

Catalogue of American Amphibians and Reptiles.

HAHN, DONALD E. 1979. Leptotyphlopidae, *Leptotyphlops*.

Leptotyphlopidae Stejneger Slender blind snakes

Stenostomata Ritgen, 1828:255. Type genus by monotypy, *Stenostoma* Wagler, 1824; preoccupied by *Stenostoma* Latreille, 1810.

Stenostomi Wiegmann and Ruthe, 1832:160.

Stenostomina Bonaparte, 1845:377.

Stenostomidae Cope, 1886:481.

Glauconiidae Boulenger, 1890:242. Type genus by original designation, *Glauconia* Gray, 1845.

Leptotyphlopidae Stejneger, 1891:501. Type genus by original designation, *Leptotyphlops* Fitzinger, 1843.

• CONTENT. Two genera, *Leptotyphlops* and *Rhinoleptus* are recognized.

• DEFINITION. These slender, cylindrical, wormlike snakes are specialized for burrowing and reach a maximum total length of about 400 mm. The eyes are vestigial, lying below oculars; brille is absent. Body scales are smooth, highly polished and close fitting. There are 14 or 16 rows of scales around the body. Ventrals are reduced to near the size of the dorsals. One vertebra is present per body segment. Teeth are confined to the anterior half of the dentary. Studies on osteology and soft anatomy of the monotypic genus *Rhinoleptus* are needed to fully define the range of characteristics present in the family. All family definitions published prior to 1970 pertain only to the genus *Leptotyphlops*. Dowling and Duellman (1978) give a good synopsis of the family.

• DESCRIPTIONS, ILLUSTRATIONS. See following account of *Leptotyphlops*. *Rhinoleptus* is described and illustrated by Orejas-Miranda et al. (1970), and Villiers (1956).

• DISTRIBUTION. Same as for the genus *Leptotyphlops*.

• FOSSIL RECORD. See generic account of *Leptotyphlops*.

• PERTINENT LITERATURE. Much of the recent literature dealing with this family explores its relationship with the family Typhlopidae. Haas' (1962) phylogenetic tree of the snakes, based on head musculature, shows the Leptotyphlopidae branching directly and separately from ancestral platynotids. McDowell and Bogert (1954) suggest that the Leptotyphlopidae and other snakes may have evolved from aigialosaurian stock similar to the living Lanthanotidae, and that the Typhlopidae may have been derived from anguinid-like lizards. They conclude that the Typhlopidae should be given subordinal rank or be placed as an infraorder of the Sauria. They list osteological differences between the Typhlopidae and Leptotyphlopidae, and presume similarities are due to parallel evolution. Dowling (1959) was uncertain about the relationships of the Leptotyphlopidae with the Typhlopidae but felt that the placement of both in a common superfamily by Romer (1956) was unwarranted, and that the two families differ primarily in jaw mechanisms. Underwood (1957, 1967) presents a number of snake-like characteristics of the Typhlopidae not considered by McDowell and Bogert (1954) and presents a case for consideration of both the Leptotyphlopidae and Typhlopidae as divergent descendants of ancestral snake stock. He also feels that Romer's (1956) superfamily Typhlopoidea implies a closer relationship between the Leptotyphlopidae and Typhlopidae than actually exists, and supports the infraorder Scolecophidia as used by Hoffstetter (1955), as it allows for the recognition of superfamilies Leptotyphlopoidea and Typhlopoidea to emphasize the differences between the two stocks. Underwood (1957) states, "If further study strengthens the case for affinity with the Leptotyphlopidae then I would suggest that the two families have diverged from a common ancestor principally in respect of their adaptations to the swallowing of prey in the restricted space of an underground burrow." Robb and Smith (1966) compare various osteological and soft anatomical features of the "typhlopoid" snakes, and view the fundamental resemblances as "overwhelmingly convincing of their common ancestry, however remote." McDowell (1974) now considers the Typhlopidae within the Serpentes, and makes further comparisons among the three families comprising the Infraorder Scolecophidia. Dowling (1975a) added

the Uropeltidae to the superfamily Typhlopoidea, in which he also included the Typhlopidae, Leptotyphlopidae and Anomalepididae. See Smith (1969) for a summary of the taxonomic history of family-group names.

Axelrod and Raven (1972) suggest a Cretaceous origin for the Leptotyphlopidae. The family has a typical Gondwanaland distribution (South America and Africa) with a few species ranging into adjacent temperate zones. Dowling (1975b) believes that the Nearctic species of *Leptotyphlops* are post-Pliocene entrants from Neotropics.

• ETYMOLOGY. See account of *Leptotyphlops*.

• KEY TO GENERA.

