

## AMPHIBIA: SALIENTIA: ASCAPHIDAE

## Catalogue of American Amphibians and Reptiles.

METTER, DEAN E. 1968. *Ascaphus* and *A. truei*.

***Ascaphus* Stejneger**  
Tailed Frog

*Ascaphus Stejneger* 1899:899. Type-species, *Ascaphus truei* Stejneger, 1899, by monotypy.

- CONTENT. One species, *Ascaphus truei*, is known.
- DEFINITION. The pupil is vertical-elliptical. There is no tympanum. The fifth digit of the hind foot is broadest. The toes are slightly to strongly webbed and the fingers are free. The cloaca of the male opens from a tear-shaped copulatory organ, the so-called "tail." The tongue is thick and free behind. The upper jaw is toothed and the vomerine teeth are between the choanae. The shoulder girdle is arciferous. The second, third and fourth vertebrae bear short, free ribs. Adults reach a snout-vent length of 35–50 mm, with the males being smaller than the females. The mountainbrook type larva has a sucking disc around the mouth, and 2-3/8-13 labial tooth rows. The spiracle is mid-ventral and opens under a flap.
- DESCRIPTIONS, ILLUSTRATIONS, DISTRIBUTION, FOSSIL RECORD and PERTINENT LITERATURE. See species account.
- ETYMOLOGY. The generic name is from the Greek *a*, "without" and *scaphos*, "spade." It is masculine.
- REMARKS. Stejneger (1899) referred the genus to the Discoglossidae. Fejérváry (1923) erected the family Ascaphidae on the basis of skeletal and muscular characters; he included only the type genus. Noble (1924) removed *Ascaphus* and *Liopelma* from the Discoglossidae and placed them in the family Liopelmididae. Noble was aware of the Fejérváry paper and used the fact that *Liopelma* is the older genus to justify the new name. However, Ascaphidae is the correct name according to article 23 of the International Code of Zoological Nomenclature.

***Ascaphus truei* Stejneger**  
Tailed Frog

- Ascaphus truei* Stejneger 1899:900. Type-locality, "Hump-tulips [Grays Harbor County] Washington." Holotype, U. S. National Museum No. 25979, an adult female (40 mm snout to vent) collected by Cloud Rutter, 19 August 1897 (examined by writer).
- Ascaphus truei californicus* Mittleman and Myers 1949:63. Type-locality, "near Klamath, Del Norte County, Calif." Holotype, Museum of Vertebrate Zoology (University of California) 19142, a female collected by W. F. Wood, 4 November 1933 (not seen by writer).
- Ascaphus truei montanus* Mittleman and Myers 1949:64. Type-locality, "tributary of Lincoln Creek, Glacier National Park, Flathead County, Montana." Holotype, U. S. National Museum 102505, a male collected by Leonard P. Schultz, date not given (not seen by writer).

- CONTENT. Three subspecies have been described but are not recognized. See COMMENT.
- DEFINITION. Same as for genus.
- DESCRIPTIONS. Adults have been described by Stejneger (1899), Van Denburgh (1912), Gaige (1920), Noble (1925, 1927), Slevin (1928), Noble and Putnam (1931), Wright and Wright (1949) and Stebbins (1951, 1954). Gaige (1920, Wright and Wright (1949) and Stebbins (1954) described the tadpoles. Gosner (1960) described the larval teeth. The male "tail" has been described by Noble and Putnam (1931), Villiers (1933) and van Dijk (1954). Aspects of the anatomy were described by Van Denburgh (1912), Frazier (1924), Slevin (1928), Villiers (1934), Pusey (1943), van Eeden (1951), Bhaduri (1953), Ritland (1955a, 1955b), Kampmeier (1959), van Dijk (1959, 1960), and Dunlap (1960). Stephenson (1951) compared the egg and larval development with that of *Liopelma*. Gaige (1920) and Noble and Putnam (1931) described the eggs. Wickbom (1950) and Morescalchi (1967) studied the chromosomes of *Ascaphus*.

