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Amblonyx cinereus.

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Amblonyx Rafinesque, 1832

Lutra Illiger, 1815:90, 99. Type species *Lutra cinerea* Illiger (vide Harris 1968).
Amblonyx Rafinesque, 1832:62. Type species *Amblonyx concolor* Rafinesque.
Leptonyx Lesson, 1842:72. Preoccupied by *Leptonyx* Swainson (Aves) and *Leptonyx* Gray (Mammalia, Pinnipedia).
Aonyx: Gray, 1843:119. Not *Aonyx* Lesson; redesignation of *Lutra leptonyx* Horsfield.
Micraonyx Allen, 1919:24. Replacement name for *Leptonyx*. Type species *Lutra leptonyx* Horsfield, 1823 = *Lutra cinerea* Illiger by tautonymy.
Amblyocix Nelson, 1983:72. Lapsus for *Amblonyx*.

CONTEXT AND CONTENT. Order Carnivora, family Mustelidae, subfamily Lutrinae. The genus *Amblonyx* is monotypic (Wozencraft 1993).

Amblonyx cinereus (Illiger, 1815)

Asian Small-clawed Otter

Lutra cinerea Illiger, 1815:90, 99. Type locality "Batavia" (= Indonesia, Java, Jakarta) (vide Harris 1968).
Lutra leptonyx Horsfield, 1823:7. Type locality "Java."
Amblonyx concolor Rafinesque, 1832:62. Type locality "Garo Hills, Assam," northeast India.
Lutra indigitatus Hodgson, 1839:320. Type locality "Nepal."
Leptonyx barang Lesson, 1842:72. Redesignation of *Lutra leptonyx* Horsfield.
Aonyx horsfieldii Gray, 1843:119. Redesignation of *Lutra leptonyx* Horsfield.
Aonyx sikimensis Horsfield, 1855:109. Type locality "Sikkim," northeast India.
Lutra (*Hydrogale*) *swinhoei* Gray, 1867:182. Type locality "Gawkang Islands, near Amoy, South China."
Amblonyx cinereus: Pocock, 1921:540. First use of current name combination.
Amblonyx cinerea: Pocock, 1921:544. Lapsus for *Amblonyx cinereus*.
Amblyocix sernaria Nelson, 1983:72. Lapsus for *Amblonyx cinereus*.

CONTEXT AND CONTENT. Context as above. Three subspecies are recognized (Harris 1968):

A. c. cinereus (Illiger, 1815:90, 99), see above (*barang* Lesson, *fulvus* Pohle, *horsfieldii* Gray, *leptonyx* Horsfield, *swinhoei* Gray, and *wurmbi* Sody are synonyms).
A. c. concolor Rafinesque, 1832:62, see above (*indigitatus* Hodgson and *sikimensis* Horsfield are synonyms).
A. c. nirnai Pocock, 1940:515. Type locality "Virajpet (Virarajendrapet) in South Coorg [= India], 3000 ft."

DIAGNOSIS. *Amblonyx cinereus* (Fig. 1) can be differentiated from other otters by its small size (mass, <3.5 kg; greatest length of skull, <90 mm), and by claws that are greatly reduced in size on all feet (van Zyll de Jong 1972). In the field, tracks from *A. cinereus* can be differentiated from tracks of other otters by smaller size (width, <4.5 cm), absence of claw marks, incomplete webbing between fingers and toes, longer middle digit compared with other digits, and relatively long fingers.

GENERAL CHARACTERS. *Amblonyx cinereus* has typical tubular morphology of otters: head is small, neck is larger than head, legs are short, and tail is flattened dorsoventrally. Pelage is typically brown but sometimes cream colored or with a reddish tinge (Foster-Turley 1992). Grayish wash on tip of hairs, for which the name *cinerea* was given, is rarely seen. Undersides are paler brown, and edge of upper lips, chin, throat, and sides of neck and face are grayish white. In South India, pelage is darker than elsewhere (Corbet and Hill 1992; Tate 1947). Rhimarium is bare. Posterior border of rhinarium is variable in shape from straight to undulated (Yoshiyuki 1971).

External measurements (in mm) of 6 males and 2 females, respectively, from North Borneo (Chasen and Kloss 1931) averaged (range in parentheses): length of head and body, 406 (360–440), 440 (440); length of tail, 246 (225–270), 268 (265–270); length of hind foot, 89 (85–93), 90 (89–90); and length of ear, 17 (16–18), 19 (19). Measurements of 1 male and 2 females (locality unknown), respectively, were: total length, 630, 743, 692; length of tail, 245, 275, 260; length of hind foot, 87, 89, 88; and length of ear, 20, 20, 19 (Yoshiyuki 1971). Body mass of 14 captive animals (sex unknown) aged 0.75–13 years averaged 3.1 kg ± 0.7 *SD* (Samuels and Cook 1991). Body mass of 6 captive animals (sex unknown) averaged 3.1 ± 0.4 kg (Borgwardt and Culik 1999).