1. Rostral terminating in an anteriorly projecting, acute conical point; no division of nasal; 16 transverse scale rows around body; body scales distinctly widened transversely; anal plate equal in size to caudal scales; scale reduction takes place on anterior third of tail; parietals and occipitals of equal size to body scales; head scales are oblique to the axis of the body in lateral view; eyes not visible; head scale tubercles do not occur posterior to rostral *Rhinoleptus*
Rostral not terminating in an anteriorly projecting, acute conical point; nasal either partially or completely divided; usually 14 transverse scale rows around body; body scales as long as wide (with the exception of the ventrals); anal plate distinctly enlarged; scale row reduction (in those species where it occurs) between anal plate and 15 scales anterior to it; parietals and occipitals larger than body scales; head scales perpendicular to the axis of the body in lateral view; eyes visible except prior to shedding; head scale tubercles extend posteriorly to the occipitals *Leptotyphlops*

Leptotyphlops Fitzinger Slender blind snakes

Stenostoma Wagler, 1824:68. Type-species, *Stenostoma albifrons* Wagler, 1824 = *Leptotyphlops albifrons* (Wagler), by monotypy. Preoccupied by *Stenostoma* Latreille, 1810.

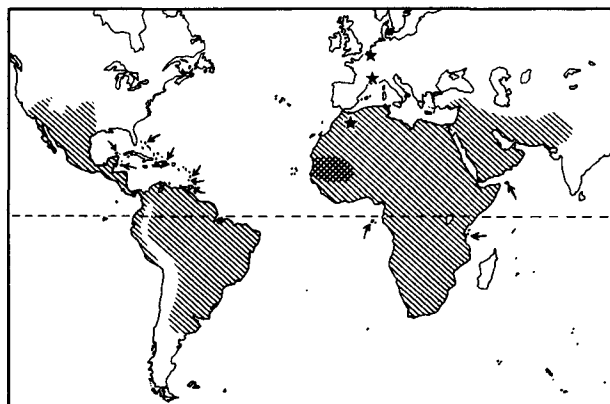
Typhlina Wagler, 1830:196. Type-species, *Typhlops semistriatus* Schneider, 1801 (lapsus) = *Leptotyphlops semistriatus* (Schneider), by monotypy.

Leptotyphlops Fitzinger, 1843:24. Type-species, *Typhlops nigricans* (Schlegel), 1839 = *Leptotyphlops nigricans* (Schlegel), by original designation.

Eucephalus Fitzinger, 1843:24. Type-species, *Typhlops bilineatus* Schlegel, 1839 = *Leptotyphlops bilineatus* (Schlegel), by original designation.

Catodon Dumeril and Bibron, 1844:318. Type-species, *Typhlops septemstriatus* Schneider, 1801 = *Leptotyphlops septemstriatus* (Schneider), by monotypy. Preoccupied by *Catodon* Linnaeus, 1761.

Epictia Gray, 1845:139. Type-species, *Typhlops undecimstriatus*



MAP. Diagonal lines show the distribution of *Leptotyphlops*, cross-hatching that of *Rhinoleptus*; arrows point to insular localities for *Leptotyphlops*, and stars indicate Tertiary fossil records of that genus.

- Schlegel, 1839 = *Leptotyphlops undecimstriatus* (Schlegel), by subsequent designation (Loveridge, 1957:246).
- Glauconia* Gray, 1845:139. Type-species, *Typhlops nigricans* Schlegel, 1839 = *Leptotyphlops nigricans* (Schlegel), by monotypy.
- Rena* Baird and Girard, 1853:142. Type-species, *Rena humilis* Baird and Girard, 1853 = *Leptotyphlops humilis* (Baird and Girard), by subsequent designation (Stejneger, 1891:501).
- Sabrina* Girard, 1857:181. Type-species, *Typhlops tessellatus* Tschudi, 1845 = *Leptotyphlops tessellatus* (Tschudi), by monotypy.
- Rhamphostoma* Jan, 1861:190. Type-species, *Stenostoma macrorhynchum* Jan, 1861 = *Leptotyphlops macrorhynchum* (Jan), by monotypy. Preoccupied by *Rhamphostoma* Wagler, 1830.
- Tricheilostoma* Jan, 1861:190. Type-species, *Stenostoma macrolepis* Peters, 1857 = *Leptotyphlops macrolepis* (Peters), by subsequent designation (Loveridge, 1957:246).
- Tetracheilostoma* Jan, 1861:190. Type-species, *Typhlops bilineatus* Schlegel, 1839 = *Leptotyphlops bilineatus* (Schlegel), by monotypy.
- Ramphostoma* Jan, 1863:16. Emendation of *Rhamphostoma* Jan, 1861.
- Siagonodon* Peters, 1881:71. Type-species, *Anguis septemstriatus* Schneider, 1801 = *Leptotyphlops septemstriatus* (Schneider), by original designation.
- Stenostomopsis* Rochebrune, 1885:141. Substitute name for *Stenostoma* Wagler, 1824.

