

## ORDERS EDENTATA, PHOLIDOTA, AND TUBULIDENTATA

In early classifications of mammals, anteaters, armadillos, sloths, pangolins, and aardvarks were commonly grouped together in a single order. Indeed, the aardvark and giant anteater were once placed in the same genus (*Myrmecophaga*). It is now clear, however, that these mammals form distinct assemblages and that, whereas pholidotes and edentates are relatively closely related and probably share a common ancestor, the affinities of the tubulidentates seem to be with the early ancestors of ungulates. Although there are morphological differences among living forms, the fossil history of the orders offers few clues to their relationships. Despite differences in degree of relatedness, the three orders are treated together here because of their superficial similarities, making it possible to separate them more effectively than if the orders were scattered throughout the book.

### ORDER EDENTATA

Living edentates are morphologically heterogeneous, consisting of arboreal and terrestrial forms of rather different features and habits. When they are considered together with fossil forms, however, the close relationships of the seemingly distinctive sloths, armadillos, and anteaters become apparent.

The name Edentata, meaning without teeth, is somewhat misleading because only anteaters (*Myrmecophagidae*) wholly lack teeth. However, incisors and canines are always absent in other members of the order, and remaining teeth are usually homodont, simple, and without enamel.

Only one of two suborders (*Xenarthra*) survives, so named because of accessory zygapophyses (*xenarthrum*) present on the thoracic and lumbar vertebra. This group evolved in South America and was widespread in North America until the end of the Pleistocene. In addition to modern forms, the suborder includes the extinct turtle-like glyptodonts and giant ground sloths.

#### Recognition Characters:

1. size small to medium-large (15-210 cm).
2. body covered with hair or scutes.
3. **forefoot with two or three principal digits, each bearing long claws; hind-foot with 2-5 digits.**
4. no incisors or canines.
5. **cheekteeth absent** (*Myrmecophagidae*), or if present, **homodont and without enamel.**
6. zygomatic arch complete (*Dasypodidae*) or incomplete (*Bradyrodidae*, *Myrmecophagidae*).
7. **jugal, lacrimal, and interparietal bones present.**
8. pterygoid bones variable, either separate (*Bradyrodidae*, *Dasypodidae*) or meeting at midline to form part of palate (*Myrmecophagidae*) (See Figs. 60-62).
9. **extra zygapophyses present on posterior thoracic and lumbar vertebrae.**

Compare with: Pholidota, Tubulidentata.

**Remark:** Characters of edentates were examined by Pocock (1924).

**KEY TO FAMILIES OF EDENTATA**

- 1a. Teeth present; jugal well developed; pterygoids usually separate and not forming part of palate (Figs. 61, 62).....2
- 1b. Teeth absent; jugal small; pterygoids meeting at midline, forming posterior portion of palate (Fig. 60)..... **MYRMECOPHAGIDAE** (p.134)
- 2a (1a). Body covered with horny scutes; limbs short; tail long; rostrum long, slender; teeth homodont..... **DASYPODIDAE** (p.138)
- 2b. Body well haired; limbs long; tail very short; rostrum very short; teeth heterodont ..... **BRADYPODIDAE** (p.136)

### Family MYRMECOPHAGIDAE (Anteaters)

This is the only family of edentates which has lost all teeth. The elongate snout, acute sense of smell, long tongue, and sharp, powerful claws equip these animals for tearing open termite and ant nests and for probing for and catching insects. The internal support for the worm-like protrusible tongue extends to the posterior portion of the sternum. The mouth is small—in *Tamandua*, the opening is reduced to the size of a pencil. The large salivary glands produce copious quantities of mucus that cause insects to adhere to the tongue.

Anteaters are arboreal (*Cyclopes*), terrestrial (*Myrmecophaga*), or both (*Tamandua*). Mobility of the two arboreal forms is assisted by a prehensile tail. They are diurnal (*Myrmecophaga*) or nocturnal

and are generally solitary. The diet is mostly termites, ants, and beetles.

Apparently one young is produced per breeding effort.

Three genera, 4 species; southern Mexico to Argentina.

