

THE MAMMALS
OF THE INDOMALAYAN REGION:
A SYSTEMATIC REVIEW

by
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E. insignis Falconer & Cautley, 1846: pl. 2 (and Falconer, 1868: 3, 28); Siwalik Hills, India.
E. ganesa Falconer & Cautley, 1846: pl. 2 (and Falconer, 1868: 4, 33); India.
E. namadicus Falconer & Cautley, 1846: pl. 12 (and Falconer, 1868: 15); Siwalik Hills, India. Usually allocated to *Palaeoloxodon*.
E. hysudricus Falconer & Cautley, 1846: 41, pls 1, 4, 6 (and Falconer, 1868: 2, 6); Siwalik Hills, India. Type of the genus *Hypselephas* Osborn, 1936.
E. cliftii Falconer & Cautley, 1846: 47; near Yenangyaung, Irrawaddy R, Burma. Allocated to *Stegodon elephantoides* by Osborn (1942).
E. bombifrons Falconer & Cautley, 1847: pl. 25 (and Falconer, 1868: 41); Burma.
E. hysudrinidicus Dubois, 1908: 1258; Kendeng, Java. Allocated to *Palaeoloxodon* by Osborn (1942).
E. platycephalus Osborn, 1929: 21; near Biswan, Amilee Creek, Simla Hills, India; Upper Pliocene or Lower Pleistocene. Allocated to *Platycephalus* by Osborn (1942).
E. platycephalus angustidens Osborn, 1929: 22; 3 miles W of Chandigarh, Siwalik Hills, India. Allocated to *Hypselephas hysudricus* by Osborn (1942).
Stegodon hypsilophus Hooijer, 1954b: 92; N of Djetis and Peming, E Java; Middle Pleistocene. Allocated, probably erroneously, to *E. celebensis* by Hooijer (1974).
Hypselephas hysudricus sinhaleys Deraniyagala, 1944: 45; Nagoda, Sri Lanka; Pleistocene. Pre-occupied by *Elephas maximus sinhaleys* Deraniyagala, 1939 (see below).
Archidiskodon celebensis Hooijer, 1949b: 206; Sulawesi. Allocated to *Elephas* by Hooijer (1974) but this was considered erroneous by Sondaar *et al.* (1989) who believed *celebensis* to be a derivative of *Mastodon* and not close to *Elephas*.
E. beyeri Koenigswald, 1956; Philippines, probably Cabaruyan I. Close to, perhaps a pygmy form of, *E. namadicus* (Groves, 1985a).
E. irshadi Sarwar, 1977: 156; near Sardhok, Gujrat dist, Punjab, Pakistan; Miocene (Pinjor zone of Upper Siwaliks).
E. hysudricus khoharensis Sarwar, 1979: 329; Pabbi Hills, Pakistan; Pleistocene (Upper Siwaliks).
E. youensis Xue, 1981: 35; R You, Weinan, Shaanxi, China; Pleistocene.

The history of elephants in the Sunda islands and Sulawesi was summarized by Sondaar *et al.* (1989).

Elephas maximus Asian elephant

E. maximus Linnaeus, 1758: 33; Sri Lanka.
E. indicus Cuvier, 1797: 148; Sri Lanka.
E. asiaticus Blumenbach, 1797: 124; Sri Lanka.
E. sumatranus Temminck, 1847: 91; Sumatra.
E. hirsutus Lydekker, 1914: 20; Negri Sembilan, Malaya.

Range (Map 105). Formerly, in historic times, throughout the mainland part of the Region and on the islands of Sri Lanka and Sumatra; in prehistoric times also on Java and Borneo, and beyond the Region west to Iraq and north through most of lowland China. At present scattered populations exist throughout much of the Indochinese subregion from Assam and extreme S Yunnan to Vietnam, Thailand and in Malaya, with isolated populations in SW and NE India, Nepal, Sri Lanka, Sumatra and N Borneo. It is uncertain whether the population on Borneo is relict or the result of re-introduction. Feral on some of the Andaman Is.