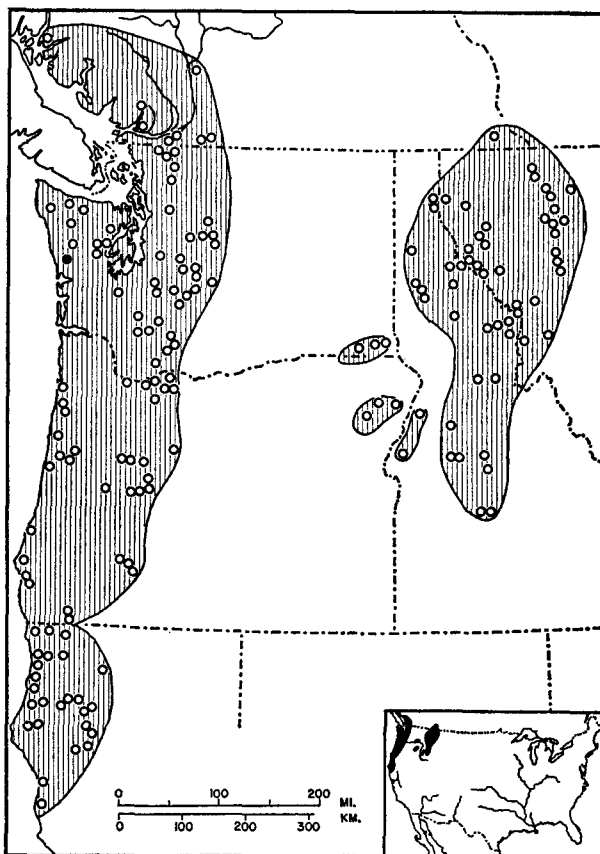
• ILLUSTRATIONS. Noble (1927), and Metter (1967) figured tadpoles; Stephenson (1951) and Metter (1964a) presented photographs of tadpoles. For figures of adults see Stebbins (1954) and Stebbins (1966, in color); photographs of adults are by Wright and Wright (1949), Cochran (1961, in color), and Metter (1964a). Metter (1964b) provided photographs of breeding adults and a drawing of sperm.

• DISTRIBUTION. The general range of *Ascaphus truei* covers two large separated areas. One area includes the coastal and near coastal mountains from Mendocino County, California northward to Bute Inlet, approximately 120 miles northwest of Vancouver, British Columbia. The second area is inland and includes the mountains of southeastern Washington and northeastern Oregon, most of the Idaho mountain ranges from Elmore County to Bonner County, most of the mountains of western Montana as far east as the eastern slope of the Continental Divide, and the mountains of British Columbia near Glacier Park, Montana. Many disjunct populations occur within the areas outlined. *Ascaphus* ranges from sea level to near timberline in forested areas with fast flowing, permanent streams. Adults may wander some distance during rainy periods but are only found in or near the streams in dry weather.

The distribution is well covered for Washington (Slater, 1955) and California (Bury, 1968). Localities for Oregon, Idaho, Montana and British Columbia are published mainly in notes.

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. The ecology and natural history of tailed frogs were discussed by Gaige (1920), Noble (1927), Noble and Putnam (1931), Carl and Cowan (1945), Metter (1964a, 1967, 1968) and Bury (1968). Breeding was described by Slater (1931), Noble and Putnam (1931) and Metter (1964b). Brattstrom (1963) reported habitat and body tem-



MAP. The solid circle indicates the type-locality; open symbols indicate other localities.

peratures. Metter (1966) tested the tolerances of adults and tadpoles to temperature and salinity. Landreth and Ferguson (1967) investigated movements and homing. Stejneger (1905) discussed the origin and dispersal of *Ascaphus*. Variation has been studied by Mittleman and Myers (1949) and Metter (1964a, 1967). Metcalf (1928), Schell (1964) and Schell, Anderson and Pratt (1965) studied some of the parasites of *Ascaphus*.

• ETYMOLOGY. The specific name honors F. W. True, former head curator of the Department of Biology, U.S. National Museum.

#### COMMENT

There appears to be little reason to recognize the subspecies named by Mittleman and Myers (1949). One of these authors, (Myers, 1952) indicated that he saw reason to question the validity of the subspecies. In my work on variation in *Ascaphus* (Metter, 1964a, 1967) I used larger samples from more portions of the range. I found nothing to substantiate the proposed partition of the species.