#### Recognition Characters:

- **no teeth** (teeth present in other edentate families) (Fig. 60).
- 1. forelimbs and hindlimbs  $\pm$  equal in size.
- 2. **tongue very long, protrusible, worm-like.**
- 3. **skull elongate; rostrum very long and curving downward** (Fig. 60).
- 4. **zygomatic arch incomplete** (Fig. 60).
- 5. teeth as above.
- 6. premaxilla very small.
- 7. **jugal small.**

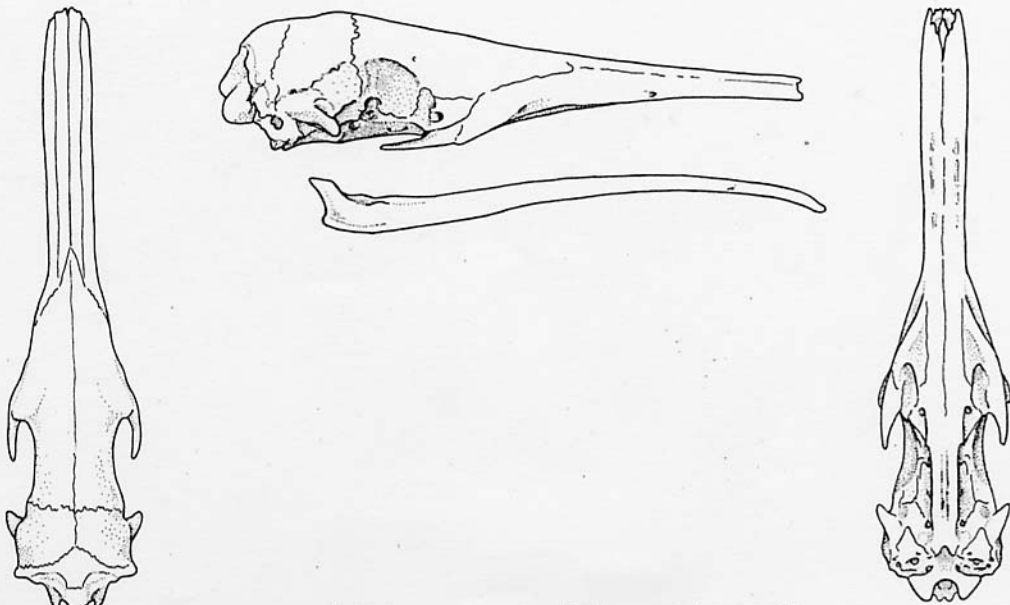


Figure 60. Skull of a myrmecophagid (*Myrmecophaga*, x 1/4).

8. pterygoids meeting at midline, extending palate posteriorly to auditory bullae (Fig. 60).

Dental formula: no teeth (Fig. 60).

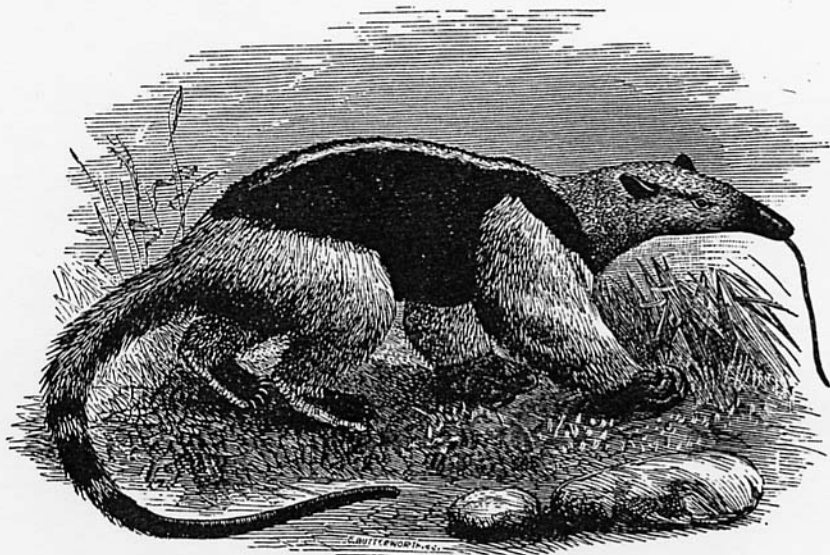
Compare with: Dasypodidae, Manidae (Pholidota), Tachyglossidae (Monotremata).

#### Genera:

*Cyclopes* (1) - *C. didactylus* is the silky anteater.

*Myrmecophaga* (1) - *M. tridactyla* is the giant anteater.

*Tamandua* (1) - *T. tetradactyla* is the tamandua or collared anteater.



Collared anteater.