• **CONTENT.** Hahn (1978, 1979c, in press) recognizes 74 species. United States, Mexico and Middle America (including coastal islands): *bressoni*, *dulcis* (3 races), *goudoti* (4 races), *humilis* (9 races), *maximus*, and *nasalis*. South America: *affinis*, *albifrons*, *albipunctus*, *anthracinus*, *australis*, *borrichianus*, *brasiliensis*, *brevissimus*, *collaris*, *cupinensis*, *diaplocius*, *dimidiatus*, *dugandi*, *guayaquilensis*, *joshuati*, *koppesti*, *macrolepis*, *melanotermus*, *melanurus*, *munaui*, *nicefori*, *peruvianus*, *rubrolineatus*, *rufidorsus*, *salgueiroi*, *septemstriatus*, *signatus*, *subcrotillus*, *teaguei*, *tenellus*, *tesselatus*, *tricolor*, *undecimstriatus*, *unguirostris*, and *weyrauchi*. Caribbean Islands: *bilineatus*, *columbi*, and *pyrites*. Africa (including Socotra and coastal islands): *bicolor*, *boulengeri*, *brevicaudus*, *cairi*, *conjunctus* (4 races), *debilis*, *dissimilis*, *distanti*, *filiformis*, *fitzingeri*, *gestri*, *gracilior*, *labialis*, *longicaudus*, *macrorhynchus*, *macrurus*, *narirostris* (2 races), *natatrix*, *nigricans* (2 races), *occidentalis*, *reticulatus*, *rostratus*, *scutifrons* (2 races), *sundewalli*, *telloi*, and *variabilis* and *wilsoni*. Middle East and southwest Asia: *blanfordi* (2 races), *buri* and *hamulirostris*.

• **DEFINITION.** Adults of these worm-like burrowing snakes range from 123 to about 400 mm in total length. Body scales are cycloid, uniform in size, and usually in 14 (rarely 16) rows around the body. The skull is highly consolidated, with the maxilla, nasals, premaxilla, and palatine sutured to the braincase. Supratemporal, tabular and ectopterygoid are greatly reduced. Prefrontals, fenestra ovalis and columella are absent. Bones of palate and upper jaw are immobile; maxilla longitudinal, fused with premaxilla. Rigid connection present between palate and vomer. Parietal is sutured to the lateral border of the basisphenoid. Pterygoid is slender and rod-like, dissociated from quadrate-mandible articulation. Coronoid present in lower jaw; a wide gap is present between splenial and coronoid. Five elements of the lower jaw remain separate. Intramandibular articulation is present, resulting in a freely movable foremandible. The extremely shortened mandible is suspended by a long narrow quadrate descending obliquely forward. Postarticular process of mandible is absent. Teeth are confined to anterior half of the dorsal border of the dentary, the 4–5 teeth are only slightly recurved. Replacement teeth are positioned near vertical, with alternate replacement. Hyoid consists of basihyal only, with elongate posterior extensions. Internal vestiges of pelvic girdle are present, sometimes including a femur. Hypapophyses and neural spines are lacking throughout the length of the vertebral column. Optic nerve foramen present in frontal bone. Trigeminal foramen is divided by a vertical strut of the prootic. Levator anguli oris muscle present. Protractor and retractor (but not levator) pterygoidei muscles present. No indication of a tracheal lung or a left lung present; trachea extends well past the heart to near the mid-level of the body. Systemic arches join anterior to the tip of the ventricle. Two common carotid arteries present. Intercostal arteries are present but do not branch off dorsal aorta at each body segment. A single renal artery is present. Spleen is applied to the body of the pancreas, which has a folded splenic limb. The liver is divided

into a large number of lobes and overlaps the tip of the ventricle. Only 2 thymus glands lie just anterior to the heart. No trace of the left oviduct is present; all species are probably oviparous. Unusually large rectal caecum present. Single visual cell type (rod) present in retina. Pars nervosa of the pituitary is reduced and asymmetrical, expanded on the left hand side (Underwood, 1967; McDowell and Bogert, 1954; List, 1966). Hemipenes with "swollen, rounded basal area, with the sulcus spermaticus beginning at the mid-ventral line, curving around maximum curve of swollen area, and continuing along the surface lying away from the body of the snake . . ." (Peters and Orejas-Miranda, 1970). Other hemipenial structures are species variable. See KEY TO GENERA for other generic characteristics.