Variation. The following subspecific names have been proposed (including those from beyond the region):

E. m. bengalensis Blainville, 1845: 353, pl. iii; Bengal.
E. indicus ceylanicus Blainville, 1845: 353, pl. iii; Sri Lanka.
E. m. sinhaleys Deraniyagala, 1939a: 130; Sri Lanka; feral.
E. m. vilaliya Deraniyagala, 1939a: 130; Manampiti Mahavili R, E Sri Lanka (extant).
E. m. dakhunensis Deraniyagala, 1950: 8 (of reprint); Tra core, S India (extant).
E. m. borneensis Deraniyagala, 1950: 10 (of reprint); Borneo (based on living, possibly introduced animals).
E. m. sondaicus Deraniyagala, 1950: 10 (of reprint); Java (based upon a 'medieval' stone carving).
E. m. rubridens Deraniyagala, 1950: 10 (of reprint); Ceylon (based upon a bronze statuette).
E. m. persicus Deraniyagala, 1950: 10 (of reprint); Iran (based upon an early historical description).
E. m. asurus Deraniyagala, 1950: 11 (of reprint); 'Mesopotamia' (based upon a prehistoric painting in Egypt and other early representations).
E. m. burmanicus Deraniyagala, 1951a: 49; Burma.
E. m. ruber Deraniyagala, 1951a: 51; 'shore of inland sea from Nakama to Sigora', Thailand.
E. m. sichiaoshanensis Wang, J.-k., 1978: 123; Kuans Commune, Nanhai County, Guangdong, China; Holocene subfossil ('not later than 2000–2500 years').

The form on Sri Lanka (*E. m. maximus*) is characterized by the absence of tusks. Elsewhere it is unlikely that more than discrete subspecies can be recognized (*E. m. bengalensis*). Indian animals tend to be larger than those further east; incidence of unpigmented patches of skin is greater in Sri Lanka than elsewhere. Variation was reviewed in more detail by Pocock (1943a) and Deraniyagala (1950).

Ecology. Found in a wide variety of forest types but limited on the one hand by the need for daily access to water and on the other by feeding primarily upon grass and therefore avoiding large areas of closed-canopy forest.

Remarks. Widespread as a domestic animal throughout the region. This was formerly based entirely upon the capture and taming of wild elephants but is now in most places dependent upon captive breeding. In Thailand for example legal capture of wild elephants ceased in the 1970s—in 1988 there were estimated to be over 5000 domesticated and 2–3000 wild elephants in the country (Lair, 1988). The species was reviewed concisely by Shoshani & Eisenberg (1982) and its status, ecology and management in detail by Sukumar (1989) and Santiapillai & Jackson (1990). CITES: Appendix I; IUCN: Red List.

ORDER PERISSODACTYLA

Odd-toed ungulates

Worldwide except for Australasia and the Nearctic (represented in the latter into the Holocene); Recent species fall into three very distinct families (Table 161). The evolution

Table 161. The families of Perissodactyla.

	Tapiridae	Rhinocerotidae	Equidae
Genera (species) in region	1 (1)	2 (3)	1 (2)
Shoulder height (max, cm)	120	200	140
Limbs	Short, stout	Short, stout	Long, slender
Dermal horns on snout	0	+	0
Scrotum	0	0	+
Upper canines	+	0	+/0
Incisors, each side	3/3	0–1/0–2	3/3

perissodactyls was reviewed in Prothero & Schoch (1989), in which an earlier view was revived, that the hyraxes, family Procaviidae (not represented in the Indomalayan Region) should also be included.

Family Tapiridae

Tapirs

Taperidae Gray, 1821: 306; type genus *Tapirus* Cuvier.

Contains one genus.

TAPIRUS Tapirs

Tapirus Brisson, 1762: 81; type species *T. terrestris* Brisson (S America); doubtfully available.

= *Tapirus* Brännich, 1771: 44.

= *Tapir* Blumenbach, 1779.

= *Rhinochoerus* Wagler, 1830: 17.

= *Tapyra* Liais, 1872: 397.

Acrocodia Goldman, 1913: 65 (*T. indicus* Desmarest).

Megatapirus Matthew & Granger, 1923: 588 (*T. (M.) augustus* Matthew & Granger).

Neotropical and Indomalayan Regions; 4 species, only one in this region.

