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# Ichneumia albicauda.

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## *Ichneumia* I. Geoffroy, 1837

*Ichneumia* (Geoffroy, 1837:251). Type species *Herpestes albicauda* G. Cuvier, by monotypy. A renaming of *Herpestes* G. Cuvier, 1829, preoccupied by *Herpestes* Illiger, 1811.

**CONTEXT AND CONTENT.** Order Carnivora, Family Viverridae, Subfamily Herpestinae. The genus includes only one species *Ichneumia albicauda.*

## *Ichneumia albicauda* (G. Cuvier, 1829)
White-tailed Mongoose

*Herpestes albicauda* G. Cuvier 1829:158. Type locality "l'Afrique australe et le Sénégal," southern Africa and Senegal.

**CONTEXT AND CONTENT.** Context noted in generic summary above, six subspecies are recognised (Coetzee, 1967) as follows:

*I. a. albicauda* (G. Cuvier, 1829:158), see above.

*I. a. loempo* (Temminck, 1853:93). Type locality Guinea coast.

*I. a. grandis* (Thomas, 1890:622). Type locality "believed to [be] . . . either on the Limpopo or in Zululand." Southern Africa south of the Cunene-Zambesi.

*I. a. loandae* (Thomas, 1904:408). Type locality "Pungo Andongo, 1200 m" in northern Angola.

*I. a. ibeana* (Thomas, 1904:409). Type locality, "Athi-ya-Maui, Mombasa-Uganda Railway, East Africa."

*I. a. dialeucos* Hollister, 1916:131. Type locality "Mount Lololokwi, British East Africa."

**DIAGNOSIS.** The single species of this genus is a large mongoose with a head and body length of 470 to 690 mm, tail length 355 to 460 mm, hind foot length 100 to 130 mm, and weight 1.8 to 4.5 kg. The marsh mongoose, *Atilax paludinosus*, black-legged mongoose, *Bdeogale nigripes*, Jackson's mongoose, *Bdeogale jacksoni*, and the Egyptian mongoose, *Herpestes ichneumon*, are all of similar size. *Ichneumia* has thick woolly pelage from which coarse guard hairs project; the bushy tail tapers distally, the terminal third usually white (occasionally melanistic). General color of the back is grizzled pale grayish with a faint brown wash; effect is produced by a coarse speckling of black and creamy bands of guard hairs, the extensive black tips of the latter running together in places to form irregular black patches over the nape and back. *Herpestes ichneumon* resembles *Ichneumia* more closely than does any other species, but its tail is distinct in that it is slender and has a black bushy tip. The ventral pelage of *Ichneumia* is a pale brown color (darker umber at its roots and paler buff-cream distally). The limbs are blackish-brown from the mid-forearms and tarsi distally. The feet of the other large herpestines also are darker than the general body coloration and *Bdeogale nigripes* and *Bdeogale jacksoni* are distinguished by their brown-black feet, which are tetradactyle. In *Ichneumia* the tail at base is the same color as the back but becomes progressively whiter distally. Upper lip is divided by an internarial groove from the nose to mouth. Legs are longish, feet pentadactyle; palms naked to wrist, but the soles are hairy from behind the small first toe to the heel. The feet of *Atilax* differ in possessing no interdigital web between the phalanges, which enables the digits to be widely spread. *Herpestes ichneumon* has a larger pollex and hallux than does *Ichneumia* and the feet are relatively more naked on the plantar surface. In *Ichneumia*, the claws are well developed and stout. Frontal region of skull is expanded and more elevated than parietal region: anterior orbital margin above P4 (above P3 in *Herpestes ichneumon* and *Atilax*, see Figure 1 for symbols used for teeth), postorbital processes well developed, forming complete postorbital bridge in fully adult skulls. Sagittal and lambdoidal crests well developed, posterior chambers of tympanic bullae strongly inflated. Dentition heavy (Figure 2), especially P4, which has a greater development of the protocone (pr) than in *Herpestes ichneumon* or *Atilax* so that the inner lobe of the tooth occupies considerably more than half the anteroposterior diameter of the crown. Metastyle (mes) of P4 reduced; M1 fairly symmetrical, parastyle (pas) slightly projecting; anterior root of zygomatic arch far behind P4; m1 with connate paraconid (pad) and metaconid (med); m2 elongate with six cusps, lower canines recurved, upper canines only slightly recurved. Dentition i 3/3, c 1/1, p 4/4, m 2/2, total 40. The above comments were modified from Harrison (1968:266–268), and Gregory and Hellman (1939:374–375).

