

THE PRE–HISTORIC PROBOSCIDEANS OF NEPAL

RAMESH SHRESTHA

Natural History Museum, Tribhuvan University

Swayambhu, Kathmandu, Nepal

r_shrestha@dr.com

ABSTRACT

Although Nepal is one of the native habitats of the present day species of the Asian elephant, *Elephas maximus*; it is also an important seat of early Proboscidean evolutionary grounds. Up to now four families and within them seven species of Proboscideans are recorded from Nepal in the forms of different fossils. Out of the total known Proboscideans throughout the world and Indian sub–continent, Nepal had approximately 3.86% and 14% respectively. This fact undoubtedly indicates that Nepal has remained an important place with perfect ecological conditions for the advance of elephants since pre–historic times.

Keywords: Proboscidea, elephants, Rato Khola, Surai Khola, Babai Khola

INTRODUCTION

Nepal, as part of the Indian sub–continent, remained an important place for the evolution of elephants since Miocene some 24 million years before present (MYBP). Many palaeontologists have discovered various body parts of these Proboscideans since a long time from different parts of the country. The Proboscidea order (from the Latin proboscis) encompasses the mammals with long muscular trunks. The features of trunks and tusks were absent or less developed in early Proboscideans. The elephant trunk is a very special feature, which is very strong, mobile, sensitive, and they can use it to grasp things with it. The trunks have certainly helped out elephants and their ancestors a lot by adapting to strange environments and use it for special things. Fossils of Proboscideans have been found on all continents except Australia and Antarctica. Such trunk bearers have lived in diverse places like lake sea shores, marshes, swamps, savannas, deserts, and mountains with varied climatic conditions varying from very hot to cold temperatures. At the present time, there are only two Proboscidean species alive. One of them is the Asian elephant (*Elephas maximus*) found in mixed habitat zones in Sri Lanka, India, Nepal and parts of southeast Asia. The other one is the African elephant (*Loxodonta africana*) found in sub–Saharan forests and grasslands.

Taxonomy of Proboscideans

The taxonomic differentiation of various extinct and the only extant species of *Elephas maximus* and *Loxodonta Africana* is made primarily on the basis of odontogeny (teeth) and the structure of molars in the jaws.

Scientific Classification

Kingdom: Animalia; Phylum: Chordata; Class: Mammalia; Order: Proboscidea Illiger,

1811; Families: 1) Barytheriidae 2) Deinotheriidae 3) Gomphotheriidae 4) Mammutidae 5) Moeritheriidae 6) Numidotheriidae 7) Palaeomastodontidae 8) Phiomidae 9) Stegodontidae and 10) Elephantidae (*Elephasmaximus* and *Loxodontaafricana*).

Beginning of the Proboscideans

During the late Palaeocene when a single common ancestor produced two separate lines of present day dugongs/sea-cows and elephants respectively. Thus, the beginning of the Proboscideans could be traced back to this time some 60 MYBP. The earliest known probable Proboscidean is *Eritherium*, a small animal about the size of a fox. The fossils of *Eritherium* were found in the late or early Palaeocene deposits in Morocco. However the earliest semi-true Proboscideans are believed to have originated and evolved during either late or early Eocene some 50 MYBP in southern Algeria.

Proboscideans in the world

ShoshaniJeheskel recognized 177 species and subspecies of Proboscideans (2005), which are classified in 43 genera with over 10 families till the year 2005. The classification of Proboscideans is still unstable and demands frequent revisions and some relationships within the order still remain unclear. However it has been noted that the temporal distribution of the Proboscideans could be traced back to the Palaeocene period to the present time with time record of different species of elephants or elephant-like creatures that existed on the Earth with very rich spatial distribution as well. Fossils of different Proboscideans are known in ample numbers excavated throughout the world since early 1800s.

