



Phylogeny of elephants

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Introduction

Phylogeny is the evolutionary pedigree or genealogical history of a species or a group of animals. As any other living animals elephants also belong to the Kingdom Animalia. Because of the presence of spinal cord these are included in the Phylum Chordata and the presence of spine and vertebrae place them under the subphylum Vertebrata. Elephants breast feed their young ones and hence are in the Class Mammalia. The Order of these proboscis bearing animals is known as Proboscidea and the Family of the present day living elephants is Elephantidae. There are two genus under this, known as *Loxodonta* (African elephants) and *Elephas* (Asian elephants).

Evolutionary history

The ancestor of elephants date back millions of years. There are many ancient fossils to throw light in this aspect. But scientists differ in the exact chronological order of their evolution. The oldest ancestor identified is *Moeritherium* and the immediate predecessor of the elephants is *Primelephas*. A brief description of these different prehistoric animals is provided below.

Moeritherium

Moeritherium lived in Africa between 50 and 57 million years ago in the Eocene period. They were pig-sized creatures having similarity to present day Hippopotamus and were

described as pygmy hippopotamus. *Moeritherium* existed in the marshes of North America. It had enlarged upper incisors that stuck outside the mouth. Instead of the trunks they were having small flexible snouts. Ears were also short. The name was derived from the fact that the fossils of these animals were first discovered from Moeris in Egypt.

Deinotherium

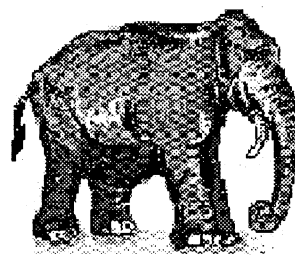
Deinotherium were present at the same time in Oligocene period around 25 to 27 million years back. They were having similar size of present day elephants. The trunk was very large. Instead of upper jaw tusks they were having two tusks curving downwards from the lower jaw. This aided them to collect the fodder material from the swamps just like a scoop and also to dig roots. They were having a height of 13 feet.



Deinotherium was evolved in Africa and later migrated to Europe and Asia. But they were not reported from North America. One million years ago they had perished from the earth.

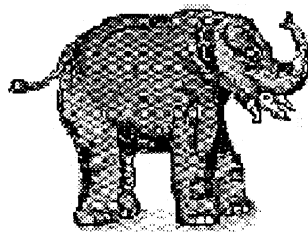
Trilophodon

They were four tusked animals with two small tusks curving upwards from the upper jaw and two large tusks curving downwards from the lower jaw. The upper part of two of the molars fused to form a crown. Their existence is believed to be around 25-30 million years back.



Mammut

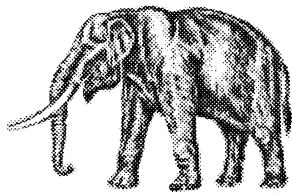
Their presence on earth was traced back to 25 million years. American mastodon was another name given for this group. They were slightly shorter than present day elephants. The body was more heavily built. They were more solidly built with a hairy body.



Stegodon

The long tusked stegodons were present 15 to 20 million years back. The tusks whereas long as three quarters of its body. It was present in late Miocene period and is considered





as the ancestor of mammoths. One of the major difference with the mammoths was the blunt crested teeth surfaces. This must have enabled the creatures to eat more coarser feed material that too of wide

variety.

Gomphotherium

They were present in Africa and then migrated to North and South America. Long narrow snout was one of the characters of this animals. It was not a trunk. Gomphotherium were having two small pointed tusks attached to upper jaw. They were present in Miocene period.

Primelephus

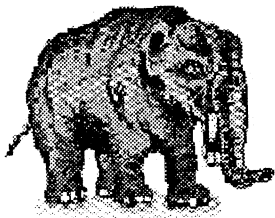
Primelephus is believed to be the immediate ancestor of the present day elephants and mammothus. From this the three genera were evolved namely mammoths, Asian elephants and the African elephants. Primelephus were evolved in Central and East Africa 5-6 million years ago. They had long developed trunk. Tusks were large and straight from the upper jaw.

Platybilodon

They were having very short trunks. The four tusked creature had the lower tusks flattened, which was modified for digging and scooping the vegetations.

Palaemastodon

Palaemastodons were the immediate ancestors of mastodons. They had very small tusks, two each from the upper and lower jaws. Their trunk was poorly developed. Palaemastodons were present in the Oligocene strata in Africa and Eurasia.

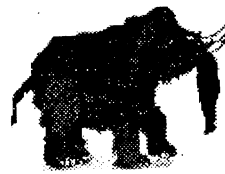


Mastodons

The mastodons lives in Europe and Asia around 3-4 million years ago. Some of the specimens survived till 10000 years ago in North America.

The major difference with present day elephants was that they were having luxurious hairs all over the body. Another difference was in molar teeth. The molars of mastodons were having rounded cusps or crests which were relatively few in number. The teeth are described as cone shaped. Their molars were modified with transverse ridges of dentine covered with hard enamel in their grinding surfaces. The dips between contained tooth cement. This in turn caused wearing of teeth at different rates and consequently an evolutionary advantage for the species. It was able

to eat coarser fodder and to survive on barren habitats.



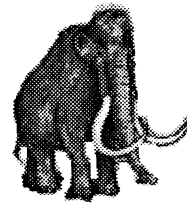
Their diet included herbs, shrubs and even tree bark. They were with short tusks on both upper and lower jaws. Compared to this present day elephants lamella are closer, more numerous and spaces

between them were filled with cementum. The tusks were long and curved. They had flat forehead rising to a prominent domed crown.