The following fossil species have been recorded from the region:

T. pentapotamiae Falconer, 1868: 415; Siwalik Hills, India. Allocated to the suid genus *Listriodon* by Pilgrim (1926).

T. sinensis Owen, 1870: 426, pl. 29; Sichuan, China.

T. pandanicus Dubois, 1908: 1265; Kendeng, Java.

T. (Megatapirus) augustus Matthew & Granger, 1923: 588; Yen-ching-kao, near Wan-hsien, Sichuan, China; ? Upper Pliocene.

T. yunnanensis Shi *et al.*, 1981: 7, 13; Zhaoting, NE Yunnan; 27°15'N, 130°38'E; Pliocene.

Tapirus indicus Malayan tapir

T. indicus Desmarest, 1819: 458; Peninsular Malaya.

Hydrochoerus sumatrensis Gray, 1821: 306; Sumatra (*nomen nudum*).

T. malayanus Raffles, 1821: 270; Malacca.

T. bicolor Wagner, 1835: 400; Malacca.

Range (Map 105). Burma and E Thailand from c. 18°N to Malaya; Sumatra. Formerly on Borneo where it survived at least until 8000 BP, probably later (Medway, 1960); in N India: a subfossil record near Allahabad dated between 1165BC and 550AD (Banerjee & Ghosh, 1981); and during the Pleistocene on Java (Sondaar, 1984).

Variation. One subfossil subspecies has been described from the region:

T. i. intermedius Hooijer, 1947: 288; Padang Highlands, C Sumatra; subfossil (based upon large size).

Remarks. The distribution and conservation status in Sumatra were reviewed by Santiapillai & Ramono (1990). CITES: Appendix I; IUCN: E.

Family Rhinocerotidae

Rhinoceroses

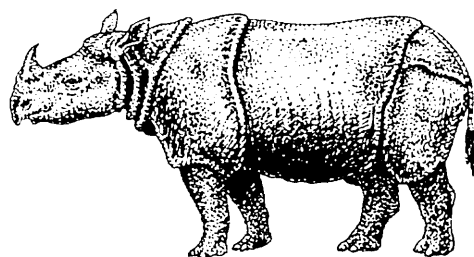
Rhinocerotidae Gray, 1821: 306; type genus *Rhinoceros* L.

Afrotropical and Indomalayan Regions; 4 genera of which 2, with 3 species, are Indomalayan (Table 162). Classification of the Asian species was reviewed in detail by Groves (1967a) and phylogenies for the family were proposed by Groves (1983) and Prothero *et al.* (1986). The fossil and prehistoric forms were revised by Hooijer (1946). Criteria for the identification of isolated horns were given by Groves (1971a). A comprehensive bibliography with over 3000 references was compiled by Rookmaaker (1983), and a comprehensive popular account of all living species was produced by Penny (1987). For status and conservation see Khan (1989).

Table 162. The species of *Rhinoceros* and *Dicerorhinus* (Rhinocerotidae).

	<i>R.unicornis</i>	<i>R.sondaicus</i>	<i>D.sumatrensis</i>
Range	Nepal-Assam	Java, Vietnam	Burma-Borneo
Shoulder height (m)	1.6-1.8	1.4-1.7	1.0-1.3
Horns	1	1	2
Base of horn with anterior channel	+	+	0
Females with horns	+	Usually 0	+
Hair on body visible throughout life	0	0	+
Skin folds	Prominent	Prominent	Weak
Skull: greatest length	560-625	440-550	470-570
Occiput	Inclined forward	Inclined forward	Subvertical

RHINOCEROS Asian one-horned rhinoceroses



Rhinoceros sondaicus

Rhinoceros Linnaeus, 1758: 56; type species *R. unicornis* L.

Naricornis Frisch, 1775. Rejected by Opinion 258 (1954).

Eurhinoceros Gray, 1868e: 1009 (*R. javanicus* Cuvier, in *R. sondaicus*).

Monocerotinus Wüst, 1922: 654 (*R. sondaicus* Desmarest).

Indomalayan Region; 2 species (Table 162). Unique amongst living rhinos in having only one horn but also characterized by prominent skin folds, enlarged lower canines and sloping occiput.