## Family BRADYPODIDAE (Sloths)

These arboreal edentates are probably best known for their slow, methodical movements and upside-down posture. The ungainly appearance of sloths is accentuated by relatively long forelimbs, a rounded head with small face and inconspicuous ears, and a stubby tail. The narrow feet are syndactylous. The digits, together with the long claws, form a hook-like appendage. Bradypodids share a skeletal peculiarity with sirenians — the number of cervical vertebrae departs from the usual seven (in sloths it is six or nine).

The shaggy pelage of sloths contains an interesting community of organisms. Red and green algae, which reside on the surface of or in longitudinal grooves in the hairs, impart a greenish hue to the animal, especially on the body parts most exposed to moisture. In addition to providing protective coloration for the sloth, these

algae provide a source of food for small pyralidid moths that also inhabit the fur.

Members of this family are heterothermic. They are strictly leaf-eaters and are relatively long-lived. Births have been recorded at all times of the year. Females bear one young. *Bradypus* is sexually dimorphic—males have a conspicuous oval patch between the shoulder blades consisting of pale to orange hairs bordering a median dark stripe.

Two genera, 6 species; Central America to Argentina.

### Recognition Characters:

- **tail very small** (long in other edentates).
- **skull blocky, snout blunt** (both are long in other edentates) (Fig. 61).
  1. **forelimbs much longer than hindlimbs.**
  2. tongue unspecialized.
  3. skull as above.

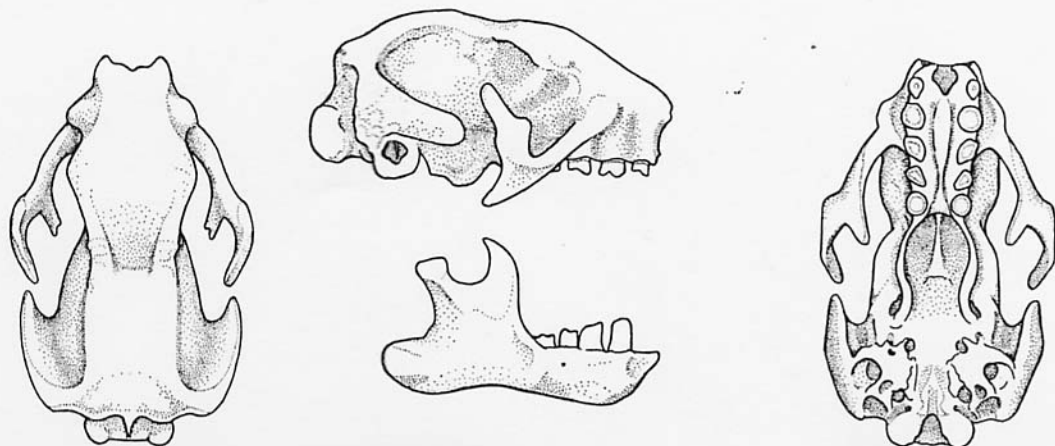


Figure 61. Skull of a bradypodid (*Bradypus*, x 2/3).

4. zygomatic arch incomplete.
5. **first pair of cheekteeth canine-like, otherwise homodont** (Fig. 61).
6. premaxilla very small.
7. jugal well developed.
8. pterygoids separate, not forming part of palate (Fig. 61).

Dental formula:  $\frac{0\ 0\ 5}{0\ 0\ 4-5} = 18-20$

(premolars and molars not distinguishable).

#### Genera:

*Bradypus* (4) - Three-toed sloths.

*Choloepus* (2) - Two-toed sloths.

**Remarks:** Bradypodid biology was summarized by Britton (1941). The life history of three-toed sloths was explored by Beebe (1926), and their anatomy has been described by Sonntag (1921).



Two-toed sloth

**Family DASYPODIDAE**  
(Armadillos)

Members of this family are the most widespread of the edentates. They are most common in arid or semi-arid grasslands and savannahs of the New World.

Armadillos are easily identified by the shell-like protective carapace covering the body. It consists of several plate-like shields covering the head, back, and rump which are separated by transverse bands. The shields and bands are composed of squarish bony scutes overlain by hardened epidermal tissue and connected by flexible skin. The banded portion of the shell contains 2-18 rings of scutes. The entire carapace is attached to the body by well-developed tegumentary muscles and connective tissue. It is supported by the axial skeleton. The degree of attachment

and support differs from species to species. Scutes are also present on the limbs and tail.

