

Dendrohyrax dorsalis. By Clyde Jones

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Dendrohyrax Gray, 1868

Dendrohyrax Gray, 1868:48. Type species *Hyrax arboreus* A. Smith, 1827, by subsequent designation (Sclater, 1900).

CONTEXT AND CONTENT. Order Hyracoidea, Family Procaviidae. The genus *Dendrohyrax* contains three living species. The following key was modified from Bothma (1971).

- 1 Fur long and soft; white spot absent under chin; nose covered with hair 2
Fur short and coarse; white spot under chin present; nose naked; dorsal spot yellowish-white, conspicuous; naked patch in dorsal spot 42 to 72 mm long; one pair of inguinal mammae; skull with postorbital bar complete; basal length of skull 96.0 to 117.0 mm; mean length of upper diastema 18.6 mm in males and 16.9 mm in females *D. dorsalis*
- 2(1) Dorsal spot creamy-white; naked patch in dorsal spot 23 to 30 mm long; one pair of inguinal mammae, infrequently a pectoral and an inguinal pair or a pectoral and two inguinal pairs; skull with postorbital bar either complete or with a narrow gap; basal length of skull 78.2 to 92.3 mm; mean length of upper diastema 15.8 mm in males and 15.2 in females *D. arboreus*
- Dorsal spot yellow- to russet-brown; naked patch in dorsal spot 20 to 40 mm long; one pair of inguinal mammae; skull with postorbital bar complete; basal length of skull 77.9 to 98.3 mm; mean length of upper diastema 15.2 mm in males and 16.1 in females *D. validus*

Dendrohyrax dorsalis (Fraser, 1854)

Hyrax dorsalis Fraser, 1854:99, see below.

Hyrax sylvestris Temminck, 1855:182, see below.

Dendrohyrax dorsalis Gray, 1868:48, first use of current name combination.

CONTEXT AND CONTENT. Context given in the generic summary above. Six subspecies are recognized (Bothma, 1971) as follows:

- D. d. dorsalis* (Fraser, 1854:99). Type locality Macias Nguema Biyogo.
- D. d. emini* Thomas (1887:440). Type locality Tingasi, Monbuttu, Zaire (*rubriventer* Brauer, *beniensis* Brauer, *congoensis* Brauer, and *brevimaculatus* Brauer are synonyms).
- D. d. latrator* (Thomas, 1910:285). Type locality Batempa, upper Sankuru River, south-central Zaire.
- D. d. marmota* (Thomas, 1901:88). Type locality Mengo, north of Entebbe, Uganda.
- D. d. nigricans* (Peters, 1879:10). Type locality Cabinda (*tessmanni* Brauer, *adametzi* Brauer, and *zenkeri* Brauer are synonyms).
- D. d. sylvestris* (Temminck, 1855:182). Type locality Guinea Coast (*stampflii* Jentink and *aschantiensis* Brauer are synonyms).

DIAGNOSIS. The relatively short and coarse fur, presence of a white spot beneath the chin, and the absence of hair on the rostrum apparently are the most useful characters for distinguishing *D. dorsalis* from other taxa of the genus (see key above). The crowns of cheekteeth are lower in *Dendrohyrax* than in other genera of hyraxes (Kowalski, 1976).

GENERAL CHARACTERS. Measurements of 14 adults in millimeters are: total length, 450 to 600; length of tail, 10 to 30; length of hind foot, 70 to 90; length of ear, 21 to 30; greatest length of skull, 92 to 110; depth of cranium, 28 to 35; breadth of cranium, 30 to 38; breadth of zygomata, 46 to 61; breadth of interorbital constriction, 18 to 25; breadth of palate, 14 to 19; length of palate, 46 to 56; length of maxillary toothrow, 32 to 41; length of diastema, 14 to 20. Weight in grams is 1850 to 4500.

Other general characteristics of the family and order were summarized by Hoffmeister (1967) and Kowalski (1976). The skull is illustrated in Figure 1. Black and white photographs of this species are in Hatt (1936), Rahm (1957), Roche (1960), and Walker *et al.* (1975). Drawings of *D. dorsalis* are in Dekeyser (1955) and Kingdon (1971).

