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Mellivora capensis.

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Mellivora Storr, 1780

Viverra: Schreber, 1776:43. Part, not *Viverra*: Gmelin, 1788.
Mellivora Storr, 1780:34. Type species *Viverra ratel* Sparrman, 1778 (= *Viverra capensis* Schreber, 1776) by designation (Melville and Smith 1987; Sclater 1900).
Ursus Cuvier, 1798:112. Type species *Ursus mellivorus*.
Meles: Thunberg, 1811:306. Part, not *Meles* Linnaeus (vide Sclater 1900).
Gulo Desmarest, 1820:176. Type species *Gulo capensis* (= *Gulo mellivora* Smith).
Ratellus Gray, 1827:118. Based on *Viverra capensis* Schreber.
Ratelus Bennett, 1830:13. Type species *Ratelus mellivorus* Bennett. Variant spelling of *Ratellus*.
Ursitaxus Hodgson, 1836:60. Type species *Ursitaxus inauritus*.
Melitoryx Gloger, 1841:57. Based on *Viverra capensis* Schreber.
Lipotus Sundevall, 1843:199. Based on *Ursus mellivorus* Cuvier.

CONTEXT AND CONTENT. Order Carnivora, suborder Fissipedia, family Mustelidae, subfamily Mellivorinae. The genus is monotypic (Wozencraft 1993).

Mellivora capensis (Schreber, 1776)

Honey Badger

Viverra capensis Schreber, 1776:plate 125. Type locality "Vorgebirge der guten Hofnung" restricted to Cape of Good Hope, Cape Province, South Africa.
Viverra ratel Sparrman, 1777:147. Type locality "Cape of Good Hope" (vide Sclater 1900).
Ursus indicus Kerr, 1792:118. Type locality "India to Turkestan."
Ursus mellivorus Cuvier, 1798:112. Type locality "Cape of Good Hope."
Meles mellivora: Thunberg, 1811:306. Name combination (vide Sclater 1900).
Gulo capensis Desmarest, 1820:176. Type locality "Vicinity of Cape of Good Hope."
Gulo mellivora Smith, 1826:17. Type locality unknown (vide Sclater 1900).
Ratelus mellivorus Bennett, 1830:13. Type locality "Madras."
Ratellus typicus Smith, 1833:83. Renaming of *Viverra capensis* Schreber, 1776.
Ratelus indicus: Burton, 1835:113. Type locality "Upper Provinces of Bengal."
Ursitaxus inauritus Hodgson, 1836:60. Type locality "Nepal, lower hilly region."
Lipotus mellivorus Sundevall, 1842:211. Type locality "Sennaar."
Mellivora ratel Horsfield, 1851:120. Type locality "India."
Mellivora ratelus Fraser, 1862:9. Type locality "India."
Mellivora leuconota Sclater, 1867:98. Type locality "West Africa."
Mellivora cottoni Lydekker, 1906:112. Type locality "eastern fringe of the Ituri Forest to a point fifteen miles west of Mawampi and thence south-east to Boni, at elevations of between 2100 and 2950 feet above sea-level" Zaire.
Mellivora concisa Thomas and Wroughton, 1907:376. Type locality "Yo, Lake Chad" Chad.
Mellivora signata Pocock, 1909:394. Type locality "about 100 miles inland of Sierra Leone."
Mellivora abyssinica Hollister, 1910:1. Type locality "vicinity of Adis Ababa, Abyssinia"; restricted to "Suksukki River, a small stream which connects Lake Zwai with Lake Hora Schalo; about midway between the two lakes, which with others lie between 7° and 8° north latitude, and between 38° and 39° longitude east. Altitude, 4,500 to 5,000 feet" Ethiopia by Hollister (1911:37).
Mellivora sagulata Hollister, 1910:2. Type locality "Mount Kilimanjaro, East Africa, at 5,000 feet altitude" Tanzania.
Mellivora brockmani Wroughton and Cheesman, 1920:197. Type locality "Upper Sheikh, Somaliland. Alt. 4300 ft" Somalia.
Mellivora wilsoni Cheesman, 1920:335. Type locality "Baksai, Tyb River, Iraq-Persian Frontier."
Mellivora maxwelli Thomas, 1923:340. Type locality "Lorian Swamp" Kenya.
Mellivora buchanani Thomas, 1925:190. Type locality "The Elmiki River. Asben. 2100 ft. Aïr, Niger."
Mellivora capensis vernayi Roberts, 1932:7. Type locality "Kwai, Mababe Flats, N. Bechuanaland."

CONTEXT AND CONTENT. Context as above. Originally, 16 subspecies were described for *M. capensis* (Allen 1939; Ellerman and Morrison-Scott 1966), currently 10 are recognized (Baryshnikov 2000).

