

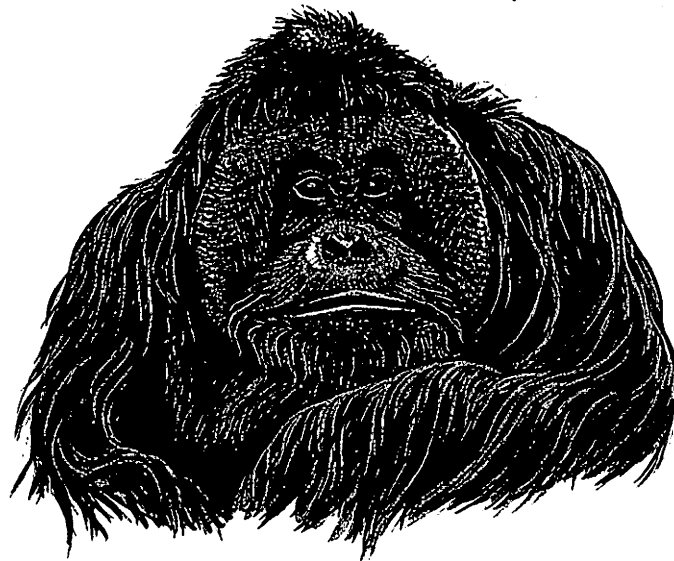
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**A FIELD GUIDE TO THE
MAMMALS OF BORNEO**

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protrude beyond the lips. There are no recorded weights for Bornean Elephants, but adults are unlikely to exceed 3000 kg.

Identification. Distinctive shape with long trunk. Generally grey-brown, but paler when dry and blackish when wet. Infants are covered in black bristly hair.

Ecology and Habitat. Mostly active from about two hours before dusk until two hours after dawn. Diet consists mainly of tender parts of monocotyledonous plants, including soft grasses, the growing parts of palms and banana stems. Fruits and the bark of latex-producing trees are also eaten but only in relatively small quantities. Water and minerals are important to Elephants, and this species' distribution in Sabah is closely correlated with permanent supplies of both resources. Groups usually contain between three and forty individuals, although larger groups up to one hundred are sometimes reported. Groups split and merge, but normally contain one or more adult females with young of both sexes and various ages. Adult males occur loosely attached to herds or as solitary individuals or in groups of two or three. Elephants occur in dipterocarp forests, and sometimes enter swamp forests and nipah to feed. They travel through and feed in gardens and plantations mainly at night or during rainy weather. They can swim across rivers.

Distribution. Once widespread but now restricted to parts of India, Sri Lanka, Burma, Thailand, Indochina, Peninsular Malaysia, Sumatra. **Borneo:** *E. m. sumatrensis*: Occurs only between S. Sugut in north-eastern Sabah and S. Sembakung in northern East Kalimantan. Exterminated from the Tawau-Semporna area and the Sandakan peninsula during the past two decades. Most of the population occurs between S. Labuk and north of a line between the upper S. Kuamut and T. Darvel. Prior to 1983, small groups of Elephants only rarely crossed the S. Labuk, but larger numbers now appear to be moving northwards as a result of rapid forest clearance for agriculture south of the river. The population in Sabah is estimated at 500-2000, but is decreasing rapidly with loss of habitat. The Elephant may have been introduced to Borneo, possibly several hundred years ago by the Sultan of Sulu. The peculiarly restricted distribution, lack of fossil remains and lack of indigenous names for the Elephant elsewhere in Borneo lend support to this theory. However, they are restricted to the region with the most fertile soils and abundant natural mineral sources and the lowest population of indigenous hunting peoples. As there are authentic reports of people in the past killing elephants only with spears both on the upper S. Kinabatangan and near Semporna, it is conceivable that Elephants are native but restricted in range by availability of minerals and prolonged hunting pressure.

Order PERISSODACTYLA

Odd-toed Ungulates

Members of this order are large herbivorous mammals with one or three toes on each foot, each with a hard hoof (except tapirs which have four toes on the front foot). The stomach is rather small and simple, while the caecum (large intestine) is large.

Domesticated horses (family Equidae), with one large hoofed toe, were present on the north-west coast of Sabah before the first recorded European contact with this area, but none have gone wild.

The Malay Tapir, *Tapirus indicus* (family Tapiridae), was present in Borneo up to at least 8000 years ago, as shown by fossils from Niah Caves in Sarawak. However, there are no authenticated records of this species in recent historical times, despite some unconfirmed reports. The reason for its apparent extinction in Borneo is unknown. The Malay Tapir is about 1 m tall at the shoulder, with an elongated, flexible nose. The head, legs and foreparts of the body are black in the adult while the remainder of the body is white. If the species does still exist, it is most likely to be detected by the footprints, which closely resemble those of the Asian Two-horned Rhinoceros, *Dicerorhinus sumatrensis*, but have somewhat more pointed toes and do not exceed about 17 cm in total width. The fourth toe on the front foot often does not show up in the footprint. The ecology and habitat of the Malay Tapir are very similar to that of the Asian Two-horned Rhinoceros; however, although the Malay Tapir often walks and bathes in streams, it does not wallow in mud pools.