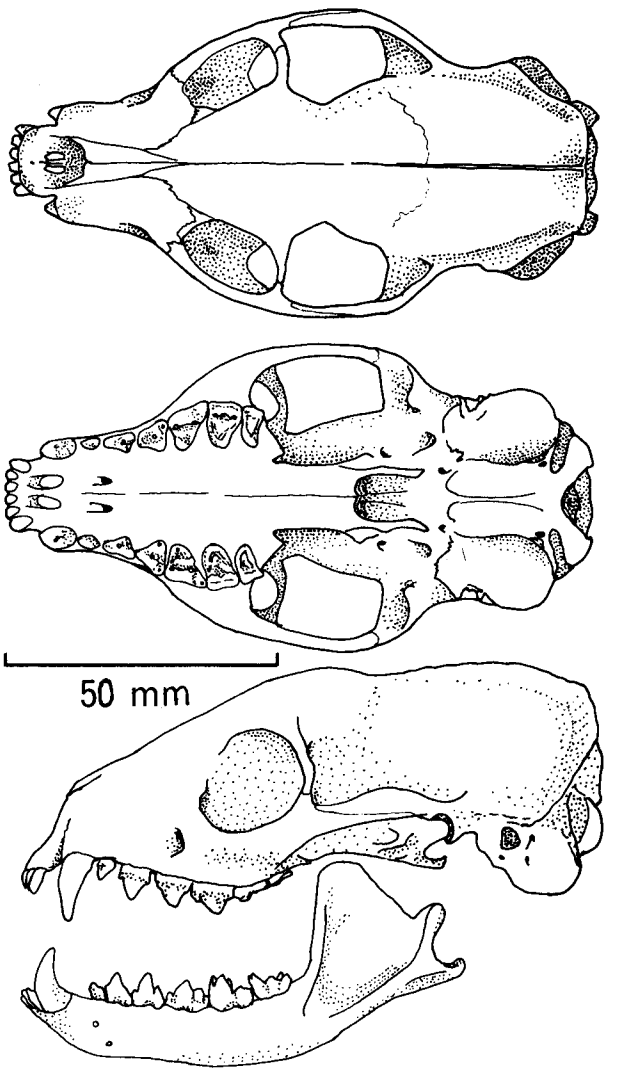


FIGURE 1. Skull of *Ichneumia albicauda*: from top to bottom, dorsal view, ventral view, lateral view, and lateral view of lower jaw. Modified from Allen (1924), using several East African specimens.

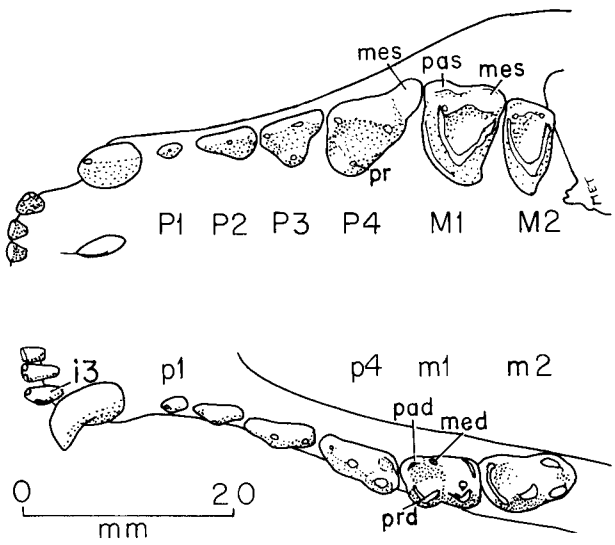


FIGURE 2. Dentition of *Ichneumia albicauda*, occlusal view of left upper jaw (top) and occlusal view of left lower jaw (bottom). Drawn by the author from a male specimen MC 42I10 catalogued in the Department of Osteology, Centre for Prehistory and Palaeontology, Nairobi, Kenya. Some teeth and their parts are labelled with abbreviations that are noted in text.