• **DESCRIPTIONS.** Good descriptions of the genus are given by Boulenger (1893), M. A. Smith (1943), and FitzSimons (1962). The hemipenis in various species has been described by Bailey and Carvalho (1946), Orejas-Miranda (1962), Orejas-Miranda and Achaval (1969), and Peters and Orejas-Miranda (1970). Other important anatomical descriptions are found in Underwood (1967), List (1966), McDowell and Bogert (1954), McDowell (1967), Brongersma (1958), Essex (1927), Fox (1965), Tihen (1945), Fox and Dessauer (1962), and Haas (1930, 1962, and 1973).

• **ILLUSTRATIONS.** Except for Jan and Sordelli (1860), no single source illustrates many species. Most regional surveys and original descriptions written in the 20th century include drawings of one or more views of the head scales. Because of the difficulty in distinguishing the shiny, close-fitting head scales, even under adequate magnification, photographs are usually of little value and rarely appear in publications.

• **DISTRIBUTION.** The genus ranges from the southwestern United States southward throughout most of Mexico, Middle and South America (excluding the higher elevations of the Andes) to Uruguay and southern coastal Peru; in the Caribbean on San Salvador Island (Bahamas), Hispaniola, and the Lesser Antilles; throughout Africa; Socotra Island; and in Asia from Turkey to northwest India.

• **FOSSIL RECORD.** Hoffstetter (1962) records *Leptotyphlops* fossils from the lower Eocene of Belgium and upper Miocene of France and Morocco.

• **PERTINENT LITERATURE.** Much of the published material for this genus refers to particular species. The natural history of most species is poorly known. For ecological references to U.S. species, see Hahn (1979a, 1979b). Visser (1966) describes color change and defensive behavior in *L. scutifrons*; Grant (1948) associations with termites; Fitch (1970) reproductive cycles; Vanzolini (1970) reports on climbing habits of several species; and Broadley and Watson (1976) character analysis, evolutionary trends, zoogeography, and ecology of South African species. Pearson (1966) makes serological and immunoelectrophoretic comparisons between the Leptotyphlopidae and other snake families. Werner (1959) reports the diploid chromosome number of *L. phillipsi* (= *macrorhynchus*) to be 36.

Orejas-Miranda (1970) assigned all Middle and South American forms to 5 species groups: *dulcis*, *albifrons*, *septemstriatus*, *melanotermus*, and *tesselatus*.

See Stimson et al. (1977) for a partial history of generic names.

Major reviews or checklists of regional leptotyphlopidae faunas are as follows: UNITED STATES—see Hahn (1979a, 1979b). MEXICO—Klauber, 1940; Murphy, 1975; Smith and Taylor, 1945. WEST INDIES—Thomas, 1965. MIDDLE AND SOUTH AMERICA—Dunn, 1944; Hoogmoed, 1977; Orejas-Miranda, 1967, 1970; Roze, 1952, 1966; Schmidt and Walker, 1943. AFRICA—Angel, 1933; Broadley and Cock, 1975; Broadley and Watson, 1976; FitzSimons, 1962; Gans and Laurent, 1965; Lesson, 1950; Loveridge, 1957; Pitman, 1974; Scortecci, 1928; Sweeney, 1961; Villiers, 1950; Witte, 1962. ASIA—Hahn, 1962; Minton, 1966; M. A. Smith, 1943.

• **KEY TO SPECIES.** See Orejas-Miranda (1970) for a key to the species occurring south of Mexico, Hahn (1978) for those of Asia and northeastern Africa, and Broadley and Watson (1976) for southern African forms. Now outdated keys to the entire genus were published by Werner (1917) and Boulenger (1893). The following key will differentiate those species found north of Colombia. Parenthetic numbers refer to published Catalogue accounts.

1. Supraoculars present 2
- Supraoculars absent 7
2. Supraoculars much larger than prefrontal or frontal; dorsal

- pattern dark brown, usually with distinct longitudinal light lines *L. goudoti*
 Supraocular approximately equal in size with prefrontal or frontal; dorsal pattern lacks distinct longitudinal light lines 3
 3. Twelve scale rows around tail *L. maximus*
 Ten scale rows around tail 4
 4. Postocular separates parietal from posterior supralabial
 *L. bressoni*
 No postocular; parietal in contact with posterior supralabial 5
 5. One supralabial anterior to ocular *L. dulcis* (231)
 Two supralabials anterior to ocular (anterior supralabials divided vertically) 6
 6. Ventral scales densely pigmented centrally, lightly pigmented peripherally, producing conspicuous reticulate pattern *L. macrolepis*
 Ventral scales not pigmented *L. dulcis* (231)
 7. Prefrontal absent; nasals elongated posteriorly to behind posterior border of eyes *L. nasalis*
 Prefrontal present; nasals do not extend posterior to the eye *L. humilis* (232)

• ETYMOLOGY. *Leptotyphlops* is derived from the Greek *leptos* meaning slender, *typhos* meaning blind, and *ops* meaning eye. The gender is masculine.

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