The following nominal fossil species and subspecies have been described from the region:

R. sivalensis Falconer & Cautley, 1847: pl. 73; Upper Siwaliks.

R. platyrhinus Falconer & Cautley, 1847: pls 72, 75; Upper Siwaliks (in *Coelodonta*: Badam, 1979).

R. palaeindicus Falconer & Cautley, 1847: pl. 73; Upper Siwaliks.

R. perimensis Falconer & Cautley, 1847: pls 75, 76; Perim (= Peram) I, Gulf of Cambay, Gujarat, India; Middle Siwaliks (in *Aceratherium*: Hooijer, 1946).

R. namadicus Falconer, 1868: 21; Narbada, India.

R. sinensis Owen, 1870: 424, pl. 29; Sichuan, China.
R. deccanensis Foote, 1874: 1; Gokak, Belgaum dist, India.
R. iravadicus Lydekker, 1876: 18 (= '36); Prome, Burma (in *Aceratherium perimensis*: Hooijer, 1946).
R. planidens Lydekker, 1878a: 95; Padri, Punjab, Pakistan (in *Aceratherium perimensis*: Hooijer, 1946).
R. sivalensis var. *gajensis* Lydekker, 1881: 40; Lower Siwaliks.
R. karnuliensis Lydekker, 1886a: 121; Karnul Caves, S India.
R. kendengindicus Dubois, 1908: 1259; Kendeng, Java.
R. sinhaleys Deraniyagala, 1939b: 235; Talavitaya, Sri Lanka.
R. philippinensis Koenigswald, 1956; Cagayan, Philippines. Likely to belong to a genus of the subfamily Aceratheriinae, not *Rhinoceros* (Groves, 1985a).
R. kagavena Deraniyagala, 1958: 116,122; Hiriliyadda, Talavitiya, Sabaragamuva Prov., Sri Lanka; Pleistocene.
R. barinagalensis Srivastava & Verma, 1972: 77; Chandigarh, Haryana, India; Pleistocene.
R. (Gaindatherium) vidali Heissig, 1972: 24; Nagri, Salt Range, Pakistan; Tertiary (Middle Siwaliks).
R. sinensis hayasakai Otsuka & Lin, 1984: 9; Taiwan.

Rhinoceros unicornis Indian rhinoceros, Greater one-horned rhinoceros

R. unicornis Linnaeus, 1758: 56; ? Assam.
R. indicus Cuvier, G., 1817: 239; India.

R. asiaticus Blumenbach, 1830: 107.

R. stenocephalus Gray, 1868e: 1018.

[*R. jamrachii* Sclater, 1876: 650; ? Manipur (Rookmaaker, 1977a). Invalid.]

Range (Map 106). The 'Terai' lowlands of Nepal, Bengal and Assam, with the main concentration now in the Kaziranga National Park, Assam (c. 1250 in 1989) and the Chitwan National Park in Nepal (c. 400 in 1989). Formerly west at least to the Indus Valley as late as the 16th century AD.

Ecology. In Nepal grass was found to constitute 70–90% of the diet although a great variety of other plants were eaten (Laurie, 1982).

Remarks. For a concise review of the species see Laurie *et al.* (1983). CITES: Appendix I; IUCN: E.