M. c. buechneri Baryshnikov, 2000:45. Type locality "Tedzhen, Central Asia (Turkmenistan)."
M. c. capensis (Schreber, 1776:plate 125), see above (*mellivorus* Cuvier, *ratel* Sparrman, *typicus* Smith, *vernayi* Roberts are synonyms).
M. c. concisa Thomas and Wroughton, 1907:376, see above (*buchanani* Thomas and *brockmani* Wroughton and Cheesman 1920 are synonyms).
M. c. cottoni Lydekker, 1906:112, see above (*sagulata* Hollister is a synonym).
M. c. inaurita (Hodgson, 1836:60), see above.
M. c. indica (Kerr, 1792:188), see above.
M. c. maxwelli Thomas, 1923:340, see above.
M. c. pumilio Pocock, 1946:314. Type locality "The Hadramaut, South Arabia" Yemen.
M. c. signata Pocock, 1909:394, see above.
M. c. wilsoni Cheesman, 1920:335, see above.

DIAGNOSIS. *Mellivora capensis* (Fig. 1) is a large mustelid (ca. 9 kg) with a coarse gray mantle that extends from crown of head to base of tail. Few sympatric species can be confused with honey badgers. Striped weasels (*Poecilogale albinucha*) are much smaller (ca. 0.25 kg), with sinuous body forms, 4 white longitudinal dorsal stripes, and fluffy tails; zorillas (*Ictonyx striatus*) also are smaller (ca. 1.1 kg), with a mixture of white spots and lines on the heads, 4 white dorsal stripes, long hairs, and bushy tails (Alden et al. 1995). A coarse gray mantle, often separated from black underparts by a horizontal white line, is distinctive and differentiates

FIG. 1. An adult *Mellivora capensis capensis* from the Mata Mata Camp, Kalahari Gemsbok National Park, Upington, South Africa. Photograph by K. Begg.

M. capensis from similar, nonsympatric species (e.g., European badgers, *Meles meles*).

GENERAL CHARACTERS. Pelage is a variable mixture of white and black hairs, from posterior canthus of eyes, across top of head along dorsum, to base of tail. Color of dorsal stripe is white, gray, or gray-brown. Some black hairs are thinly scattered along middle of dorsum. Coat consists of coarse, straight hairs (Burton 1835; Sclater 1900). Tail has gray or white tip (De Winton 1902). Honey badgers in Africa and Arabian countries have pure white band ca. 25 mm in breadth, dividing gray dorsum from black venter. This white margin forms concave line across face, running from forehead, ca. 12–15 mm above corner of eye, along upper margin of ear. Margin descends backward through neck, shoulder, ribs, flanks, and trunk, and then ascends to base of tail. Margin is white anteriorly but becomes grayer toward tail. Young honey badgers lack dividing line, as do honey badgers in Asia (Finn 1929; Sclater 1900). Color pattern of honey badgers, with dorsum paler than ventrum, may be primitive and functions both as warning to enemies and as concealment to secure prey (Pocock 1908).

Skin is thick and loose, with coarse hair dorsally and scarce hair ventrally. Length of hair is ca. 10 mm on head, 26–35 mm on dorsum, 40–45 mm on flanks, and ≤70 mm on upper part of hind limbs, rump, and tail (Cheesman 1920; Smithers 1983; Wroughton and Cheesman 1920). Diameter of hairs is 0.04–0.15 mm. Straight bristle hairs dominate body, whereas finer hairs comprise underfur. Both types usually are of 1 color throughout their length, namely, all black or all white. However, some white bristle hairs have black tips, and some black bristle hairs have a white band of ca. 5 mm near tip. Underfur generally is sparse, with a length of 18–27 mm (Rosevear 1974). Hairs on posterior part of thighs are long and may form tufts. Hairs on front of forelegs course directly across limb. On sides of neck, layer of black hairs is vertical, meeting perpendicular to white ones, which are longitudinal. Around opening of ears is a circular ring of hairs, ca. 13 mm in breadth. Face and jaws are sparsely haired. A few long black hairs are scattered on chest, belly, and undersurfaces of extremities; however, skin is not concealed. A naked line occurs along inferior surface of tail. Epidermis around anus is also naked (Burton 1835). Width of dorsal band is as follows: 100 mm on head between ears; 90 mm on neck; 150 mm on shoulders; 220 mm at middle of dorsum; 234 mm on posterior part of dorsum (Ognev 1962).

In honey badgers, coat may vary considerably with seasons in the Himalayan Mountains. In winter, underwool is present, and contour hairs of upper surface are abundant and ≤40 mm long. Also, heel of hind foot may be overgrown with hair. These hairs thin out during molting, and underfur disappears completely so that skin is largely exposed in summer, when coat is ca. 16 mm long (Pocock 1941). In Africa, honey badgers lack underwool (De Winton 1902).

As honey badgers age, dorsum generally becomes saturated with black hair, making pelage darker. Head does not darken with age (Pocock 1941; Shortridge 1934). Coat color of *M. capensis* is not consistent throughout its range and may be influenced by season, wear, or stain from soil (Hollister 1918; Smithers 1983).

External ear does not have definite laminate pinna standing away from head. Cavities of ear are surrounded above and behind by thickening of integument, which forms a hard ridge. Supratragus consists of oblique ridge. Opposite the ridges is a small raised tubercle, which is a remnant of the tragus and antitragus. A bursa is not present. Rudiments of ear lobes occur around meatus externus; however, they are not visible (Burton 1835; Pocock 1920). An oblique convergence of the margins of the ear closes the opening of the ear when honey badgers dig (Kingdon 1977).