DISTRIBUTION. This species occurs from Gambia to the Niger River in Nigeria (*D. d. sylvestris*), from the lower Niger River in Nigeria to the northern part of Angola (*D. d. nigricans*), in central Zaire (*D. d. latrator*), in northern and eastern Zaire (*D. d. emini*), and in northern Uganda (*D. d. marmota*). In addition, the species is found on the island of Macias Nguema Biyogo (*D. d. dorsalis*). The general range of the species is shown in Figure 2. The geographic limits of most of the subspecies are imperfectly known, especially in central Africa.

FOSSIL RECORD. There is no fossil record for *D. dorsalis*. However, four closely related genera in this family are known from Oligocene, Miocene, and Pliocene of Africa, southwestern Asia, and southern Europe. For discussions of the geological history and evolutionary trends of hyraxes, see Simpson (1945), Friant (1965), and Kowalski (1976).

FORM. Detailed morphological studies have not been made of *D. dorsalis*. Anatomical peculiarities of the genus include the absence of sweat glands and gall bladder. Arterial retia mirabilia are present in the limbs (Grassé, 1955). The limbs are mesaxonic. The foot pads are black, pliant, and with numerous ridges. The forefoot has four digits; the hind one has three digits. Except for the clawlike nail on the inner bifid digit of the hind foot, the nails are rounded and hooflike. The clavicle is absent. The vertebral formula is C 7, T 20-21, L 7-9, S 5-7, Cd 4-8. Two sacral vertebrae are fused to the ilium. The tail does not extend beyond the body.

The dental formula is $i \frac{1}{2}, c \frac{0}{0}, p \frac{4}{4}, m \frac{3}{3}$, total 34. The lower incisors are flattened, trifid, and serrated; the upper incisors are caniniform and triangular in cross section. The premolars are molariform. The cheekteeth are lophodont and resemble the teeth of rhinoceroses. For detailed descriptions of the cheekteeth of *Dendrohyrax*, see Friant (1965). The deciduous dentition is $i \frac{3}{3}, c \frac{1}{1}, p \frac{4}{4}$, total 32. The upper lip is cleft. The nose and upper lip form a short snout.

The uterus is bicornuate. The testes remain in the abdominal cavity. There is no os penis. The sperm of *D. dorsalis* was described and illustrated by Tuzet *et al.* (1957). Measurements of the sperm in microns are: length of head, 10; length of midpiece, 7; length of tail, 50 to 60. The sperm of this taxon resembles the sperm of monotremes and some marsupials.

Long sensory vibrissae are scattered throughout much of the pelage. Dorsal sebaceous glands are conspicuous and are surrounded by a patch of yellow or white fur. The eyes have umbraculæ. The stomach is simple. A sacculate ileocolic caecum is present, and long, pointed caecae are present on the ascending colon. The superficial body musculature of *D. dorsalis* was illustrated by Kingdon (1971).

FUNCTION. Richard (1964) presented an account of some of the climbing abilities of *D. dorsalis*, and noted that these animals could climb easily and quickly up the edge of an open door, as well as on the smooth trunk of a tree 50 cm in diameter. Captive animals have been observed climbing on vines and wires, as well as up door frames. The grip is strong, and the feet may be revolved on their axes to assume a position similar to supination. Captive animals used their teeth to help hold on to vines and wires.

Richard (1964) reported that before copulation a female produced a secretion from the dorsal gland that smelled like cinnamon. Captive animals rubbed the glandular region against trees, edges of doors, legs of chairs, and other objects. When disturbed, these animals exhibited pilo-erection of the hairs surrounding the dorsal gland, which exuded odoriferous secretions.