Rhinoceros sondaicus Javan rhinoceros, Lesser one-horned rhinoceros

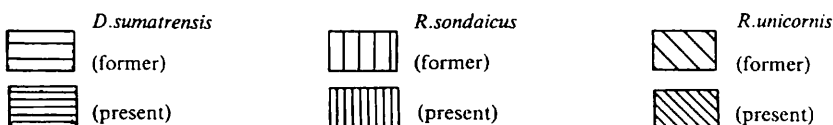
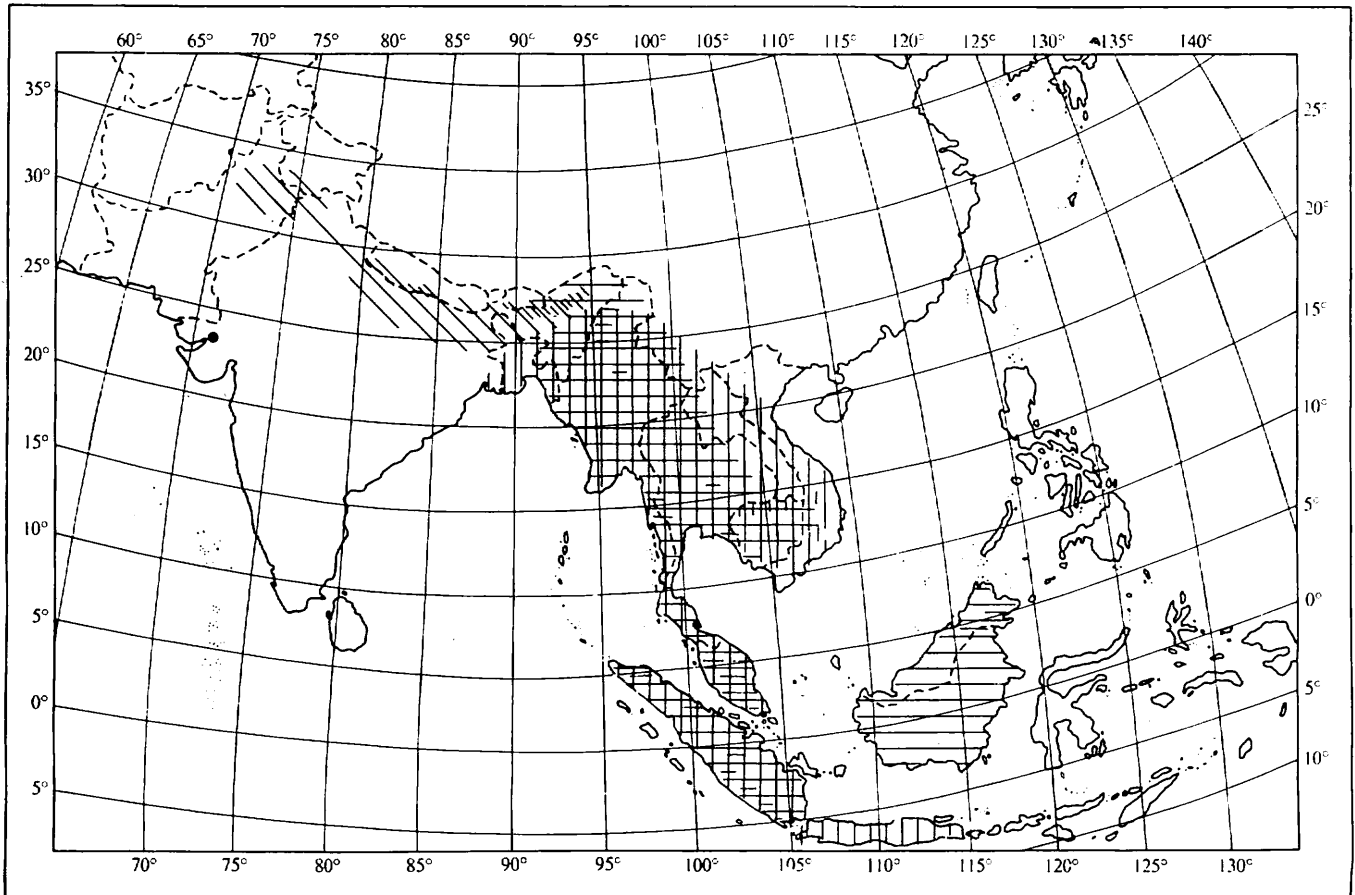
R. sondaicus Desmarest, 1822: 399; Sumatra (Sody, 1946); usually given as Java.