**GENERAL CHARACTERS.** More complete descriptions are in Astley Maberly (1960), Allen (1924), Harrison (1968), Hinton and Dunn (1967), Thomas (1890), and Walker *et al.* (1964).

**DISTRIBUTION.** The genus occupies Africa south of the Sahara (Figure 3) and scattered records have been obtained from the Nile Valley in Sudan (Cloudsley-Thompson, 1968) and from Oman and Muscat in South Arabia (Harrison, 1968). It is found in coastal areas of Cape Province, Natal, the northern "bushveld" of Transvaal, Ngamiland in Botswana, northern Southwest Africa, Angola, and northward to Sudan, Ethiopia (possibly Egypt), Somalia and westwards to Senegal. *Ichneumia* might be absent from the central Congo Basin, parts of Gabon, and similar extremely moist areas.

**FOSSIL RECORD.** The only known fossils of *Ichneumia albicauda* are a tibia and femur from Bed 1, Olduvai Gorge, Tanzania. This level represents the Villafranchian period or early Pleistocene (Petter, 1967).

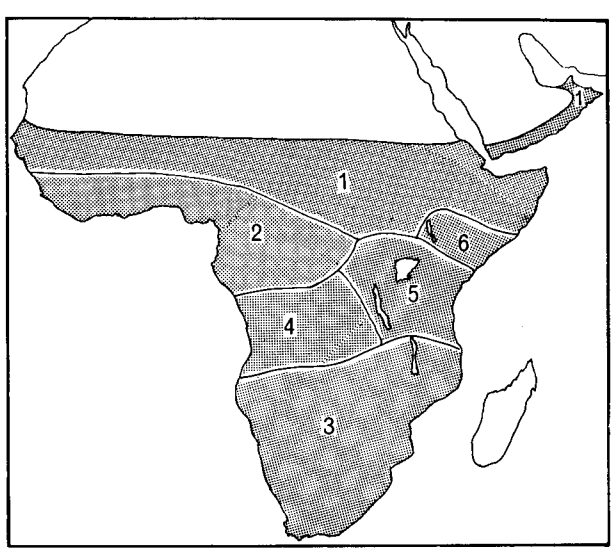


FIGURE 3. Map showing the distribution of *Ichneumia albicauda* and the general areas occupied by the subspecies: (1) *I. a. albicauda*, (2) *I. a. loempo*, (3) *I. a. grandis*, (4) *I. a. loandae*, (5) *I. a. ibeana*, (6) *I. a. dialeucos.*

