamander** (*Desmognathus welteri*)
- 30a. Undersurfaces of limbs and tail usually with light yellow wash; from the Great Smoky, Balsam, and Unicoi mountains—**Santeetlah Dusky Salamander** (*Desmognathus santeetlah*)
- 30b. Undersurfaces of limbs and tail usually without light yellow wash → 31

- 31a. Remnants of larval dorsal spotting (6–8 pairs of large spots) fused into a band in adults; from northeast section of Tennessee—**Northern Dusky Salamander** (*Desmognathus fuscus*)
- 31b. Remnants of larval dorsal spotting still evident and usually not fused in adults; not from northeast Tennessee—**Spotted Dusky Salamander** (*Desmognathus conanti*)
- 32a. Toe tips square-shaped; green blotches on dorsum—**Green Salamander** (*Aneides aeneus*)
- 32b. Toe tips rounded; green blotches lacking on dorsum → **33**
- 33a. External gills present in adults; greatly reduced eyes; from caves → **34**
- 33b. External gills absent; eyes not reduced → **36**
- 34a. Dorsum flesh colored and lacking spotting; from caves in southern Franklin and Marion counties—**Pale Salamander** (*Gyrinophilus palleucus palleucus*)
- 34b. Dorsum dark, usually yellowish brown, reddish brown, or purplish brown, with numerous flecks or spots → **35**
- 35a. From caves in the Nashville Basin, Eastern Highland Rim, and Western Escarpment of the Cumberland Plateau—**Big Mouth Cave Salamander** (*Gyrinophilus palleucus necturoides*)
- 35b. Some individuals with distinct throat stripe or blotch; from caves in the Valley and Ridge of East Tennessee—**Berry Cave Salamander** (*Gyrinophilus gulolineatus*)
- 36a. Canthus rostralis present → **37**
- 36b. Canthus rostralis absent → **38**
- 37a. Dorsum a dull red, salmon, to brownish pink, usually with darker markings forming a mottled or cloudy appearance; dark pigmentation bordering canthus rostralis not as distinct; from Valley and Ridge, Cumberland Mountains, Cumberland Plateau, and Eastern Highland Rim—**Northern Spring Salamander** (*Gyrinophilus porphyriticus porphyriticus*)

- 37b. Dorsum reddish, salmon, or orangish yellow with small brown to black flecks or spots; canthus rostralis bordered by a dark brown or black line; from Blue Ridge Mountains—**Blue Ridge Spring Salamander** (*Gyrinophilus porphyriticus danielsi*)
- 38a. Body robust; tail short in relation to body length; ground color bright orangish red, reddish, salmon, to purplish that fades with age and with conspicuous black spots or flecks → **39**
- 38b. Body more slender; tail longer in relation to body length → **43**
- 39a. Black spots on dorsum round and few in number; venter unmarked; iris of eye usually brown—**Midland Mud Salamander** (*Pseudotriton montanus diastictus*)
- 39b. Black spots on dorsum more numerous and irregular in shape; iris of eye usually yellow → **40**
- 40a. Ground coloration purplish brown with tiny white flecks on the snout and sides of the head; dark spots on dorsum often fusing to form chevron pattern; from West Tennessee—**Southern Red Salamander** (*Pseudotriton ruber vioscai*)
- 40b. Usually lacking white flecking on snout and sides of head; not from West Tennessee → **41**
- 41a. Little to no dark spotting on the posterior half of the tail; chin with little to no black flecking; from northern Blue Ridge Mountains in Tennessee—**Blue Ridge Red Salamander** (*Pseudotriton ruber nitidus*)
- 41b. Black flecking usually present on chin → **42**
- 42a. Ground coloration more variable ranging from red to reddish orange to purple; some black flecking along margin of the chin; from Valley and Ridge, Cumberland Plateau, and Highland Rim—**Northern Red Salamander** (*Pseudotriton ruber ruber*)
- 42b. Heavy black flecking on chin; from southern Blue Ridge Mountains in Tennessee—**Black-Chinned Red Salamander** (*Pseudotriton ruber schencki*)