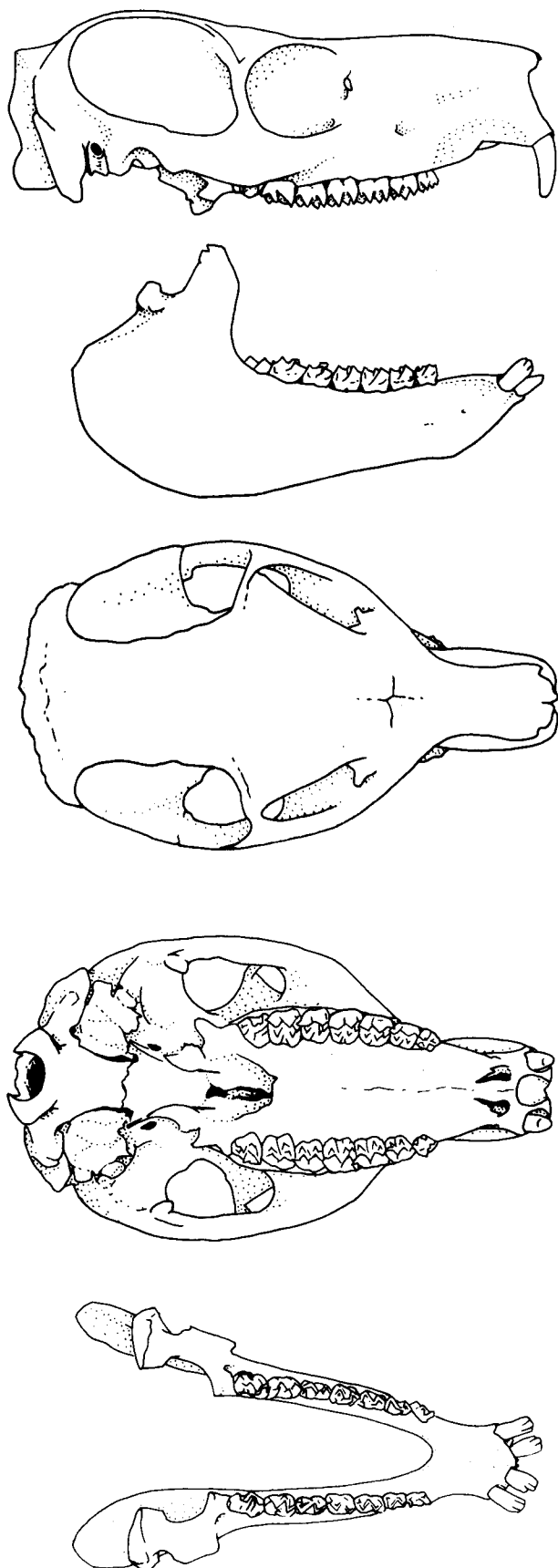


FIGURE 1. Views of the skull and mandible of *Dendrohyrax dorsalis* (USNM 512790). Illustration by Wilma Martin.



FIGURE 2. Distribution of *Dendrohyrax dorsalis*. For details about subspecies, see the section on distribution.

Because of the unique umbraculae, hyraxes apparently can look directly at the sun. In addition, the animals spend long periods of time with a fixed, starelike visage.

The lower incisors function as a comb for grooming. The inner digit of the hind foot is used to groom the fur also.

ONTOGENY AND REPRODUCTION. Spermatogenesis of *D. dorsalis* was described by Tuzet *et al.* (1957), whose data were taken from an animal obtained in February in the Ivory Coast. The gestation time apparently is about eight months. According to Kingdon (1971), both copulation and birth occur during the dry seasons. Birth of young is primarily during March and April in Gabon and Cameroun, and from May to August in the western and southern parts of Zaire. In the eastern parts of the geographic range of the species, young are born throughout the year (Kingdon, 1971). *Dendrohyrax dorsalis* produces either one or two, usually one, young (Roche, 1962). Members of this genus have smaller litter sizes than do other Hyracoidea. Sale (1969) has reviewed the information on breeding seasons and litter sizes of several species of hyraxes.

The young of *D. dorsalis* are precocious. A male born in captivity weighed 380 g (Roche, 1962). Mollaret (1962) gave weights of 200 g, 180 g, and 220 g for a male and two females born in captivity. Total lengths and weights of two- to five-day-old animals were 39.5 to 52.0 per cent and 19.4 to 23.0 per cent, respectively, of these measurements for adult females.