Skull (Fig. 2) measurements (in mm) of 6 males and 1 female, respectively, from North Borneo (Chasen and Kloss 1931) averaged (range in parentheses for males): basal length, 76.3 (74.5–78.4), 75.5; condylobasal length, 82.9 (80.5–84.6), 82.9; palatal length, 39.5 (38.5–40.6), 38.5; and zygomatic breadth, 56.8 (54.2–60), 57.2. Skull measurements of 1 male and 2 females (locality unknown), respectively, are: condylobasal length, 82.5, 85.0, 86.0; zygomatic breadth, 54.2, 61.0, 63.8; mastoid width, 45.7, 51.6, 54.2; postorbital constriction, 18.3, 17.3, 14.8; interorbital constriction, 16.0, 18.2, 14.5; occipital depth, 28.4, 29.6, 28.8 (Yoshiyuki 1971).

DISTRIBUTION. *Amblonyx cinereus* inhabits Bangladesh, Bhutan, Borneo, Brunei, south China, southern India, Indonesia, Java, Karimon Islands, Laos, Malay Peninsula, Myanmar (Burma), Palawan, Philippines, Sumatra, Thailand, and Vietnam (Fig. 3). The Asian small-clawed otter is likely extinct in Hong Kong and Singapore (Foster-Turley and Santiapillai 1990; Sebastian 1995).

FOSSIL RECORD. No fossils are known (van Zyll de Jong 1987). A fossil described as *L. palaeoleptonyx* was initially believed to be an ancestor of *A. cinereus* but later proved to be an ancestor of *Lutrogale perspicillata* (Willemsen 1986). *A. cinereus*

FIG. 1. Adult *Amblonyx cinereus* with young in captivity. Photo courtesy of Shirley McGreal.

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Amblonyx cinereus* (American Museum of Natural History 101460). Greatest length of cranium is 88.3 mm.

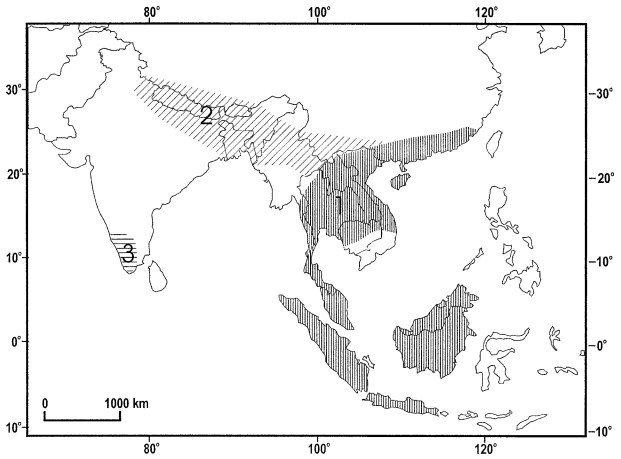

FIG. 3. Distribution of *Amblonyx cinereus* in Asia, modified from Chanin (1985), Corbet and Hill (1992), Foster-Turley et al. (1990), and Harris (1968): 1, *A. c. cinereus*; 2, *A. c. concolor*; 3, *A. c. nirnai*.

likely originates from *Aonyx aonychoides* from China (Radinsky 1968), which suggests that the lineage diverged in late Miocene (Koepfli and Wayne 1998).

FORM AND FUNCTION. Prepuce is pendulous and unhaired. Penis lies completely sheathed under skin (Davis 1978). *A. cinereus* has a baculum ca. 5 cm in length (Davis 1978). Females have 4 mammae (Timmis 1971).

Heart rate of anesthetized animals varies between 80 and 300 beats per minute (Samuels and Cook 1991). While at rest, 6 captive Asian small-clawed otters had a respiratory quotient of 0.77 and a resting metabolic rate of 5.0 W/kg ± 0.8 *SD*. Resting metabolic rate increased to 9.1 ± 0.8 W/kg during rest in 11–15°C water and to 17.6 ± 1.4 W/kg during feeding activities. Transport costs for otters swimming at 1 m/s were minimal and averaged 1.47 J N^{-1} m^{-1} ± 0.24 *SD* (Borgwardt and Culik 1999).