Phiomia.

They were also found in Africa in and around present day Egypt. The creature was having height of 8 feet at shoulders. They had four short tusks two each from upper and lower jaws. The appearance was more pig like than elephant like. Trunk was very short.

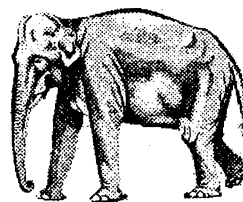
Mammoth (Mammuthus)



The name indicates the woolly nature. They are believed to have originated 3-4 million years back at Africa. The information about the mammoths is more than any other ancestors of the elephant. Some of them were huge creatures measuring 4 meters at shoulder. Some others

were comparatively smaller with a height of around 6 feet. Their body was covered with luxuriant growth of hairs. The hairs were short on face, trunk and ears. Huge tusks were an important character of these giants. Spread of these animals to cold regions made evolutionary changes like woolly coat. Two species were identified as *Mammuthus columbi* and *Mammuthus primigenius*. Mammoths had very large rootless tusks that grew out of the skull and continued growing throughout the Mammoth's life.

Asian Elephant (Elephas)



Elephas is the generic name given for Asian elephants. *Elephas maximus* is the taxonomic name of the species. There are few sub species of this group. *Elephas maximus indicus* is the Indian elephant, *Elephas maximus maximus* is the Srilankan elephants, *Elephas maximus sumatranus* is the

elephants of Sumatra islands

There does exist some taxonomic disagreement concerning the number of Asian subspecies due to the recent discovery of a population of "giant" elephants, about one foot taller than other Asian elephants from the forests of northern Nepal. Their number as on today is believed to be between 50 and 100.





Asian elephants once ranged from the Tigris and Euphrates Rivers in ancient Mesopotamia in the west, east through Asia, south of the Himalayas to Indochina and the Malay Peninsula, including Sri Lanka and Sumatra and possibly Java, and north into China at least as far as the Yangtze River. Even in the 19th century it was still common over much of the Indian subcontinent and the eastern parts of its range. Today they are found from India to Vietnam, with a tiny population in the extreme Southwest of China's Yunnan Province, with an estimated total of 35,000 to 50,000 Asian elephants remaining in the wild.

The various subspecies described so far are not recognised widely. In general presence of four subspecies namely Sri Lankan elephants, Sumatran elephants, Malaysian elephants and Indian elephants is accepted. Three more subspecies, namely Myanmar elephants (*Elephas maximus burmanicus*), Northern Indian elephants (*Elephas maximus bengalensis*) and South Indian elephants (*Elephas maximus dakamensis*) are also suggested by some scientists.

Sri Lankan elephants

Sri Lankan elephants are the largest of Asian elephants. They are very dark in colour. Mature Sri Lankan elephants show areas of the skin around the ears, face, belly and trunk as pink colour. These are the areas of depigmentation. The head of the male has large and pronounced bulges while those of the female are smaller. The shoulder height of average male adult Sri Lankan elephant will be around 3.5 meters and it weighs as much as 5.5 tonnes. Females are much smaller around 4 tonnes. The subspecies names assigned to these animals are *Elephas maximus maximus* or *Elephas maximus ceylonicus*.

Indian elephants

Indian elephants have the species name *Elephas maximus indicus*. They are bigger than Sumatran elephants and smaller than Sri Lankan elephants. The huge Nepal elephants and the Myanmar elephants are also grouped as this species. The height at withers ranges between 2.5 to 3.5 meters, females being smaller and will be only half the size of bigger males. The adults weight 3 to 4.5 tonnes. Their colour is described as lighter grey.

Sumatran elephants

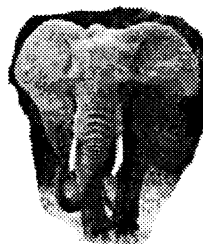
The subspecies name is *Elephas Maximus sumatranus*. The smallest and lightest of the Asian elephants are Sumatran elephants. They are seen in Sumatran islands. The exact location is described as from Way Kambas, Lampung until Gn. Sulah, Ace. They are smaller than other Asian elephants. The maximum height is around 2.5 meters only and weigh 2-3.5 tonnes. The colour is lighter than that of Indian elephants.



Malaysian elephants

The elephants seen in Malaysia and Thailand are together classified as *Elephas maximus hirsutus*. They are comparatively smaller with the height of 2.5 to 3 meters. Males are usually 15% larger than females. The adult body weight will be around 4-5 tonnes. The local name for this species is *Malay Gajah*. The west Malaysians refer to it as "*Pak Tulang*" meaning father bones and the east Malaysians call it "*nenek*" meaning grandmother.

African Elephant (Loxodonta)



The generic name of African elephants is *Loxodonta*. There are two sub species identified under this. An international group of researchers after analysis of the DNA of the two groups discovered that they as different as that of tiger and lion. Hence these two should be classified as two different species.

Savannah or Bush elephant

It is one the subspecies of African elephants. They are larger than all the other elephants available on earth. The height may reach upto 4 meters. There are specimens weighing more than 7 tonnes. The colour is described as grey. The scientific name of these animals is *Loxodonta africana africana*.

Forest elephant

The other group is *Loxodonta africana cyclotis*. They are smaller than bush elephants. Their existence is limited to central Africa. Their ears are small and skin is darker. They weigh around 2-4 tonnes and the height will be between 2 and 3 meters.



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