Eyes are diminutive. Maximum distance between canthi is <13 mm. This opening leaves little space for eye (Burton 1835). Small and deep-set eyes are longsighted, black, and reflect light at night (Fitzsimons 1919; Jeannin 1936).

Nose is brown (Jeannin 1936). Wide rhinarium has well-defined area encircling nostrils below and laterally. Upper lip is shallow and lacks philtrum (gutter) and median groove, and infranarial portions are somewhat deep, causing nostrils to be much nearer to its lower than to its upper edge. Lateral slits are short, and upper surface of lip is completely naked. Interramal tuft of facial vibrassae may be absent (Pocock 1920, 1946). Tongue has sharp papillae pointing to rear of mouth (Rosevear 1974).

Neck and shoulders are muscular. Forefeet are broad with long, powerful claws, whereas hind feet are more restricted with small claws. Tail is short, cylindrical, and bushy. Two anal glands and 4 mammae are present (Burton 1835; Kingdon 1997; Sclater 1900).

FIG. 2. Dorsal, ventral, and lateral views of cranial and lateral view of mandible of *Mellivora capensis* from Gaucha, South West Africa (male, United States National Museum of Natural History 296107). Greatest length of cranium is 152.4 mm. Photographs by T. L. Best.

Average body measurements (in mm, with parenthetical range and *n*) for African honey badgers for males and females, respectively, are: total length of body, 977 (733–950, 11), 908 (870–960, 6); length of tail, 196 (143–230, 11), 206 (185–225, 6); mass (in kg), 9.2 (7.7–10.5, 9), 8.9 (6.2–13.6, 5—Allen 1924; K. Begg, in litt.; Smithers 1971, 1983; Thomas and Wroughton 1907; Wroughton and Cheesman 1920). Average measurements (in mm, with parenthetical range and *n*) for Asian honey badgers for males and females, respectively, are: total length of body, 892 (889–898, 3), 831 (812–927, 4); length of tail, 173 (152–188, 3), 174 (152–190, 4); mass (in kg), 8.4 (8.2–8.6, 2), 6.4 (*n* = 1—Cheesman 1920; Dunbar-Brander 1927; Harrison 1968; Pocock 1941; Smithers 1971, 1983).

Skull (Fig. 2) is massive with a wide base, short postorbital processes, and robust teeth. Average skull measurements (in mm, with parenthetical range and *n*) of African honey badgers for males

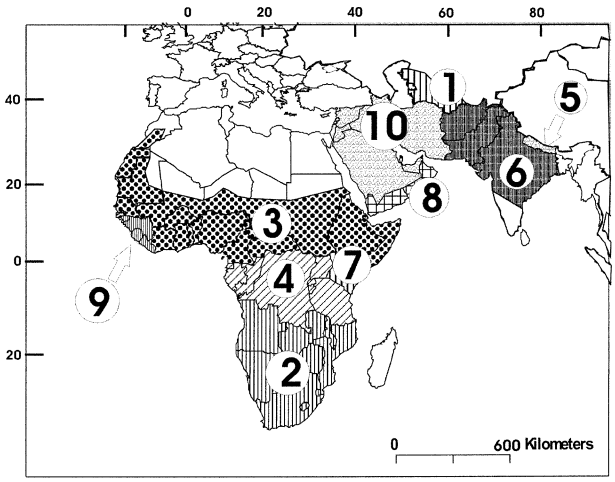

FIG. 3. Distribution of *Mellivora capensis* in Africa and southwestern Asia (Baryshnikov 2000): 1, *M. c. buechneri*; 2, *M. c. capensis*; 3, *M. c. concisa*; 4, *M. c. cottoni*; 5, *M. c. inaurita*; 6, *M. c. indica*; 7, *M. c. maxwelli*; 8, *M. c. pumilio*; 9, *M. c. signata*; 10, *M. c. wilsoni*.

and females, respectively, are: condylobasal length, 141 (128–152, 3), 126 (118–133, 2); palatal length, 69 (63–72, 3), 43 (33–53, 2); zygomatic breadth, 88 (86–91, 3), 68 (64–75, 3); least postorbital breadth, no data, 32 (32–33, 3—Allen 1924; De Winton 1902; Hollister 1910; Roberts 1932; Thomas 1923; Thomas and Wroughton 1907; Wroughton and Cheesman 1920). Average skull measurements (in mm, with parenthetical range and *n*) of Asian honey badgers for males and females, respectively, are: condylobasal length, 134 (119–145, 11), 125 (115–134, 10); palatal length, 59 (55–62, 15), 56 (50–60, 13); zygomatic breadth, 78 (65–86, 14), 74 (67–80, 12); least postorbital breadth, 30 (24–35, 15), 30 (27–33, 13—Baryshnikov 2000).