Endocranial casts show that coronal gyrus is similar to other fissiped carnivores. However, expansion of lateral part of sigmoid gyrus is twice as large in *Amblonyx* as in *Lutra* or *Pteronura*. Enlargement of primary somatic sensory projection area of forelimb suggests increased tactile sensitivity (Radinsky 1968). Short claws also enhance manual dexterity (Timmis 1971).

REPRODUCTION. In captivity, females come into estrus every 28–30 days, and estrus lasts 3 days. Gestation is ca. 60 days (Lancaster 1975).

One pair may produce 2 litters per year, with up to 7 young in each litter (Foster-Turley 1990; Lancaster 1975). At the Adelaide Zoo in Australia, mean litter size for 16 litters was 4.4, with even sex ratio at birth (Lancaster 1975). In captivity, cub mortality may reach 45% (n = 70 cubs born from 16 litters—Lancaster 1975), and disturbance of the female after parturition may decrease cub survival (Leslie 1971).

Neonates weigh ca. 50 g at birth and measure 14 cm in length (Timmis 1971). Pelage at birth is silver gray, and eyes are closed until the 5th week (Lancaster 1975). Teeth are absent at birth. In captivity, females may coax young to swim when 7 weeks old (Timmis 1971).

Sexual maturity likely occurs during the 1st year. In captivity, the youngest female to reproduce was 13 months of age (Foster-Turley and Engfer 1988).

ECOLOGY. Asian small-clawed otters inhabit coastal habitats as well as inland rivers, marshes, mangroves, and rice fields up to 2,000 m above sea level (Melisch et al. 1994; Nor 1989). They often inhabit areas close to human activity (Foster-Turley 1992).

Throughout its distribution, *A. cinereus* feeds primarily on crabs, shellfish, fish, snakes, and insects (Foster-Turley 1992; Timmis 1971). From 20 defecation sites in Thailand, 95% of spraints contained crab *Potamon smithianus*, 40% contained amphibians and fish, 15% contained small mammals, and 5% contained arthropods (Kruuk et al. 1994). The size of crabs consumed by Asian small-clawed otters reflects what is available in the watershed they inhabit (Kruuk et al. 1994).

Asian small-clawed otters coexist with *Lutra lutra*, *L. sumatrana*, and *Lutrogale perpicillata* in numerous locations, including several river systems in Thailand and Malaysia (Foster-Turley 1992). Although all 3 species consume the same prey, *A. cinereus* is predominantly a crab eater, whereas the other species consume mostly fish (Kruuk et al. 1994). Coexistence may be facilitated by differential habitat and food preferences. In peninsular Malaysia, *L. perspicillata* is more abundant in reservoirs and lakes, whereas *A. cinereus* is confined to small rivers and streams (Nor and Ahmad 1990). In Southeast Asia, *A. cinereus* also is more abundant in small waterbodies (Shariff 1984) and is especially abundant in rice fields where *L. sumatrana* was absent (Shariff 1985).

Few parasites infect *A. cinereus*. Postmortem examination of 30 Asian small-clawed otters from Thailand revealed 13 animals infected with *Gnathostoma vietnamicum* (Daengsvang 1973).

In captivity, cases of pneumonia and liver-lobe torsion were recorded, as well as cases of rickets that suggested calcium imbalance and lack of vitamin D (Lancaster 1975; Warns-Petit 2001). Two captive animals died of cyanide toxicosis after ingesting cyanide-containing loquat (*Eriobotrya japonica*) seeds from exhibit plants (Weber and Garner 2002). Urolithiasis is a prevalent disease in captive populations of Asian small-clawed otters (Karesh 1983; Nelson 1983; Petrini et al. 1999). Imbalances in mineral content of diets in captivity may explain the high incidence of renal calculi (66% incidence, $n = 56$ necropsied or X-rayed animals) and cystic calculi (23% incidence) in Asian small-clawed otters (Calle 1988; Calle and Robinson 1985).

Amblonyx cinereus is sometimes killed as a pest because of the perceived damage to fisheries (Melisch et al. 1994). Longevity may reach 15 years in captivity (Foster-Turley and Engfer 1988; Leslie 1971). Asian small-clawed otters may be anesthetized with ketamine and acepromazine (Nelson 1983), ketamine and midazolam (Samuels and Cook 1991), or medetomidine and ketamine (Lewis 1991).

BEHAVIOR. Asian small-clawed otters are nocturnal and crepuscular (Foster-Turley 1992). Groups of otters of up to 12–13 individuals may forage together (Furuya 1976; Timmis 1971).