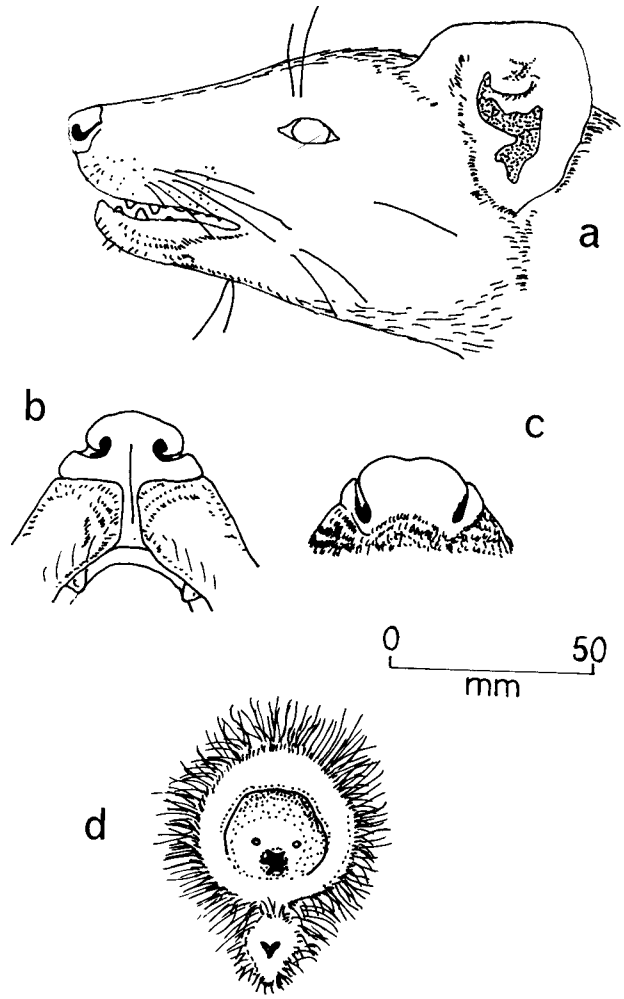


FIGURE 4. External views of *Ichneumia albicauda*: (a) lateral view of head, (b) ventral view of snout (not to scale), (c) dorsal view of snout (not to scale), (d) anal pouch. Modified from Pocock (1916).

**FORM.** Pelage dense and guard hairs about 40 mm long in mid-dorsal region. Dense woolly underfur about 15 mm thick. There is much color variability in the species (Harrison, 1968), this was recognised by Thomas, who noted (1882:77) that "*Herpestes albicauda* and *H. loempo* cannot even be separated as varieties; for the only difference between them, namely the color of the tail, seems to be purely an individual variation. It is true that for the most part specimens from West Africa, representing *H. loempo*, have black tails, and those from East Africa white tails; but I have seen too many exceptions to this rule to feel justified in regarding the two forms as varietally distinct." The subspecies have been based predominantly on pelage coloration and variations in size. Inadequate sampling from areas may give a false idea of subspecies distribution, for specimens from Kenya may be of a size comparable with those from South Africa (personal observations). The crown of the head and ear fringes are the same color as the back; the tip of the muzzle and chin are dusky brown, the cheeks predominantly buffy whitish. The ventral surface is light brownish (Yellow-Beige, H7, Plate 13, Maerz and Rea, 1950), the underfur shows through extensively, and the flanks are grayer than the dorsal color. The individual guard hairs of the tail are white at their bases and white-tipped, and have one or two black bands that gradually disappear toward the tip of the tail, as does the pale orange-tinted brown underfur, thus producing the pure white tip. The caudal guard hairs are about 85 to 100 mm long. The muzzle is attenuated; the rhinarium is blackish and forwardly projecting (Figure 4); its inferior surface is marked by a distinct inter-narial groove continued backward as a naked, shallow philtrum dividing the deep upper lip (Pocock, 1916). The depth of the upper lip beneath the rhinarium varies among the genera of viverrids, in most it is less than the depth

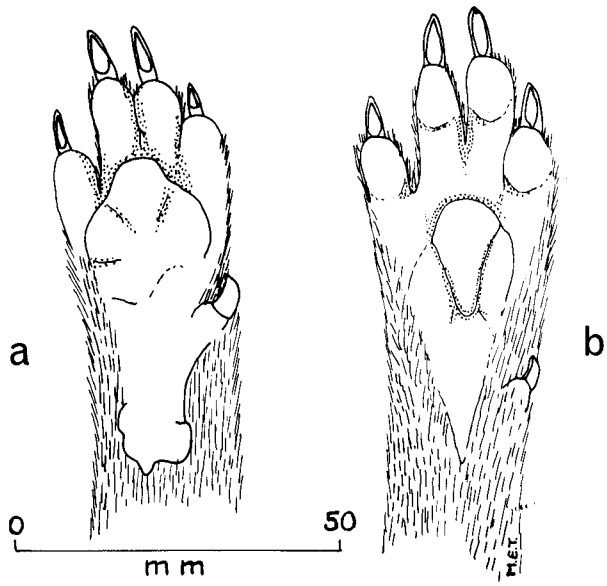


FIGURE 5. Forefoot (a) and hindfoot (b) of *Ichneumia albicauda*, drawn from photographs and specimens.

of the rhinarium, but in *Ichneumia albicauda* the lip is as deep as the rhinarium. The ears are much larger than in *Herpestes ichneumon*, the pinna projects above the profile of the head and has a broader more squarish outline, with bluntly rounded antero-superior and postero-superior angulations; the posterior margin is gently convex throughout and with a more prominent convexity at the junction of its lower and middle thirds than in *Herpestes ichneumon*.