DISTRIBUTION. *Mellivora capensis* ranges from the Cape Province in South Africa north to Sudan, Ethiopia, and Somalia on the east and to Niger and Morocco in the west. Honey badgers occur throughout the Middle East as far north as Turkmenistan and southwest Kazakhstan, then eastward to India and Nepal (Fig. 3). In the Indian subcontinent, they are absent from the Malabar Coast, the lower Bengal, and Ceylon (Finn 1929). In Africa, they are absent from the Central Sahara Desert, the Mediterranean littoral, the Nile valley (Egypt), and the Orange Free State (South Africa—Kingdon 1997). Honey badgers occur from sea level (Drake-Brockman 1910) to 4,050 m (Sillero-Zubiri 1996).

FOSSIL RECORD. *Mellivora* has probably been in Africa since late Miocene (12 million years ago). Oldest record of *M. capensis* is ca. 10 million years old, from Ngorora Formation in Kenya (Hendey 1978). Most fossil remains date from the Pleistocene times. *Mellivora benfieldi* described from Langebaanweg, South Africa, may be the most ancestral form to extant species, dating from the late Miocene and early Pliocene (3.5–7 million years ago). *Eomellivora* and *Promellivora* are fossil species from Asia and most likely are not related to *Mellivora* (Hendey 1978). Milk teeth of *Mellivora* and permanent teeth of *Galictis* show morphological resemblance. *Galictis* and *Mellivora* may have had a common ancestor that once inhabited Asia. In middle Miocene times, mellivorines may have arrived from India via Arabia to Africa just before the Red Sea rift opened (Lydekker 1912; Savage 1978).

FORM AND FUNCTION. Dental formula is i 3/3, c 1/1, p 3/3, m 1/1, total 32 (Sclater 1900). Teeth are trenchant (Pocock 1941). *Mellivora capensis* usually lacks m2; 1 specimen retained an m2 on the left side; this m2 was small and came into use before the p3 fully protruded (Lydekker 1912). I3 differs from I/i 1 and 2, in being stronger, 3 times larger, and curved inward; I3 resembles C/c. Upper canine has tubercle projecting lingually. Upper carnassial has anterior inner cusp. A wide cingulum and a small-outer and a large-inner rounded lobe characterize M1. Lower carnassial lacks a metaconid. Premolars increase in size from front to back (Burton 1835; Pocock 1922; Sclater 1900). The large P2 has 2 roots and is somewhat displaced from toothrow toward internal side of corresponding canine. The p3 bears a fairly large internal cusp that occupies one-half the length of tooth. Denticles of p3 are disposed much more externally than those of remaining lower teeth, and they diverge greatly when jaws are closed (Ognev 1962). The p3 of milk dentition has inner tubercle placed near middle of blade (Lydekker 1912). Mellivorines ($n = 19$) show high degree of teeth abrasion. The omnivorous diet of honey badgers probably causes crowns of molars to be ground away, nearly down to roots (Herán 1971).

An extremely wide base and short frontal postorbital process characterize the massive skull. Before reaching maturity, skull sutures close (De Winton 1902). Lower jaw is held in place by pre- and postglenoid processes (Sclater 1900). Mastoid processes form broad rims near large external auditory meatus and fuse partly with the occipital. Palate is extremely short and broad. Mastoid processes are compressed dorsoventrally, and paroccipital processes are massive (Ognev 1962). Postglenoid foramen is intermediately positioned in front of auditory bulla (Pocock 1921). Posterior lacerate foramina are small but somewhat larger than middle lacerate foramina. Auditory bullae protrude far anteriorly, approaching the postglenoid processes (Ognev 1962). Auditory bullae are pronounced, oval, thick-walled, and rough on the surface. Carotid foramen is conspicuous near middle of medial border of bulla (Flower 1869). Cavity of bulla is partially divided by an arcuate septum into anterior and posterior chambers (Pocock 1921). Rostrum is short and broad, and nasal turbinals are complex. Skulls have a wide range of size, irrespective of age (Rosevear 1974).

Skulls of males are larger. A confluence of temporal ridges on crown of skull forms a definite sagittal crest usually 5–6 mm high posterior. It extends as far forward as postorbital constriction, ranging in width from 6 to 18 mm. In skulls of females, temporal ridges on crown never coalesce to form a definite sagittal crest. Skulls of females are recognized by presence of widely separated temporal ridges (Pocock 1941).

An inward-flaring greater tuberosity and a peaked dorsal surface characterize the calcaneum. It has a smooth posterior articular surface, and cuboid surface is visible from the dorsal aspect (Stains 1976).

Broad feet have large carpal and metatarsal pads in contact with plantar pads. Pollex is short. Forefoot is shorter and wider than hind foot. Digits of forefoot are spread unevenly; distance between digits 1 and 2 is greater than that between digits 2, 3, and 4. The latter are tightly attached by extended webbing along edges of digital pads. Digit 5 has more freedom of movement. Plantar pad is a large, almost semicircular mass, with 4 ill-defined elements. A deep integumental groove separates it from the 2 carpal pads. External carpal pad is a large subspherical mass, at least as long and half as wide as plantar pad. Internal carpal pad is smaller and differs in smoothness from the rest of the pads, which are coriaceous. Underside of forefoot is hairless (Pocock 1920, 1922). The 5 toes are armed with enormous claws. Average length of nails is ca. 32 mm. The middle one is longest, ca. 38 mm, and the smallest outer one is <25 mm. Thick nail is rounded at the edges, with a concave undersurface. Edge is reduced to a line, except near tip, where laminae separate. Lateral surfaces of both nails and toes are flat to adapt them for accurate apposition to each other. Therefore, when honey badgers dig, forefoot shapes tightly into broad and powerful spade (Burton 1835; Sclater 1900).