In many aspects of their morphology and life style, armadillos are similar to anteaters (p.134). The limbs are stout and are equipped with large curved claws (some armadillos walk wholly on these claws), the snout is usually long, and the tongue is long and protrusible. Teeth are present: they are all small, peg-like, and sometimes numerous (up to 100 total teeth in *Priodontes*).

Armadillos are terrestrial and diurnal or nocturnal. They occur singly, in pairs, or in small bands. They construct shallow or deep burrows, which they may share with several other individuals. Most are omnivorous, feeding on insects and other invertebrates, small vertebrates, and vegetation. Protective behavior includes

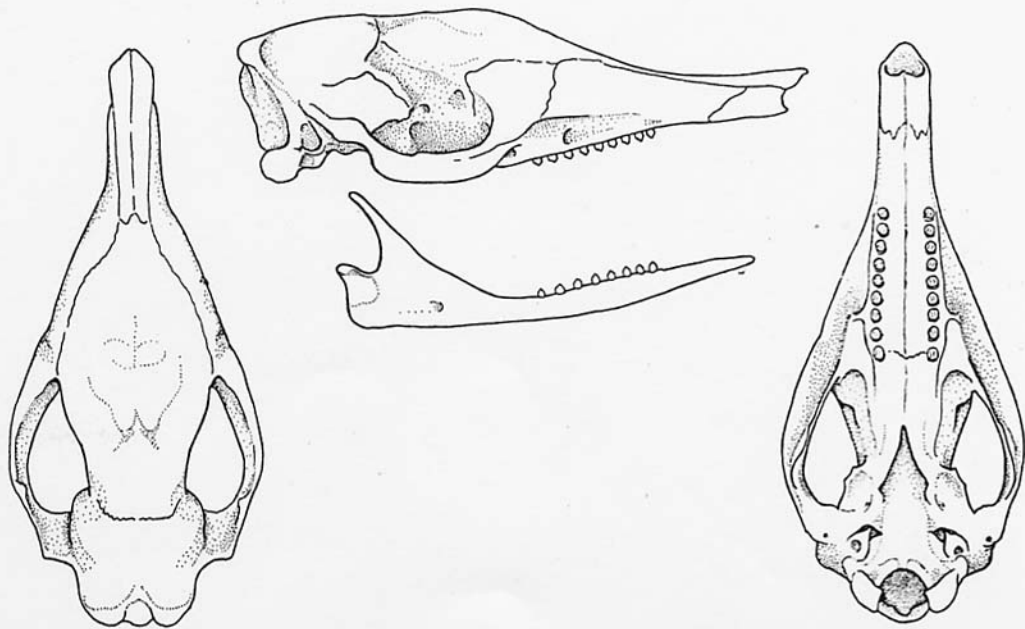


Figure 62. Skull of a dasypodid (*Dasypus*, x  $\frac{1}{4}$ ).

rolling up in a ball, wedging themselves in burrows, or simply crouching on the ground.

Reproduction in armadillos is peculiar. Females are polyembryonic; that is, all litter mates originate from division of a single zygote (Patterson, 1913). Up to a dozen identical offspring of the same sex are produced, although the usual number is one to four. Delayed implantation is also common.

Nine genera, 21 species; central United States to Argentina.

### Recognition Characters:

● **body covered with horny scutes** (body well-haired in other edentate families).

1. forelimbs and hindlimbs about equal in size.
2. tongue long and protrusible.
3. **skull elongate, flattened; rostrum elongate** (Fig. 62).
4. zygomatic arch complete.
5. **cheekteeth homodont**.
6. premaxilla well developed.
7. jugal well developed.
8. pterygoids usually separate, not forming part of palate (joined at mid-line in *Dasypus*) (Fig. 62).

Dental formula:  $\frac{0\ 0\ 7-25}{0\ 0\ 7-25} = 28-100$

(premolars and molars indistinguishable).

Compare with: Myrmecophagidae, Manidae (Pholidota).

### Representative Genera:

*Cabossous* (5) - Naked-tailed armadillos.

*Chlamyphorus* (1) - *C. truncatus* is the pygmy armadillo.

*Dasypus* (6) - Nine-banded armadillos.

*Priodontes* (1) - *P. giganteus* is the giant armadillo.

*Tolypeutes* (2) - Three-banded armadillos.

*Zaedyus* (1) - *Z. pichiy* is the pichi.

**Remark:** Taber (1945) studied the natural history of *Dasypus*.