Proboscideans in Indian Sub-continent

In the Indian sub-continent alone some 50 different species of extinct and extant elephants are known during different times. And these have been described and classified in assorted ways by Osborn (1921,1936,1942), Colbert (1935), Lydekker (1877,1878,1880), Simpson (1945), Chakravarti (1965), Maglio (1973) and others from time to time.

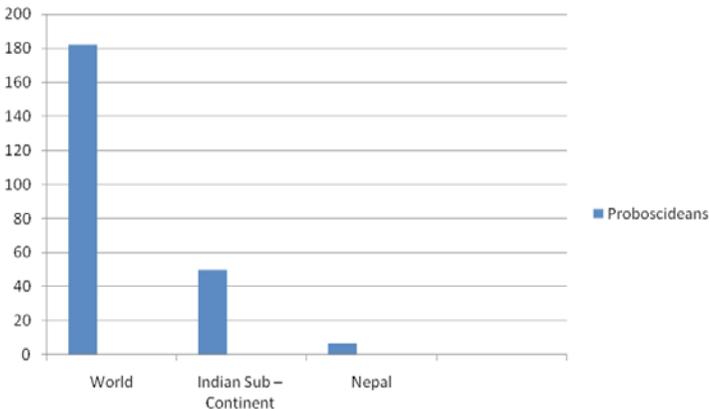


FIG 1. Comparative Number of Proboscideans species.

Extinct Proboscideans in Nepal**TABLE 1. Extinct Proboscideans' fossil finds in Nepal.**

Up to now a total of 7 different extinct Proboscideans are known to have existed in Nepal evidenced by several findings of fossils in different parts of the country at different times (table 1).

	Genus/ Species	Family	Fossil in Nepal
1	<i>Deinotherium</i>	Deinotheriidae	Babai Khola (West <i>et al.</i> , 1978)
2	<i>Gomphotherium</i> (Synonym: <i>Trilophodon</i>)	Gomphotheriidae	Babai Khola (West <i>et al.</i> , 1978), Surai Khola (Corvinus, 1988), Dongol (1985)
3	<i>Stegodon bombifrons</i>	Stegodontiidae	Rato Khola (Corvinus, 1988)
4	<i>Stegodon ganesa</i> (Synonym: <i>Stegodon insignis</i>)	Stegodontiidae	Kathmandu Valley (Sharma & Singh, 1966), Babai Khola (West & Munthe, 1981), Kathmandu Valley (Corvinus, 1988)
5	<i>Archidiskodon planifrons</i> (Synonym: <i>Elephas planifrons</i>)	Elephantiidae	Babai Khola (West & Munthe, 1981), Kathmandu Valley (Dongol, 1985) and Rato Khola (Corvinus, 1988).
6	<i>Elephas hysudricus</i> (Synonym: <i>Hyselephas hysudricus</i>)	Elephantiidae	Kathmandu Valley (Dongol, 1987).
7	<i>Elephas namadicus</i>	Elephantidae	Binai Khola near Pidari village, Dumkibas in Nawalparasi

- 1. *Deinotherium*** (Family: Deinotheriidae): *Deinotherium* also known as a 'terrible beast' was a large prehistoric relative of modern–dayelephants that appeared in late/middle Miocene and survived until early Pleistocene. Its trunk was shorter and it had downward curving tusks attached to the lower jaw. *Deinotherium* evolved from the smaller early Miocene *Prodeinotherium*. Three species of *Deinotherium giganteum* in Europe, *Deinotherium bozasi* in Africa and *Deinotherium indicum* in India, Nepal and Pakistan are known. The molar teeth of *Deinotherium* were discovered at Babai Khola (West *et al.*, 1978), in west Nepal.
- 2. *Gomphotherium*** (Family: Gomphotheriidae): It called welded beast, which evolved in the late Oligocene/early Miocene of north America from 13.650 to 3.6 MYBP living about 10 million years. The genus immigrated into Eurasia and Africa after a drop in sea level (probably during the Tortonian epoch) allowed them to cross over. It survived into the Pliocene and its remains have been found in many countries including Nepal. These animals probably lived in swamps or near lakes using their tusks to dig or scrape up aquatic vegetation. Fossils of *Gomphotherium* are reported from Babai Khola (West *et al.*, 1978), Surai Khola (Corvinus, 1988) and Dongol (1985) in Nepal.
- 3. *Stegodon bombifrons*** (Family Stegodontiidae): The Gable–toothed Elephant or *Stegodon bombifrons* is the initial stage of the true elephant family, or more correctly, the transition