The information on growth presented herein is based on unpublished data obtained from two animals reared and maintained in captivity. The animals were obtained in the vicinity of Anduacaeng, Rio Muni (Republic of Equatorial Guinea) on 22 April 1967. No physical anomalies were noted, and the animals appeared normal, although captivity may alter the rate of growth. By 120 days of age, total lengths had reached adult proportions, and little growth occurred thereafter. Weights of young *D. dorsalis* increased steadily throughout the period of observation (figure 3). There were some differences in the rates of weight gains between the animals measured; one reached adult size by 120 days of age, whereas another did not attain adult proportions until it was more than 200 days old. The weights of the young tree hyraxes presented in Figure 3 are similar to those recorded by Roche (1962) from captive-born animals weighed at monthly intervals for five months. Young hyraxes apparently reach sexual maturity when they are more than one year of age (Hoffmeister, 1967).

Literature information on the longevity of *D. dorsalis* is not available. One of the aforementioned animals that was reared and maintained in captivity, however, lived for five and a half years.

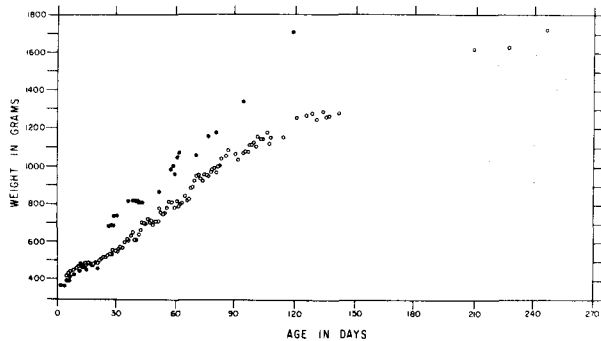


FIGURE 3. Weights of two young *Dendrohyrax dorsalis* reared in captivity.

ECOLOGY. This species occurs mostly from sea level to about 1500 m elevation. However, there are records from localities up to 3500 m (Malbrant and Maclatchy, 1949). The species inhabits upland and riverine forests within a vegetation type described as either tropical rain forest (Richards, 1952) or tropical closed forest (Clark, 1967). Forests with lianas contain more animals than do other habitats (Kingdon, 1971). Blancou (1958) placed *D. dorsalis* in ecological association with elephants, buffalo, bongos, red forest pigs, chevrotains, and several other antelopes as major mammalian components of the fauna of the dense humid equatorial forests.

Dendrohyrax dorsalis is arboreal. However, the animals frequently descend and move about on the ground.

The animals are herbivorous. Leaves, fruits, twigs, and bark, usually from the upper canopy, are consumed (Kingdon, 1971). Precise information on foods eaten by *D. dorsalis* is not available.

Nematodes (*Crossophorus collaris*, *Libystrongylus alberti*, *Hoplodontophorus flagellum*, *Theileriana brachylaima*) are known from *D. dorsalis* in West Africa (Dekeyser, 1955). No parasites were found on animals kept in captivity. Nothing else has been recorded on other parasites or diseases of *D. dorsalis*.

Predators include hawk eagles, leopards, golden cats, genets, servals, and pythons (Kingdon, 1971). In addition, this species throughout its geographic range is hunted by man for food and pelts.

BEHAVIOR. Members of this species are usually solitary, but groups of two and occasionally three animals can be found.

These animals each use a small area in the forest, usually centered around a single home tree (Kingdon, 1971). No other information on home range is available.

Dendrohyrax dorsalis is nocturnal, most activity apparently taking place shortly after dark and before dawn (Richard, 1964). Captive animals, however, fed during daylight hours.