R. javanicus Geoffroy & Cuvier, 1824: liv. 445; Java.

R. javanus Cuvier, G., 1829: 247; Java.

R. inermis Lesson, 1838: 514; 'Les Sundries', i. e. Sunderbunds, Bangladesh/W Bengal.

Map 106. *Rhinoceros*, *Dicerorhinus*, *Equus*



● *E. hemionus*

R. sinensis Owen, 1870: 424, pl. 29; Sichuan, China.
R. deccanensis Foote, 1874: 1; Gokak, Belgaum dist, India.
R. iravadicus Lydekker, 1876: 18 (= 36); Prome, Burma (in *Aceratherium perimensis*: Hooijer, 1946).
R. planidensis Lydekker, 1878a: 95; Padri, Punjab, Pakistan (in *Aceratherium perimensis*: Hooijer, 1946).
R. sivalensis var. *gajensis* Lydekker, 1881: 40; Lower Siwaliks.
R. karnuliensis Lydekker, 1886a: 121; Karnul Caves, S India.
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R. kagavena Deraniyagala, 1958: 116, 122; Hiriliyādda, Talavitiya, Sabaragamuva Prov., Sri Lanka; Pleistocene.
R. barinagalensis Srivastava & Verma, 1972: 77; Chandigarh, Haryana, India; Pleistocene.
R. (Gaiudatherium) vidali Heissig, 1972: 24; Nagri, Salt Range, Pakistan; Tertiary (Middle Siwaliks).
R. sinensis hayasakai Otsuka & Lin, 1984: 9; Taiwan.

Rhinoceros unicornis Indian rhinoceros, Greater one-horned rhinoceros

R. unicornis Linnaeus, 1758: 56; ? Assam.
R. indicus Cuvier, G., 1817: 239; India.

R. asiaticus Blumenbach, 1830: 107.

R. stenocephalus Gray, 1868e: 1018.

[*R. jamrachii* Sclater, 1876: 650; ? Manipur (Rook: 1977a). Invalid.]

Range (Map 106). The 'Terai' lowlands of Nepal. Ber Assam, with the main concentration now in the Ka National Park, Assam (c. 1250 in 1989) and the C National Park in Nepal (c. 400 in 1989). Formerly west to the Indus Valley as late as the 16th century AD.

Ecology. In Nepal grass was found to constitute 70–90% diet although a great variety of other plants were eaten (1982).

Remarks. For a concise review of the species see Laur (1983). CITES: Appendix I; IUCN: E.

Rhinoceros sondaicus Javan rhinoceros, Lesser one-horned rhinoceros

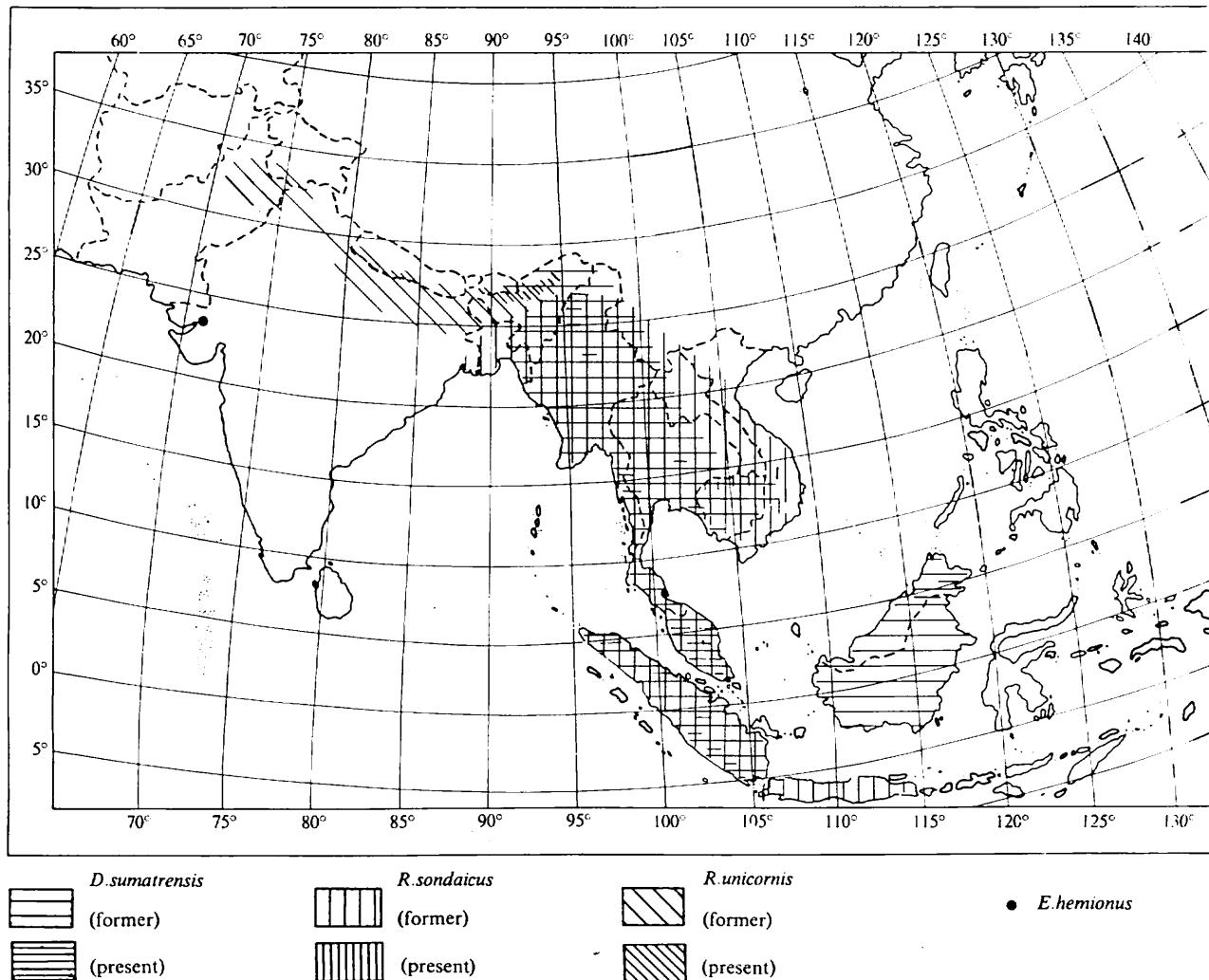
R. sondaicus Desmarest, 1822: 399; Sumatra (Sody, usually given as Java).