- 43a. Tongue attached on a central pedicel and free all around; ground color usually yellowish, orangish, or reddish → 44
- 43b. Tongue attached in front and free on sides and behind; ground color of dorsum not brightly colored → 50
- 44a. Tail about half of body length; 2–5 costal grooves between adpressed limbs → 45
- 44b. Tail more than half of body length; 0–2 costal grooves between adpressed limbs → 48
- 45a. Dorsolateral stripes or streaks usually not continuous and not extending onto tail; from Blue Ridge Mountains of east-central Tennessee—**Junaluska Salamander** (*Eurycea junaluska*)
- 45b. Dorsolateral stripes present and extending onto tail → 46
- 46a. Body robust, head relatively wide, trunk thick, and limbs tail relatively short; dorsum brownish with dark brown to dusky black sides; from Ridge and Valley—**Brownback Salamander** (*Eurycea aquatica*)
- 46b. Body less robust and slender, head more narrow, trunk less thick, and tail long; dorsum lighter in coloration and usually yellow to orange or tan → 47
- 47a. Dorsolateral stripes unbroken and extending past midpoint of the tail—**Southern Two-Lined Salamander** (*Eurycea cirrigera*)
- 47b. Dorsolateral stripes rarely extending unbroken past midpoint of the tail—**Blue Ridge Two-Lined Salamander** (*Eurycea wilderae*)
- 48a. Vertical bars or chevrons lacking on sides of tail; small black flecks or spots on dorsum—**Cave Salamander** (*Eurycea lucifuga*)
- 48b. Vertical bars or chevrons usually present on sides of tail → 49
- 49a. Dorsolateral and middorsal stripes forming a distinct three-lined appearance—**Three-Lined Salamander** (*Eurycea guttolineata*)

- 49b. Middorsal line or line of spots usually not present—**Long-Tailed Salamander** (*Eurycea longicauda longicauda*)
- 50a. Dorsum and lateral surfaces without conspicuous spotting or blotches → **51**
- 50b. Dorsum and lateral surfaces with conspicuous white to brassy spotting and/or blotches → **63**
- 51a. Bright red to orange or yellow pigment on cheeks or legs present → **52**
- 51b. Bright red to orange or yellow pigment on cheeks or legs absent → **53**
- 52a. Bright red to orange or yellow pigment on cheeks only—**Red-Cheeked Salamander** (*Plethodon jordani*)
- 52b. Bright red to orange pigmentation on upper surfaces of limbs—**Red-Legged Salamander** (*Plethodon shermani*)
- 53a. Dorsum with straight, wavy, or serrate-edged stripe that is tan, red, orange, or yellow in color → **54**
- 53b. Dorsum without evidence of a stripe → **56**
- 54a. Dorsal stripe wavy or zigzag-shaped—**Northern Zigzag Salamander** (*Plethodon dorsalis*) and **Southern Zigzag Salamander** (*Plethodon ventralis*)
- 54b. Dorsal stripe serrated or straight-edged → **55**
- 55a. From northern Blue Ridge Mountains north of the French Broad River—**Northern Red-Backed Salamander** (*Plethodon cinereus*)
- 55b. From southern Blue Ridge Mountains south of the French Broad River—**Southern Red-Backed Salamander** (*Plethodon serratus*)
- 56a. Ground coloration of dorsum and venter typically slate gray to purplish black with little to no flecking, spotting, or blotches → **57**
- 56b. Ground coloration of dorsum and especially venter often flecks, spotting, or blotches → **58**