Claws are well developed, dusky brown, longest of the forefeet about 14 mm (Harrison, 1968). Feet are slender and longish, with decidedly emarginate webs; hallux and pollex about equal in size, set well above the plantar pad (Figure 5). The carpal pad is semi-elliptical, of moderate size and higher than the pollex. Pocock (1916) described the anal sac; its function seems to be marking territory (personal observation). There are two pairs of abdominal mammae (Roberts, 1951). There is no published work on the postcranial skeleton. Basically the skeleton is more doglike than in most other herpestids, because the long limbs are modified for cursorial life. Some measurements are: humerus 85 mm, radius 84 mm, ulna 100 mm, metacarpal III 36 mm, pelvis 81 mm, femur 94 mm, tibia 112 mm, metatarsal III 48 mm. Vertebrae number, c 7, t 13, l 7, s 3, and cd 22 to 27. The upper incisors form a slightly curved row; their crowns are smooth and convex in front, concave behind, the third with the cingulum defined posteromedially but without any cusp. Upper canine scarcely recurved; first upper premolar has one root and is small, its single conical cusp is upright and nearly twice as high as its anteroposterior diameter; P2 three times as large as P1 (see Figure 2); P3 has its posteromedial heel well developed; M1 is strikingly broad with a distinctive outline, its metastyle projects almost as far laterally as its parastyle, the medial part of the crown forms a broadly triangular inner lobe, with a deep cup-like depression; M2 is well developed and functional and not overshadowed by M1, its antero-posterior length is about half its transverse width and its crown resembles that of M1 with the cusps less accentuated. The lower incisors are obscurely bifid, the small outer cusp of i3 more distinct and set decidedly lower than the inner one. The small lower p1 is fairly well developed with the cusp a little forwardly inclined. The premolars become increasingly complex, the posterior cusp increasing in size so that in p4 it is nearly three-fourths of the height of the principal cusp; m1 has a well-developed talonid posteriorly, its area almost attaining that of the higher anterior trigonid. The metaconid is well developed, only a little lower than the paraconid, which is subequal with the protoconid. The talonid has a small conical central cusp developed on its medial rim, the posterior rim forms a cusplike ridge. The crown area of m2 is large (it may be as large as or larger than the carnassial m1) and its form is more complex and somewhat like that of m1, with an elevated subtricuspidate anterior part, the posterior heel of the tooth has a large antero-lateral cusp and an obscurely bifurcated postero-medial one (modified after Harrison, 1968). The muscular anatomy of the limbs is being studied by Taylor; there are modifications towards cursorial habits, muscles being located more proximally than in *Herpestes ichneumon* to overcome moments of inertia. The brain has a cruciate sulcus, which though present in other Herpestinae is not present in viverrines (Radinsky, personal communication). Phalangeal numbers from first to fifth digits in both fore and hind feet are 2-3-3-3-3. Other organ systems have not been studied.

**ECOLOGY.** Man is probably the major predator on white-tailed mongooses though the young may be subjected to limited predation by larger raptors. White-tailed mongooses are primarily solitary, and rarely are seen in pairs, although female and young may be seen together. They are generally nocturnal, but are occasionally diurnal; one was caught between the hours of 1400 and 1630 (personal observation). They coexist with genets (either *Genetta tigrina* or *G. genetta*), black-tipped mongooses (*Herpestes sanguineus*), four-toed mongooses (*Bdeogale crassicauda*), and the jackal (*Canis mesomelas*)—see Sale and Taylor, 1970. Competition is reduced by differences in feeding times and behavior patterns. *Ichneumia* is terrestrial, and is found in a wide variety of habitats from woodland to semidesert, but is not found in swamps or tropical rain forest (Coetzee, 1967) or above 4400 m. Individuals do not migrate, except away from parental territory. When a region is trapped out, new animals enter over a period of several months. Home range is about 8 square kilometers (Taylor, 1970). Diseases have not been investigated. Several cases of bone fractures have been found. These include pelvic injuries, probably related to the habit of collecting prey on roads at night and, as a result, being hit by passing vehicles, and stress fractures of metatarsals, probably also related to behavior (Taylor, 1971). Diet consists mainly of insects (locusts, beetles, mole crickets), but also rats, mice, shrews, lizards and possibly small snakes, smaller birds (chickens when available), carrion, berries and fruits in season.