R. javanicus Geoffroy & Cuvier, 1824: liv. 445; Java.

R. javanus Cuvier, G., 1829: 247; Java.

R. inermis Lesson, 1838: 514; 'Les Sundries', i. e. Sunda; Bangladesh/W Bengal.

Map 106. *Rhinoceros*, *Dicerorhinus*, *Equus*



- ? *nasalis* Gray, 1868e: 1015; 'Borneo', probably Java.
 ? *floweri* Gray, 1868e: 1015; Sumatra.
 ? *sivasondaicus* Dubois, 1908: 1245; Kendeng, Java (fossil).
Aceratherium boschi Koenigswald, 1933: 121; Java; Pliocene
vide Aimi & Sudijono, 1979).

Range (Map 106). Formerly, in historical times, from Bhutan and West Bengal to Burma, Laos and Vietnam, through Thailand to Malaya; and on Sumatra and Java. Now certainly known to be present only in the Ujung Kulon Reserve in extreme western Java (c. 57 animals in 1989: Santiapillai *et al.*, 1990), and in Vietnam where 10–15 were located c. 130km NE of Saigon in 1989 (Schaller *et al.*, 1990). Perhaps also surviving in Laos and Burma. Recent reports from Cambodia and Laos are likely to be of this species but these require confirmation (Rookmaaker, 1988). Subfossil finds show its former presence in Borneo around the Pleistocene/Holocene boundary and in middens dated c. 8–10000 BP (Cranbrook, 1986). It has been suspected of occurring in New Guinea (Sody, 1959) but this has not been confirmed and is improbable (Heptner, 1960).

Variation. The following subspecific names have been proposed:

- R. s. annamiticus* Heude, 1892: 75, 113, pl. xixA; locality unknown, presumably Annam, Vietnam.
R. s. simplisinus Deraniyagala, 1946: 165; Nivitigala, Sabaragmura Prov., Sri Lanka; fossil.
R. s. guthi Beden & Guérin, 1973: 19; Phnom Loang, Kampot Prov., Cambodia; Pleistocene.

Remarks. For a detailed account see Sody (1959). CITES: Appendix I; IUCN: E.

DICERORHINUS

- Dicerorhinus* Gloger, 1841: 125; type species *R. sumatrensis* Cuvier = *R. sumatrensis* Fischer. Conserved by Opinion 1080 (1977).
 = *Didermocerus* Brookes, 1828: 75. Rejected by Opinion 1080 (1977).
 = *Ceratorhinus* Gray, 1868a: 1021.