Hind foot is longer and narrower than forefoot and has short claws. Extending along the midline, halfway between plantar pad and heel, is a single large metatarsal pad. Integument of the hind foot is naked and wrinkled. Pads of digits 3 and 4 are fused proximally (Pocock 1920). Pads of digits 1, 2, and 5 are free. Toes are webbed. On undersurface of nails, laminae are separated and form a deep oval fossa between them. These claws do not reach the ground (Burton 1835; Pocock 1922; Sclater 1900). Length of claws on hind feet is ca. 15 mm (Ognev 1962). Carpal vibrassae are reduced to a small wartlike swelling on the skin, which houses tactile nerve endings (Pocock 1922).

Skin is tough, thick, and loose, preventing a predator from firmly grasping it and allowing honey badgers to turn in their skin and bite the attacker (Blumenbach 1825; Fitzsimons 1919; Sclater 1900). Skin is impervious to stings of bees, fangs of snakes, and teeth of dogs (Blumenbach 1825; Stevenson-Hamilton 1947). Near

the throat, skin is 6 mm thick (Kingdon 1977). Only the underparts have thin skin (Fitzsimons 1919).

Two anal glands lie obliquely backward from the anus, deep within surrounding tissue near the scrotum. Each anal gland measures ca. 30 by 20 mm. Glands open upon a papilla or nipple, just within the anal orifice. External portion of glands consists of spongy tissue traversed by a narrow passage to the aperture on the papilla, which is the secreting area. Internal or adoral portion forms a hollow semioval space, which may act as a reservoir for storage of ejectable fluid. Secretion is yellow and looks similar to liquid mustard, and its smell can be perceived at a distance of ≥45 m (Pocock 1909, 1946). Odor of fluid has a heavy stench (Matschie 1895) but is less sharp than that of striped polecat (*I. striatus*—Fitzsimons 1919; Sclater 1900). Anal pouch is everted whenever honey badgers become excited (Kingdon 1977); fluid is dribbled, not squirted (Estes 1991).

Vulva is tapered at each end, has a vertical slitlike opening (Sclater 1900), and is situated ca. 12 mm anterior to anus (Pocock 1946). Urinary and genital openings and clitoris are enveloped by 2 labia. Females have 2 pairs of mammae (Sclater 1900).

Prepuce is situated significantly in front of scrotum. Penis has a short, stout baculum that is nearly straight and smooth. Ventrally, os penis has a slight ridge near the head, and proximally it is rounded like a club. Proximal end is thick and wide, forming an almost cup-like distal head with a ventral slit. Apex is sharply curled upward and transversely expanded into a hollowed, somewhat basin-shaped disk. Rim of disk is interrupted in front by a channel, which is continued as a groove down apex of bone. Measurements (in mm) of 1 baculum of an adult honey badger are: length, 61; height at proximal end, 9; height at distal end, 5; width of proximal end, 7; dimensions of disk, 15 by 10 (Didier 1947; Pocock 1920).

ONTOGENY AND REPRODUCTION. Mating occurs throughout the year (Estes 1991; Smithers 1971; Yaniv and Golani 1987). Gestation period is recorded from 6 weeks (Yaniv and Golani 1987) to ca. 6 months (Shortridge 1934). One or 2 young are born per litter (Shortridge 1934; Yaniv and Golani 1987). They are born and reared in burrows (Shortridge 1934) and may be carried in the mouth (Rosevear 1974).

At 2 days of age, 1 captive honey badger weighed ca. 0.23 kg, was hairless except for a few hairs on the face, and had its eyes shut. In 3 months, the young had fully developed an adult pelage with the white dividing line clearly defined (Anonymous 1973). Claws were fully formed on each foot, front ones measuring 13 mm at 4 weeks of age. Eyes opened at 33 days of age. Teeth began erupting at 36 days and were fully developed at >3 months. When 2 days old, length of head and body measured 197 mm, length of tail was 38 mm, and at ca. 6 months it was fully grown. It uttered squeaks and low guttural sounds during the first weeks, usually at feeding time. Vocalization changed to deep, drawn-out, ominous growls at 10 weeks. Attempts at walking progressed from a swimming motion, using all 4 legs at age 2–3 weeks, to a forward-dragging movement by the front legs at age 5 weeks, and finally to a trot similar to that of an adult at 8 weeks. Climbing started at 10 weeks (Johnstone-Scott 1975).