Family RHINOCEROTIDAE

Rhinoceros

Rhinoceroses are characterised by a large, stocky body; short, stout legs with three toes on each foot; and either one or two horns made of compacted hairs on top of the muzzle. The rhinoceros family has a long fossil history and of the five living species (two in Africa and three in Asia), the species found in Borneo most closely resembles the primitive forms found in Europe about 30 million years ago. There appears to have been a relatively recent decrease in body size of Bornean rhinos. Bones from Niah caves in Sarawak, which are less than 30,000 years old, are significantly larger than those of living rhinos. All rhinos have been persecuted for their horns and other parts of the body which are falsely believed to have medicinal properties.

Only one species of rhinoceros now occurs in Borneo, but fossil remains of the Lesser One-horned (Javan) Rhinoceros, *Rhinoceros sondaicus*, have been found in Madai cave in south-eastern Sabah, dating from about 10,000 years ago.

ASIAN TWO-HORNED (SUMATRAN) RHINOCEROS

Dicerorhinus sumatrensis

Plate 51

Measurements. Height at shoulder about 1.2-1.3 m. HB about 2.5 m.

Identification. General coloration usually dark brown, but appearance may vary after bathing in water or mud. Hairy, especially when young, but hairs often not apparent in the field. Front horn rarely exceeds 30 cm in length, smaller in females than in males. Rear horn normally very short, sometimes hardly projecting above the level of the skin; often not visible in the field. Presence usually detected by tracks: footprints of adults on firm soil 18.5-23.5 cm across at widest point, showing 3 clear toe marks. Mud wallows can be distinguished from those of Bearded Pigs, *Sus barbatus*, by the clear, deep horn marks in the sides of the wallow. Dung consists of balls of coarsely chopped woody material about 9 cm in diameter, usually found in small piles, sometimes in mounds frequently used over long periods. When disturbed unexpectedly, this Rhinoceros usually flees rapidly, sometimes giving a series of short, hoarse barks. **Similar species:** Bearded Pigs, *Sus barbatus*, have slender legs, a large head relative to the body and two-hoofed footprints; adult

Malay Tapir, *Tapirus indicus*, and Lesser One-horned Rhinoceros, *Rhinoceros sondaicus* (not presently known to occur in Borneo) have footprints which are respectively smaller and larger.

Ecology and Habitat. Mainly active from late afternoon to mid morning. Usually rests during the hot hours of the day in a mud wallow, shaded spot or ridge top. Feeds on mature leaves and twigs from a wide range of woody plants including saplings, lianas and small trees, which may be pushed over to obtain the leaves. Occasionally eats fallen fruits. Natural mineral sources are visited and all accurate records of rhinos in Sabah are within 14 km of a mineral source. Occurs in tall and secondary forests, including very steep areas. Rarely comes out into open areas.

Distribution. Once widespread through mainland South-east Asia. Now known definitely only from Peninsular Malaysia and Sumatra. **Borneo:** *D. s. harrissoni*. Recorded in recent years only from the eastern half of Sabah, with a small breeding population surviving in Tabin Wildlife Reserve. There may still be scattered individuals in the remote interior of other parts of Borneo. Old records cover all parts of Sabah; scattered parts of Sarawak; G. Liang Kubung and southern parts of West Kalimantan; upper S. Kahayan in Central Kalimantan; and the S. Telen region in East Kalimantan. Rhinoceroses appear to have disappeared from most parts of Borneo as a result of hunting over thousands of years and particularly over the past one hundred years.

Order ARTIODACTYLA

Even-toed Ungulates

The even-toed ungulates are terrestrial mammals with two functional hoofed toes and two small dew toes on each foot. The dew toes are situated well above the main toes and, except in pigs, appear in foot prints only in soft soil or mud. Most species feed only on plant material. The stomach is rather large and complex, with 2 or 3 chambers in pigs, 3 in mouse-deer and 4 in other species. The caecum is small. All Bornean artiodactyls (except pigs) are classed as ruminants — food is partially digested in the stomach and then brought back up into the mouth for further chewing one or more times. This permits the maximum amount of nutrition to be extracted from vegetation containing a large proportion of indigestible material. It also permits ruminants to ingest large amounts of food quickly and move to sheltered places, better protected against predators, for processing.

In comparison to many other regions of the world, both tropical and temperate, Borneo has rather few species of artiodactyls; and even among the species that do occur, population densities are low. Bornean forests, despite their dense and diverse vegetation cover, may not produce very much plant material suitable for ruminants. To support large populations of artiodactyls, plants must not only have a high productivity (that is, a fast growth rate) but also be fairly free of digestion-inhibiting substances such as fibre and tannins, and be available to animals no more than one or two metres above the ground. In Bornean forests, most plants are high in fibre and tannins, and most leafy material is situated well above the ground. Grasses, herbs and shrubs edible to ruminants are very scarce inside forests and occur abundantly only on river banks and cultivated land. Another factor possibly contributing to the rarity in Borneo of all large terrestrial mammals is the scarcity of minerals. Soils in many regions of Borneo are very poor in minerals, and supplementary sources such as salt water springs and mud volcanoes are patchy in distribution.

Family Suidae

Pigs

Unlike other artiodactyls, pigs have incisors in the upper jaw and an omnivorous diet, including animal material. Only the Bearded Pig, *Sus barbatus*, occurs wild in Borneo. The Domestic Pig is believed to have been bred from the Common Wild Pig, *Sus scrofa*, of mainland Asia.

Figure 37. Skull of a Bearded Pig. *Sus barbatus*.