- 57a. From Unicoi Mountains in Monroe County—**Red-Legged Salamander** (*Plethodon shermani*) **dark phase**
- 57b. From Blue Ridge Mountains northeast of Great Smoky Mountain National Park—**Northern Gray-Cheeked Salamander** (*Plethodon montanus*)
- 58a. Body long and slender with disproportionally short limbs; venter dark and plain; lightly mottled chin; from northeast Tennessee—**Southern Ravine Salamander** (*Plethodon richmondi*)
- 58b. Body and limbs not disproportionate → **59**
- 59a. Dorsum dark with large brassy to coppery blotches or striations that are metallic in appearance; venter dark with light mottling; from mountains of extreme northeast Tennessee—**Weller’s Salamander** (*Plethodon welleri*)
- 59b. Dorsum without large metallic-colored blotches or striations → **60**
- 60a. Venter uniformly gray; throat white or with white blotches; dorsum purplish brown with numerous small light flecks and bronze mottling; some individuals with two rows of large yellow spots on dorsum—**Wehrle’s Salamander** (*Plethodon wehrlei*)
- 60b. Venter with distinct mottling → **61**
- 61a. Venter with salt-and-pepper mottling without red or orange pigment → **62**
- 61b. Venter with salt-and-pepper mottling with red or orange pigment—**Northern Zigzag Salamander** (*Plethodon dorsalis*) and **Southern Zigzag Salamander** (*Plethodon ventralis*) **unstriped phase**
- 62a. From northern Blue Ridge Mountains north of the French Broad River—**Northern Red-Backed Salamander** (*Plethodon cinereus*) **leadback phase**
- 62b. From southern Blue Ridge Mountains south of the French Broad River—**Southern Red-Backed Salamander** (*Plethodon serratus*) **leadback phase**

- 63a. Dorsum with large chestnut blotches that often fuse into large streak; sides with large white blotches that often fuse—**Yonahlossee Salamander** (*Plethodon yonahlossee*)
- 63b. Dorsum without chestnut blotches → **64**
- 64a. Chin lighter than overall ground coloration → **65**
- 64b. Chin nearly as or as dark as overall ground coloration → **67**

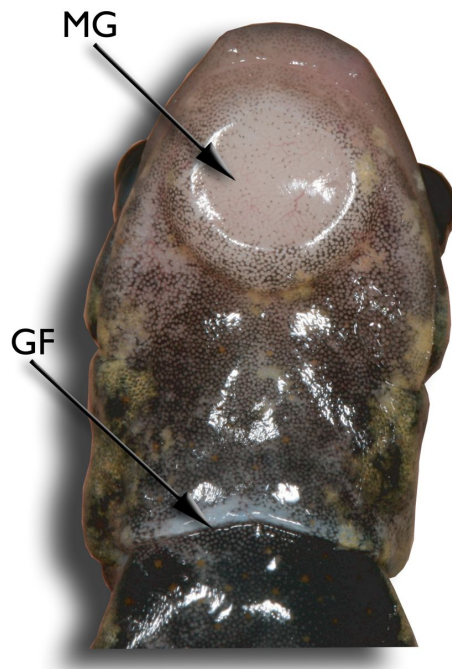


Fig. 7. Underside of the head of a male Tellico Salamander (*Plethodon aureolus*) showing the mental gland (MG) and the gular fold (GF).

- 65a. Dorsum with numerous brassy spots and flecks; sides with greater concentration of yellowish to white spotting or blotches; from Monroe and Polk counties—**Tellico Salamander** (*Plethodon aureolus*)
- 65b. Spotting, flecks, and blotches not brassy in coloration; from northern Cumberland Plateau or southern Blue Ridge Mountains → **66**

- 66a. Dorsum and sides with scattered, tiny white flecks or spots; from Blue Ridge Mountains—
Southern Appalachian Salamander (*Plethodon teyahalee*)
- 66b. Dorsum and sides with scattered, white spots that become larger on the sides; from the
Cumberland Mountains—**Cumberland Plateau Salamander (*Plethodon kentucki*)**
- 67a. Dorsum with variable white spots that become larger and often fuse to form blotches along
sides; from west of Tennessee River in West Tennessee—**Mississippi Slimy Salamander
(*Plethodon mississippi*)**
- 67b. Dorsum as in 66a but from east of Tennessee River → **68**
- 68a. Dorsum with large white spots and abundant white or yellow spotting or blotches on sides;
from northeast Tennessee—**White-Spotted Slimy Salamander (*Plethodon cylindraceus*)**
- 68b. Dorsum with small to medium spots; spots and blotches numerous but not abundant; not
from northeast Tennessee—**Northern Slimy Salamander (*Plethodon glutinosus*)**