ECOLOGY. Honey badgers occur in diverse habitats, including deep forests; subtropical dry evergreen forests; tropical thorn forests; open *Acacia*, *Combretum*, and *Terminalia* woodlands; open riparian (dominated by *Acacia albida*) woodland; Tarâi or marshes; floodplain grasslands (dominated by *Vetivaria nigritana*); bushveld; afro-alpine steppes ($T \geq -15°C$); rocky hills and kopjes; *Rhigozum* scrub sandveld; savannah; dry swamps; waterless sandplains; coastal sandveld; and deserts (Marlow 1983; Shortridge 1934; Sillero-Zubiri 1996; Smithers 1971; Stuart 1981). They tolerate habitats with a rainfall of >2,000 mm annually as well as arid areas with <100 mm annual rainfall (Smithers 1983).

Honey badgers are omnivorous and feed on insects, amphibians, reptiles, birds, and mammals, as well as roots, bulbs, berries, and fruits (such as ber, *Zizyphus jubata*—Roberts 1977). Favorite foods are honey and larvae of honeybees (Hymenoptera). However, the adaptation to burrowing, together with the abundance of subterranean animals found in 6 stomachs, suggests that honey is only a secondary food (Smithers 1971). Consumption of honey may be seasonal because it is most widely available in drier months of the year (Kingdon 1977). In October and November, honey badgers in the Kalahari Gemsbok National Park, South Africa, ate mainly rodents, which occurred in 60% of the feces and made up ca. 30% of the volume of food (Kruuk and Mills 1983). Excess food may be cached in a lair (Fitzsimons 1919). When living close to humans, honey badgers are widely blamed for breaking into poultry houses and apiaries (Matschie 1895; Smithers 1971). Ostrich chicks (Fitzsimons 1919), springhares (*Pedetes capensis*), suricates (*Suricata suricatta*), as well as domestic sheep and goats, are also eaten (Hoesch 1961). In northern India, honey badgers were historically accused of digging out dead bodies and eating carrion (Burton 1835).

A case of Batesian mimicry may occur between infant cheetahs (*Acinonyx jubatus*) and adult honey badgers. Resemblance in coat color, silver gray to nearly white back with dark lower parts, may protect young cheetahs from predation. Aggressive species that fear honey badgers leave young of cheetahs alone (Eaton 1976).

Mellivora capensis may harbor ancylostomids, helminths, physalopterids, rictularids, and trichostrongylids. The nematode *Artyfechinostomum sufrartyfex* and trematodes *Strongyloides akbari* and *Uncinaria stenocephala* were identified from honey badger intestines (Maplestone 1939; Srivastava 1964). Ectoparasites include the ticks *Amblyomma javanensis*, *Boophilus microplus*, and *Haemaphysalis indica* (Sanyal et al. 1987).

One case of rabies in *M. capensis* occurred in Zambia (Hayles et al. 1977). The SAG-2 oral rabies vaccine was orally administered in 6 honey badgers to test for innocuity in Zimbabwe. None of the animals were infected with or died of rabies. Pulmonary silicosis was diagnosed in all 6 honey badgers (Bingham et al. 1997). Feline panleukopenia virus infection was demonstrated in 1 individual from South Africa (Steinel et al. 2000), and in East Africa, honey badgers might suffer from common canine distemper disease (Kingdon 1977). In captivity, they have died of pneumonia (Ranjitsinh 1982), gastroenteritis, and pseudotuberculosis (Johnstone-Scott 1980). In captivity, the oldest honey badger lived 26 years 5 months (Nowak and Paradiso 1983).

Honey badgers have been successfully immobilized with 5 mg/kg ketamine, 0.8 mg/kg phencyclidine, and 1 mg/kg xylazine (Bingham et al. 1997; Harthoorn 1976). They may be radio-tracked via an internal transmitter implanted into the abdominal cavity. In Mana Pools, Zimbabwe, following animals on foot was optimal in the dry season but impossible in the wet season (Begg 1995). Honey badgers can be captured in cages or leg-hold traps and then housed in single steel-mesh cages (Bingham et al. 1997).

BEHAVIOR. Activity is primarily nocturnal, although diurnal observations are numerous (Drake-Brockman 1910; Fitzsimons 1919). Activity might be diurnal in wild areas and nocturnal in areas disturbed by humans (Rosevear 1974). Honey badgers live singly, in pairs, or sometimes in groups. Pairs of female and male honey badgers are common (Drake-Brockman 1910). A maximum of 12 foraged together for beetle larvae at a Masai cattle boma (Kingdon 1977).

Honey badgers shelter in burrows in or under thick bush, caves, clumps of fallen bamboo, graveyards, hollow trees, old ruins, rock shelters (between crevices enlarged and deepened), dens excavated by themselves, or abandoned burrows of porcupines (*Atherures africanus* and *Hystrix cristata*), yellow mongooses (*Cynictis penicillata*), aardvarks (*Orycteropus afer*), bat-eared foxes (*Otocyon megalotis*), springhares (*P. capensis*), or Cape foxes (*Vulpes chama*—Blumenbach 1825; Dunbar-Brander 1927; Fitzsimons 1919; Roberts 1977; Shortridge 1934). Hollow trees are ascended and entered from the top (Fitzsimons 1919).