I found the variation in vomerine tooth counts (0-30) so great that the key provided by Mittleman and Myers proved useless. Populations frequently did not fit the subspecies characters of eye/snout-vent and head-width/snout-vent ratios, and neighboring populations often showed more distinctive differences than those used to name the subspecies.

Partitioning the species at the California-Oregon border is unrealistic. No noteworthy differences were detected between *Ascaphus* from the Siskiyou Mountains at the California border and those inhabiting the Cascade Mountains along the upper Rogue River. Ecological changes that occur near the southwestern border of Oregon, constitute weaker barriers to distribution than those found between small ranges of mountains inhabited by the species in other areas.

The fragmentation of the species into numerous separated populations seems fairly recent and indicates a contracted range. The differences that exist between many of the disjuncts, are not of a magnitude to justify partition of the species.

#### LITERATURE CITED

- Bhaduri, J. L. 1953. A study of the urinogenital system of Salientia. Proc. Zool. Soc. Bengal 6:1-111.
- Brattstrom, B. H. 1963. A preliminary review of the thermal requirements of amphibians. Ecology 44(2):238-255.
- Bury, R. B. 1968. The distribution of *Ascaphus truei* in California. Herpetologica 24(1):39-46.
- Carl, C. C. and I. M. Cowan. 1945. Notes on some frogs and toads of British Columbia. Copeia 1945(1):52-53.
- Cochran, D. M. 1961. Living amphibians of the world. Doubleday Co., Garden City, New York, 199 pp.
- Dunlap, D. G. 1960. The comparative myology of the pelvic appendage in the Salientia. J. Morphol. 106:1-76.
- Fejérváry, G. J. de 1923. Ascaphidae a new family of the tail-less batrachians. Ann. Mus. Nat. Hungary 20:178-181.
- Frazier, Mary. 1924. A contribution to the anatomy of the amphibian larynx. J. Morphol. 39:285-293.
- Gaige, H. T. 1920. Observations upon the habits of *Ascaphus truei* Stejneger. Occ. Pap. Mus. Zool. Univ. Michigan (84):1-9.
- Gosner, K. L. 1959. Systematic variations in tadpole teeth with notes on food. Herpetologica 15(4):203-210.
- Kampmeier, O. F. 1959. On the lymphatic system of *Ascaphus*; its evolutionary significance. Anat. Rec. 132:343-357.
- Landreth, H. F. and D. E. Ferguson, 1967. Movements and orientation of the tailed frog, *Ascaphus truei*. Herpetologica 23(2):81-93.
- Metcalf, M. M. 1928. The bell toads and their opalinid parasites. Amer. Nat. 62:5-21.
- Metter, D. E. 1964a. A morphological and ecological comparison of two populations of the tailed frog *Ascaphus truei* Stejneger. Copeia 1964(1):181-195.
- 1964b. On breeding and sperm retention in *Ascaphus*. *Ibid.* 1964(4):710-711.
- 1966. Some temperature and salinity tolerances of *Ascaphus truei* Stejneger. J. Idaho Acad. Sci. 4:44-47.
- 1967. Variation in the ribbed frog *Ascaphus truei* Stejneger. Copeia 1967(3):634-649.
- 1968. The influence of floods on population structure of *Ascaphus truei* Stejneger. J. Herpetology 1:105-106.
- Mittleman, M. B. and G. S. Myers. 1949. Geographic variation in the ribbed frog *Ascaphus truei*. Proc. Biol. Soc. Washington, 62:57-68.
- Morescalchi, Alessandro. 1967. Note citotassonomiche su *Ascaphus truei* Stejn. (Amphibia Salientia). Atti Soc. Peloritana, Sc. fis. mat. nat. 13:23-30.
- Myers, G. S. 1952. [Review of] Amphibians of Western North America by Robert C. Stebbins. Copeia 1952(2):123-124.
- Noble, G. K. 1924. A new spadefoot toad from the Oligocene of Mongolia with a summary of the evolution of the Pelobatidae. Amer. Mus. Novitates (132):1-15.