One species. A primitive genus, more closely related to *Rhinoceros* than to the African genera and with many fossil species recorded in Europe and N Asia.

The following fossil species has been described from the edge of the region:

- D. lantianensis* Hu & Qi, 1978: 38; Lantian, Shaanxi, China; Pleistocene.

Dicerorhinus sumatrensis Sumatran rhinoceros, Asian two-horned rhinoceros

- Rhinoceros sumatrensis* Fischer, 1814: 301; Bencoolen dist, S Sumatra. Conserved by Opinion 1080 (1977).
R. crossi Gray, 1854b: 251; locality unknown.
R. lasiotis Buckland, 1872: 89; Chittagong, E Bengal.
Ceratorhinus niger Gray, 1873c: 357, pl. 11; Sungghijong dist, Malacca. Pre-occupied by *R. niger* Schintz, 1845, in *Diceros bicornis*, Africa.
C. blythii Gray, 1873c: 360; ? Tenasserim, Burma.

Range (Map 106). Formerly from Assam, Burma and Indochina to Malaya, and on Sumatra and Borneo. Still present in small numbers in Borneo (Sabah, N Sarawak, probably also Kalimantan), Sumatra and Malaya, and perhaps in parts of

Thailand, Burma and Indochina. In Malaya there was estimated to be a total of 50–75 individuals in ten isolated areas in 1975–81 (Flynn & Tajuddin Abdullah, 1984); in Sumatra c. 400–750 in 1985; and in Burma c. 10 in 1985.

Variation. One fossil and one Recent subspecies have been described:

- D. s. eugenei* Sody, 1946: 151; cave at Ngatau Lida Ajer, near Pajakombo, Padang Highlands, C Sumatra; fossil.
Didermocerus s. harrissoni Groves, 1965: 130; Suan-Lambah, Sabah, N Borneo. Based on average smaller size. However subfossils dated c. 8–10000 BC indicate that they were then about 10–20% larger than non-Bornean animals (Cranbrook, 1986).

Ecology. A browser, feeding upon a large variety of plant species but rarely grass other than bamboo (van Strien, 1975).

Remarks. For detailed accounts see van Strien (1975) and Groves & Kurt (1972). The taxonomic history was reviewed by Rookmaaker (1984). CITES: Appendix I; IUCN: E.

Family Equidae

Horses and asses

Equidae Gray, 1821: 307; type genus *Equus* L.

Afrotropical and Palaearctic Regions; c. 7 wild species of which one occurs marginally in the northwest of this region. Only one genus is recognized here, but the Asiatic asses are often separated in the genus *Hemionus*. Classification was reviewed by Groves & Willoughby (1981) and Groves (1986) who recognized only one genus, *Equus*, with six subgenera. For a comprehensive popular account see Groves (1974a).

EQUUS

- Equus* Linnaeus, 1758: 73; type species *E. caballus* L. Conserved by Opinion 271 (1954).
Asinus Brisson, 1762: 70 (*E. asinus* L.).
 = *Onager* Brisson, 1762.
 = *Asinus* Gray, 1824: 244.
Hemionus Stehlin & Graziosi, 1935: 3 (*E. (Hemionus) hemionus* Pallas).
Asinohippus Trumler, 1961: 118 (*E. khur* Lesson).
Praehemionus Trumler, 1961: 119 (*E. sivalensis* Falconer & Cautley—fossil).

Palaearctic and Afrotropical regions; c. 7 species. Although only one species is native (but very marginal) in the region, domestic horses and donkeys, and their hybrid mules, are widely used and are detailed below (Table 163).

Table 163. The species of *Equus*.

	<i>hemionus</i>	<i>asinus</i>	<i>caballus</i>
Shoulder height (cm)	110–127	80–150	Variable, commonly ~170
Length of ears (cm)	19–21	Longer	Shorter
Mid-dorsal stripe	+	+	0
Transverse stripe on shoulders	0	+	0
Horizontal stripes on legs	0	+/0	0
'Chestnut' (horny callous) on each hind leg	0	0	+
Mane	Erect	Erect	Usually lax
Long hair on tail	Distal half	Distal half	From base