Shellfish are dug up and left in the sun so that the heat causes them to open, allowing Asian small-clawed otters to consume them without having to crush the shells (Timmis 1971). Asian small-clawed otters in captivity adapt quickly to experimental feeding trials (Foster-Turley and Markowitz 1982).

Along rivers, Asian small-clawed otters rest, sun, and groom on grassy or sandy banks. In marshes, they use mostly islands (Foster-Turley 1992). Resting sites often show signs of scat smearing, a behavior also observed in captivity (Foster-Turley 1992). Defecation sites (spraints) used by *A. cinereus* occasionally are shared with *L. lutra* and *Lutrogale perspicillata* and thus cannot be differentiated with certainty (Kruuk et al. 1993; Macdonald 1990).

Captive animals are extremely playful, and adults as well as juveniles enjoy playing in water or on land (Leslie 1971; Pellis 1983, 1984). Asian small-clawed otters have a diverse vocal repertoire that includes at least 12 different sounds, such as alarm, greeting, and mating calls (Timmis 1971). In captivity, Asian small-clawed otters typically swim underwater at speeds of 0.7–1.2 m/s (Borgwardt and Culik 1999).

Asian small-clawed otters are monogamous, and both parents contribute to raising their offspring (Foster-Turley 1986; Foster-Turley and Engfer 1988; Leslie 1970). In captivity, males spend more time maintaining the nest, whereas females spend more time grooming and training young (Nor 1990). In captivity and in the wild, older siblings may help raise offspring (Foster-Turley 1990; Furuya 1976). Females in captivity build nests of grass 2 weeks before parturition (Timmis 1971).

CONSERVATION STATUS. The American Association of Zoological Parks and Aquariums established in 1983 a species-survival plan to encourage more research on the captive breeding of *A. cinereus* (Foster-Turley 1986). In 1985, an estimated 40 Asian small-clawed otters were maintained in captivity in 13 zoos throughout North America. By 1987, the number of captive *A. cinereus* had increased to 63 animals in 11 North American institutions (Foster-Turley and Engfer 1988), and this number again increased to 117 otters by June 1989 (Samuels and Cook 1991).

In the wild, Asian small-clawed otters most likely are threatened by habitat destruction and environmental pollution, especially by organochlorines (Foster-Turley and Santiapillai 1990). Otters also may be killed for their pelts and organs; the latter are believed to have medicinal value in Asia (Foster-Turley and Santiapillai 1990). *A. cinereus* was recognized as "of local conservation concern" by the Otter Specialist Group of the International Union for the Conservation of Nature (Mason and Macdonald 1990). The species is listed under "lower risk" in the Red List of Threatened Species (Reuther 1999). In England, animals that have escaped captivity are surviving in the wild (Jeffries 1988).

GENETICS. *Amblonyx cinereus* has $2n = 38$ chromosomes. The X chromosome is metacentric, whereas the Y chromosome is acrocentric (van Zyll de Jong 1987).

REMARKS. The Asian small-clawed otter is often considered under *Aonyx* with the Cape and Congo clawless otters (*Aonyx capensis* and *A. congicus*, respectively). The cytochrome-*b* sequences suggest that the Cape clawless otter and the Asian small-clawed otter are sister taxa with 10.4% sequence divergence and an estimated divergence time of 5 million years ago (Koepfli and Wayne 1998). Thus, generic separation of *Aonyx* and *Amblonyx* may not be warranted. The Otter Specialist Group of the International Union for the Conservation of Nature has not yet decided whether the Asian small-clawed otter should be considered under *Amblonyx* or *Aonyx*.

The Asian small-clawed otter also is often referred to as *Amblonyx cinerea* (e.g., Chanin 1985). However, the epithet *cinereus* should be used instead of *cinerea* in accordance with the gender of the genus (van Zyll de Jong 1987). A listing of museum specimens is available (Sivasothi and Nor 1994).

The generic name *Amblonyx* is from the Greek prefix *ambl* meaning blunt and the suffix *onyx* meaning claw or nail. The specific epithet *cinereus* is from the Latin *ciner* meaning ashes (Borror 1960) and refers to the gray tinge of the pelage. Other vernacular names include Asian clawless otter (Harris 1968), Oriental short-clawed otter (Leslie 1971), Malaysian small-clawed otter (Foster-Turley and Engfer 1988), nutria cenicienta or nutria inerme asiatica (Spanish), loutre cendrée (French), Zwergotter (German), lontra nana or lontra senza unghie (Italian), and berang-berang cakar kecil or memerang (Indonesian—Foster-Turley et al. 1990; Medway 1969; Melisch et al. 1994).

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