Owing to the thickset form, stocky feet, and sharp and long foreclaws, honey badgers cannot run quickly. Their swinging trot or gallop is comparable with that of bears (Drake-Brockman 1910; Sikes 1963). The normal gait is a slow, rather bow-legged lumber, which they can maintain for hours (Kingdon 1977).

Mellivora capensis has 4 modes of horizontal turning behavior. To turn, honey badgers lower the head while converging the limbs close together, bend the trunk laterally (especially the neck, because the massive trunk limits bending capacity), arch the trunk into a ball and roll forward or sideways, or pivot on the hind legs while elevating the anterior part of the body vertically (front legs lose contact with ground). Even though the last turning behavior costs the animals more energy, the rotation around the longitudinal axis of the trunk results in a minimal turning radius and therefore a minimal moment of inertia. Thus, smoothness between turning

and forward movement in the new direction or a halt may be optimized (Eilam 1994). When 2 captive honey badgers are released together in an enclosed yard, a fixed sequence of bodily rotations is observed. This so-called ritualized fighting comprises whole-body rotations (3 types: pivoting, rolling, and tumbling), squatting, and forward walking. The most submissive honey badger is relatively immobile and elicits the most fixed-response sequences, whereas the most dominant honey badger is extensively mobile and has the most variable response sequences (Yaniv and Golani 1987).

Female honey badgers forage in a relatively small area, covering ca. 10 km/day. They zigzag short distances from bush to bush, digging on average 10.2 holes/km. Males engage in long-distance foraging, covering ca. 27 km/day. Only ca. 1.3 holes/km are dug. Mean straight-line distance between dens from 1 day to the next was ca. 2.5 km for short-distance foragers (n = 12) and ca. 10.1 km for long-distance foragers (n = 2—Kruuk and Mills 1983). Occasionally, after foraging in a particular area for most of the night, a male honey badger may suddenly move off to a location ≤9 km away, where it may meet up with other adult-sized honey badgers. On 1 occasion in Mana Pools, Zimbabwe, 6 animals met up; they showed no aggression but continuously uttered a wide range of grunts, hisses, squeaks, and whines while rolling in the sand, sniffing each other, and scent marking. Such gatherings may last >18 min, and the honey badgers may retreat to the same den during the day (Begg 1995).

When in search of prey, honey badgers trot along with the nose a few centimeters off the ground and often with the tail elevated slightly above the level of the back (Fitzsimons 1919; Stevenson-Hamilton 1947). On 1 occasion, an individual was observed for 4 h as it made 5 excursions from its den. Making a large oval, it traveled ca. 300 m each time, after which it returned to its den for 5–13 min. It foraged in all directions from the den, overlapping with previous excursions and reexamining previous feeding spots. The excursions were 20–40 min in duration. As the honey badger trotted along, it examined the ground with its nose, sometimes stopping and circling. While smelling, the animal scraped with its forefoot and sometimes entered small holes. Several times it squatted and dabbed its anal glands on the ground. Taller plants nearby were not scented. After marking, it continued foraging without reexamining the scented spot (Frame and Frame 1977).

Most food is obtained by digging particularly close to bushes (mostly *Acacia haematoxylon* or *Acacia mellifera*). Honey badgers approach these bushes from downwind 94% of the time (n = 50—Kruuk and Mills 1983). Honey badgers use the same behavior as aardvarks (*O. afer*): blowing vigorously into a hole and then cocking the head to listen for a response (Kingdon 1977).

When honey badgers eat, food is held between the front claws while the forelegs rest on the ground (Watson 1950). Beehives are opened by tearing away wood of trees or by scooping out the comb from between cracks of rocks with claws of forefeet (Fitzsimons 1919; Hoesch 1961). Anal secretions may be used to fumigate insects when robbing nests of bees. Grubs are removed from the comb with incisors. In Tanzania, >10% of apiaries are damaged by *M. capensis* in a year (n = 56—Kingdon 1977). Hardened earth of termitaries, clay capsules of estivating lungfish (*Protopterus aethiopicus*), cases of insect pupae, carapaces of turtles, or skins of animals are peeled away to expose the softer inner parts to be eaten (Kingdon 1977). Honey badgers dig large spiders out of holes 15–25 cm deep in the ground (Smithers 1971). Fish are caught with the claws at the edge of streams (Pocock 1909) or from drying pans (Ivy 1970). Honey badgers are good swimmers and chase turtles underwater (Kingdon 1977).

Honey badgers will forage in the presence of eagle owls (*Bubo africanus*), black-backed jackals (*Canis mesomelas*), and adult pale chanting goshawks (*Melierax canorus*). Jackals may wait within 5 m of a hole for a honey badger to emerge (Marlow 1983). Honey badgers raid tents of tourists or campsite garbage containers (Begg 1995) and may visit residential trashcans nightly, overturning them to find food (Ivy 1970).