- 1925. An outline of the relation of ontogeny to phylogeny within the Amphibia I. *Ibid.* (165):1-17.
- 1927. The value of life history data in the study of the evolution of the Amphibia. Ann. New York Acad. Sci. 30:31-128.
- Noble, G. K. and P. G. Putnam, 1931. Observations on the life history of *Ascaphus truei* Stejneger. Copeia 1931:97-101.
- Pusey, H. K. 1943. On the head of the liopelmid frog, *Ascaphus truei*. Quart. J. Micr. Sci. 84:105-185.
- Ritland, R. M. 1955a. Studies on the post-cranial morphology of *Ascaphus truei*. (I) Skeleton and spinal nerves. J. Morphol. 97:119-177.
- 1955b. Studies on the post-cranial morphology of *Ascaphus truei*. (II) Myology. *Ibid.* 97:215-282.
- Schell, S. C. 1964. *Bunoderella metteri* gen. and sp. n. (Trematoda: Alloeceadiidae) and other trematode parasites of *Ascaphus truei* Stejneger. J. Parasitol. 50(5):652-655.
- Schell, S. C., G. Anderson and I. Pratt. 1965. The life cycle of *Bunoderella metteri* (Alloeceadiidae: Bunoderinae), a trematode parasite of *Ascaphus truei*. J. Parasitol. 51(4):579-582.
- Slater, J. R. 1931. The mating of *Ascaphus truei* Stejneger. Copeia 1931:62-63.
- 1955. Distribution of Washington amphibians. Occ. Pap. Dept. Biol. Coll. Puget Sound (16):122-154.
- Slevin, J. R. 1928. The amphibians of western North America. Occ. Pap. California Acad. Sci. (16):1-152.
- Stebbins, R. C. 1951. Amphibians of western North America. University of California Press, Berkeley and Los Angeles, 539 pp.
- 1954. Amphibians and reptiles of western North America. McGraw-Hill Book Co. Inc. New York, 528 pp.
- 1966. A field guide to western reptiles and amphibians. Houghton Mifflin Co., Boston, 279 pp.
- Stejneger, L. 1899. Description of a new genus and species of discoglossid toad from North America. Proc. U. S. Natl. Mus. 21(1178):899-901.
- 1905. A resume of the geographical distribution of the discoglossid toads in the light of ancient land connections. Bull. Amer. Geog. Soc. 37:91-93.
- Stephenson, N. G. 1951. Observations on the development of the amphicoelous frogs, *Liopelma* and *Ascaphus*. J. Linn. Soc. London (Zool.) 42:18-28.
- Van Denburgh, J. 1912. Notes on *Ascaphus* the discoglossid toad of North America. Proc. California Acad. Sci. 3:259-264.
- van Dijk, D. E. 1954. The "tail" of *Ascaphus*. Ann. Univ. Stellenbosch 31 (Sec. A No. 1):1-71.
- 1959. On the cloacal region of Anura, in particular of larval *Ascaphus*. *Ibid.* 35 (Sec. A No. 4):169-247.
- 1960. Segmentation of the pelvic region of Anura with particular reference to the urostyle of *Ascaphus*. S. African J. Sci. 56:78-80.
- van Eeden, J. A. 1951. The development of the chondrocranium of *Ascaphus truei* Stejneger with special reference to the relations of the palatoquadrate to the neurocranium. Acta. Zool. 32:41-176.
- Villiers, C. G. S. de. 1933. The "tail" of the male American toad *Ascaphus*. Nature (London), 131(3315):692-693.
- 1934. Studies on the cranial anatomy of *Ascaphus truei* Stejneger, the American "Liopelmid." Bull. Mus. Comp. Zool. 77:1-38.
- Wickham, T. 1950. The chromosomes of *Ascaphus truei* and the evolution of the anuran karyotypes. Hereditas (Lund). 36(4):406-418.
- Wright, A. H. and A. A. Wright. 1949. Handbook of frogs and toads, 3rd Ed. Comstock Publ. Co., Ithaca, New York, 640 pp.
- DEAN E. METTER, UNIVERSITY OF MISSOURI, COLUMBIA, MISSOURI 65201.

Published 16 December 1968 by the American Society of Ichthyologists and Herpetologists. Publication is supported by National Science Foundation grant G24231.

Primary editor for this account, Richard G. Zweifel.