from Mastodon to Elephant. In Bardia National Park in Nepal, there is a population of Indian elephants which, possibly due to inbreeding, exhibit many *Stegodon* like morphological features. Some dismiss these primitive features as recent mutations rather than atavisms. Corvinus (1988) found the whole skull of this elephant at Rato Khola, which is now in the collection of Department of Geology, Tribhuvan University.

4. ***Stegodon ganesa*** (Synonym ***Stegodon insignis***) (Family Stegodontiidae): *Stegodon*, also known as roofed tooth elephant, is the genus of the sub family Stegodontinae. Although it was assigned to the family Elephantidae by some authors, but it has more comfortably been placed in Stegodontiidae due to its certain features which are more towards *Stegodons* than true elephants. In some individuals the tusks were so close together that the trunk probably did not lie between them but instead draped over. The molars of *Stegodon ganesa* are reported from Kathmandu Valley (Sharma & Singh, 1966; Corvinus, 1988) and Babai Khola (West & Munthe, 1981).
5. ***Archidiskodon planifrons*** (Synonym: ***Elephas planifrons***) (Family Elephantidae): *Archidiskodon planifrons* is a type of a genus *Stegodon* of the sub-family Stegodontinae. While tracing the biogeography of these animals they were found to live in large parts of Asia during the Pleistocene and Pliocene and locally in Indonesia into the Holocene epoch. *Archidiskodon planifrons* was also found in the then ancient lands of present day Nepal. Many fossilised body parts of these elephants were recorded from different parts of Nepal. There is a fossilized skull with tusk of the *Archidiskodon* (3 MYBP) found on the banks of Rato Khola, Siwalik hills of Nepal. Several other fossils are also recorded from Babai Khola (West & Munthe, 1981) and Kathmandu Valley (Dongol, 1985).
6. ***Elephas hysudricus*** (Synonym: ***Hyselephas hysudricus***) (Family Elephantidae): *Elephas hysudricus* is an extinct elephant species and was described from fossil remains found in the Siwalik Hills. It lived during the Miocene and Pliocene epochs. The molar teeth of *Elephas hysudricus* has been reported from Kathmandu valley (Dongol, 1987).
7. ***Elephas namadicus***(Family Elephantidae):***Elephas namadicus*** was a species of 2.1 metre-tall prehistoric elephant that ranged throughout Pleistocene Asia from India (where it was first discovered) to Japan where the indigenous Neolithic cultures hunted that particular subspecies for food. *Elephas namadicus* is a descendant of the Straight-tusked elephant. The molar teeth of *Elephas namadicus* was discovered from the alluvial deposits of Binai Khola near Pidari village at Dumkibas in Nawalparasi.

DISCUSSION

At the moment only 7 species of Proboscideans are known to have existed on the ancient lands of Nepal. Keeping in view of ample number of fossil finds of the past, Nepalese Proboscideans at different time frequencies and also the findings of the rich number of different species in the Indian sub-continent, it is probable that more examples and additional species are likely to surface in due course of time. Furthermore, the presence of extant species *Elephas maximus* in Nepal also confirms the perfect ecological conditions for the previous elephants. And, these facts evidence the apparent findings of other species also. However, due to difficult terrain of the Nepalese lands covered with rich vegetation exhibits a great difficulty in the fossil works.

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