In other viverrids in East Africa, two young, or sometimes only one, are born during, or just after, the short or long rains (Taylor, 1969), and my few records for *Ichneumia* indicate similar breeding seasons. The only longevity record for this species is 10 years and 29 days for an animal in the Zoological Gardens of London (Crandall, 1964). Trapping using live traps (.6 by .3 by .3 m size) was successful, when bait was fresh meat or freshly killed birds. Watching for individuals killed on the roads is satisfactory as a collecting method but shooting is highly impractical.

**BEHAVIOR.** The locomotion of the white-tailed mongoose has been studied in the wild and captivity. It generally walks or trots. The walking is similar to that of the dog and can be divided into two parts, elevation or protraction and contact or retraction. In protraction the manus is flexed as it is lifted off the ground and the limb swung forward. During retraction the forefoot may be extended as much as 25° anteriorly to the axis of the radius, the main propulsive thrust is produced by the hind limbs. The head is carried low, and the shoulder is nearer the ground than is the base of the tail. In one study, the mongoose walked at approximately 4.2 kph, each stride taking approximately 1.7 s. The gait used was a slow, single-foot, lateral-sequence walk with a gait formula of 73–20 (Hildebrand, 1966). The first number of the gait formula represents the percentage of the stride interval that the footfall of the forefoot follows that of the hind foot on the same side. The second figure shows the percentage of the stride interval that each hindfoot is on the ground. Trotting is often observed in the white-tailed mongoose (Pienaar, 1968; Taylor, 1970) and a moderate walking trot (63–45) is the fastest filmed locomotion. No other studies have been made, most of the information on behavior is anecdotal (Roosevelt, 1910).

**GENETICS.** The karyotype of a male white-tailed mongoose was found to have 36 diploid chromosomes, with 66 chromosomal arms (the "nombre fondamental") in a haploid set. The autosomes are composed of 14 pairs of meta- or submetacentric and three pairs of acrocentric elements. The X chromosome is a medium sized metacentric and the Y is a small submetacentric, the smallest element (Wurster and Benirschke, 1968).

**REMARKS.** Little is known about the parasites of *Ichneumia*, but four specimens of *Pseudandrya mkuzii* (a cestode worm), two complete with their scolices, were collected from a stomach of a white-tailed mongoose from the

Mkuzi Game Reserve, Zululand. The length of the worms ranged from 150 to 180 mm, and maximum breadth was 1.5 mm. The anterior segments are much broader than long, posteriorly the segments increase in length so that the last ones are almost square. Segmentation is distinct from behind the neck, the posterior rim of each mature and ripe segment overhanging the following segment (Ortlepp, 1963).

The sera of *Ichneumia* from Kenya were tested for rickettsial antibodies and found to be positive, with the two sera tested containing *Rickettsia burneti* (Heisch *et al.*, 1962).

The structure of haemoglobins is being studied but no clear results for the Viverridae have been found. *Ichneumia albicauda* was studied but no results given (Seal, 1969).

A white-tailed mongoose was immobilized by administration of 1.0 mg/kg body weight of phencyclidine with promazine added (Seal *et al.*, 1970).

From collecting and examining material of this species, the subspecific differences appear to be sufficiently small and the local variations sufficiently large to make all subspecies of dubious value. The generic name *Ichneumia* is derived from the Greek *ichneumōn* meaning a tracker; the word ichneumon is one of the vernacular terms used for the Egyptian mongoose, *Herpestes ichneumon*; *albicauda* is derived from the Latin, *albus* meaning white and *cauda* meaning tail.

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