Mellivora capensis is known for its energy, endurance, and strength when excavating burrows, fighting, raiding poultry houses, or breaking open cages (Fitzsimons 1919). Its bite is savage and tenacious (Sclater 1900). One individual wrestled with a python of 3–3.5 m length for ca. 15 min, killing and eating it (Anonymous 1964), whereas another carried on a fight for >6 h, finally being killed by the python (Pretorius 1989). When followed by humans, it may advance aggressively with a trot, growling and showing its teeth with lips curled back and head held high. Wounded individuals display similar ferocity (Smithers 1971).

Vocalizations include a harsh grating sound between a growl and a hiss, comparable with screams made by bear cubs (Dunbar-Brander 1927; Stevenson-Hamilton 1947). The grating sound resembles a high-pitched screaming bark or "haarr-haarr" (Smithers 1971, 1983). Vocalizations of different tones and frequencies come from the throat and are intensified by the tongue (Sikes 1963). Juveniles emit a faint whine and make hiccupping calls of distress (Kingdon 1977).

In captivity, honey badgers tame easily and make entertaining pets (Sclater 1900). Emissions from anal glands are present when foraging, in fury, or in contact with the handler (Sikes 1963). They urinate and defecate into depressions or holes, often dug by the animal, and these may be covered or kept bare (Kingdon 1977; Sikes 1963). Urine dabbing, defecating in holes, and anal scent marking may be a purposeful marking of a home range, because such sites are often explored by other individuals (Kingdon 1977). Some tame honey badgers stop using their anal glands (Fitzsimons 1919; Pocock 1908).

The symbiotic relationship described between *M. capensis* and the greater honey guide (*Indicator indicator*) is firmly entrenched in literature. In this anecdotal mutual association, greater honey guides, which subsist mainly on beeswax, guide honey badgers to nests of bees (Dean et al. 1990). The bird, perched on a tree, utters an unceasing chatter, described as the sound made by a partially filled box of matches shaken rapidly lengthwise (Friedmann 1955). As soon as it has attracted attention of a honey badger, it flies a few meters ahead and settles on another branch, where it continues chattering. The bird repeats this display, leading the badger into the vicinity of a beehive. The route taken to the bee's nest, except when only a few meters away, is never a straight line but circuitous, meandering, or even crisscrossing (Friedmann 1955; Rosevear 1974). The journey can take from a few seconds to >0.5 h, with a distance ranging from a few meters to ≤2 km. Having arrived near the nest of the bees, the greater honey guide remains perched silently on a nearby branch. It does not indicate the exact location of the hive but waits patiently, sometimes 1.5 h, for the honey badger to find it. Should the latter fail to locate the beehive, the bird will try to lead it to another. Once the honey badger has opened the nest and eaten its share, the greater honey guide will feed on the bee larvae and pieces of comb left behind (Friedmann 1955). Although the 2 animals may occur together at nests of bees, complete observation of this behavioral sequence, from initial attraction by a greater honey guide of a honey badger, through stages of guiding, to discovery and breaking open of a nest, does not exist (Rosevear 1974). The symbiosis may have evolved between early man and the bird and may have mistakenly been described to occur between greater honey guides and honey badgers (Dean et al. 1990). In India, this relationship is unknown (Finn 1929).

CONSERVATION STATUS. Throughout its range, *M. capensis* is uncommon, and areas in which it is rare or absent are increasing. Persecution by beekeepers and livestock farmers and susceptibility to feline and canine diseases are causes of decline (Kingdon 1997; Smithers 1983). In South Africa, unselective trapping during animal control programs causes death of the animal (Stuart 1981) and has resulted in the honey badger being on the vulnerable species list (Smithers 1986). The honey badger is an endangered species in National Park W, Niger (Poche 1973).

GENETICS. Two proteins that have been sequenced for *M. capensis* are erythrocytes containing 2 components of hemoglobin. Primary structures of the 2 components consist of 2 dissimilar alpha-chains and 1 similar beta-chain. Alpha-chains differ in 1 residue at position 34 (Ala to Val) only. A high degree of homology exists between honey badger hemoglobin and other Carnivora (Rodewald et al. 1988). An exceptionally large albino honey badger lived in Hankey, Cape Province, South Africa (Fitzsimons 1919).

REMARKS. The generic name *Mellivora* is from the Latin *mel* meaning honey and *voro* meaning to devour (Rosevear 1974). The specific epithet *capensis* refers to the Cape of Good Hope, where Schreber (1776) collected the type specimen. *M. capensis* was named a badger because of its similarity to European badgers (*M. meles*) in respect of color, form, and gait (Smithers 1983). The common name honey badger comes from its fondness for honey and the larvae of wild bees (Rosevear 1974). Owing to the aggressive

rattling grunt it makes, Dutch settlers in South Africa gave the honey badger the name ratel (Ivy 1970). The Sindhi name for honey badger is gorpat, which means gravedigger (Roberts 1977:124). The Luganda name ntaulira means that which does not hear and is derived from the observation that the ears of the honey badger are reduced (Watson 1950:201). Many other vernacular names exist. Natives in Somalia hold a firm belief that when a honey badger bites a man, he loses his fertility. As a result, they are afraid to come near the animal (Drake-Brockman 1910).

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