Vocalizations of wild and captive *D. dorsalis* were described by Richard (1964) and Rahm (1969). The latter recorded vocalizations throughout the night from about 1800 to 0600 hrs, with most activities from 2000 to 2200 hrs, and a small burst of calls from about 0400 to 0500 hrs. I noted calls of wild *D. dorsalis* in the Republic of Equatorial Guinea from as early as 1637 hrs until 0630 hrs. Animals maintained in captivity vocalized mostly from 1835 to 0710 hrs; a few vocalizations were noted during the day, but these seemingly were associated with some disturbance to the animals. In Gabon some seasonal changes occurred with regard to the timing of vocal activities. In December most vocalizations were from 1900 to 2000 hrs, in January vocal activities were most intense at 2000 hrs, in February most calling occurred between 2200 and 2300 hrs, and in March most vocalizations were apparent at about 2400 hrs (Richard, 1964). Vocalizations are made by both sexes of *D. dorsalis*. These hyraxes frequently call from the same place. Richard (1964) attributed sexual and territorial functions to vocalizations. Kingdon (1971) noted that most vocalizations followed periods of intensive feeding. Sound spectrograms of individual vocal patterns of *D. dorsalis* were depicted by Rahm (1969).

Grooming was a major activity of the animals observed in captivity. Most scratching was with the inner digits of the hind feet. This was accomplished by rapid limb movements with the inner digits fully extended. The incisors were used frequently, and were moved through the pelage by rapid biting movements of the jaws. Captive animals frequently groomed each other with their incisors, especially on the face and neck.

Several postures have been described for *D. dorsalis*, and some postures are illustrated in the reports by Rahm (1969) and Kingdon (1971). Captive animals of both sexes occasionally exhibited aggression to other animals by making short forward rushes and rapidly snapping the jaws together. This behavior usually was accompanied by stamping the feet, pilo-erection, especially around the dorsal gland, pronounced arching of the back, and stiff-legged movements. In addition, secretions were emitted from the dorsal gland.

As mentioned previously, captive animals rubbed the dorsal gland against various objects, such as edges of doors and trees. Kingdon (1971) suggested that the dorsal gland was important for marking territories and home ranges, as well as for sexual identification.

No information is available on the relationships between young and adult *D. dorsalis* in the wild. In the other genera of hyraxes, young animals frequently ride on the backs of adults. In captivity, young animals rested on top of adults, but none were seen being carried about. The period of lactation is not known for *D. dorsalis*.

When feeding, the head of the animal is usually turned to the side, food is taken at the side of the mouth, and bitten off by the cheekteeth. The long maxillary toothrow allows large amounts of food to be sheared with each bite. Food is chewed with side to side motions of the jaws. Hyraxes do not ruminate (Matthews, 1971). However, captive *D. dorsalis* frequently made chewing-like movements of the jaws, especially when at rest.

Sometimes the forefeet are used to pin down a food item. No other manipulation of either food or other materials with the forefeet has been noted.

Like other genera of hyraxes, *Dendrohyrax* uses selected places for defecation for a considerable period of time. Piles of excrement accumulate at the bases of trees (Kingdon, 1971). My captive animals frequently defecated in selected places also, usually in toilet basins (whenever available).

GENETICS. The karyotype has not been published for *D. dorsalis*. For some general comments on chromosomes and illustrations of cells during spermatogenesis, see the article by Tuzet *et al.* (1957).

REMARKS. Vernacular names in the literature, in addition to tree hyrax, include tree dassie, tree coney, and western tree dassie; the latter was used by Bothma (1971).

Subspecific boundaries are not well established for *D. dorsalis*, and the validity of some named taxa is questionable. The relationship between the genera of hyraxes is confused and controversial. The affinities of the Hyracoidea with other orders are obscure. For information on this subject, consult the works by Simpson (1945), Sale (1960), and Friant (1965).

I am grateful to Urs Rahm, Gordon Corbet, Hendrik Höeck, and Henry Setzer for providing stimulating discussions and information about *D. dorsalis*.

The generic name refers to the tree dwelling habit of the animal. The trivial name refers to the peculiar gland and corresponding pelage on the back.

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- C. JONES, NATIONAL FISH AND WILDLIFE LABORATORY, FISH AND WILDLIFE SERVICE, NATIONAL MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. 20560.