

The Evidence of Oligocene Elephants from Eritrea

Written by shabait Administrator

Saturday, 22 October 2016 00:58 - Last Updated Saturday, 22 October 2016 01:03



Elephants are massive mammals. They can reach a height of about 3 - 4 meters and a weight of 4,000 -7,000 kilograms. These massive creatures are known for their thick bodies, stocky legs, giant floppy ears, trunks, and tusks. Those big ears help elephants stay cool in hot, dry conditions. And their trunks serve as a fifth limb which they use to breathe, grasp objects, lift water, and even suckle for comfort. There are approximately 40,000 muscles in the elephant's trunk alone giving him an exceptional degree of flexibility and maneuverability. The skeleton of an elephant is made up of 326–351 bones. Over 99 percent of all terrestrial mammals have hair, but elephants are completely bald.

And the earflaps are huge especially in the African variety, which actually has the largest earflaps of any animal in history. The main reason for this is, elephants live in some of the hottest climates on earth and their bodies produce an enormous amount of heat. Although they have adjusted their thermostats to reduce the heat output of their cells, it is still not enough. Baldness helps them eliminate heat faster, but that is also not enough, hence the huge earflaps function as a cooling device. The elephant ears are loaded with blood vessels particularly where the skin is very thin, this allows for faster dissipation of heat helping to keep the animal cooler when temperatures seem impossibly hot. East African elephants flocking in group alongside a river

Elephants are herbivores that live in many different types of habitat from savannah to marsh to forest. They are considered keystone species due to their impact on the environment in which they live. They have the longest known pregnancy of any living mammal. Mothers carry their babies for 22 months in the womb and then care for their babies for several years after birth. Elephants have been known to communicate via touch, sight, smell, and sound. Over long distances, they can use seismic communication - or vibrations made by stomping their feet - to communicate dangers to other members of the herd.

Elephants usually have 26 teeth: the incisors, known as the tusks, 12 deciduous premolars, and

The Evidence of Oligocene Elephants from Eritrea

Written by shabait Administrator

Saturday, 22 October 2016 00:58 - Last Updated Saturday, 22 October 2016 01:03

12 molars. Unlike most mammals, which grow baby teeth and then replace them with a single permanent set of adult teeth, elephants are polyphyodonts that have cycles of tooth rotation throughout their lives.

In general, there are two recognized subspecies of elephants - the African elephant and the Asian elephant, with the greatest difference between the two being their physical location. African elephants are scattered throughout sub-saharan Africa while Asian elephants are found in southern and southeastern Asia. Among African elephants, the forest form is smaller than the savannah form.

- rief evolution of Elephants

Proboscideans (a relative of the modern elephant)) have been a part of the Afro-Arabian landscape since at least the early Eocene, ~55 Mya. "Proboscidea" is a Greek word that means "having a nose". Over 350 Proboscidea have been identified as having existed over the last 50 million years. Elephantidae is the only surviving family of the order Proboscidea; other, now extinct, members of the order include deinotheres, gomphotheres, mammoths, and mastodons. The only areas that Proboscidea were not found to have been home at least some of these species are Antarctica and Australia. Majority of these species are extinct leaving only the Asian Elephant, African Savanna Elephant (the world's largest land mammal) and African Forest Elephant.

The evolutionary tree of proboscidea, a taxonomic group that unites all elephantid lineages as well as mammoth and mastodon species, can now be constructed with higher certainty than ever before. Two distinct clades seem to have formed 6 million years ago. The first clade included the hypothetical ancestor of savanna and forest elephants. The two seem to have diverged sometime during the miocene-pliocene transition 5 million years ago. The second clade includes Asian elephant and the now extinct woolly mammoth. It is important to note that these two diverged from their common clade later than savanna and forest elephants diverged from theirs, making them genetically closer to each other than the two species of Loxodonta.

With only two living species left, the African (*Loxodonta africana*) and the Asian (*Elephas maximus*) it is hard to believe that this order, the proboscidea, was once one of the most successful mammal groups on Earth. While they originated in Africa, the proboscidea managed to conquer almost every continent on this planet. They are known for their ability to adapt to a variety of different environments which allowed them to evolve and survive till the present times.

The Evidence of Oligocene Elephants from Eritrea

Written by shabait Administrator

Saturday, 22 October 2016 00:58 - Last Updated Saturday, 22 October 2016 01:03

They are still considered to be one of the most adaptable animals in the world. Some of them lived in the rainforests while others resided in the desert. The evidences from the fossil sites of Dogali and Kudo- Felassi (in Eritrea) and the Chilga site (in Ethiopia) are the only known late Oligocene mammal sites from the whole of Africa.

The Evolution tree of the elephant family based on evidence of fossils.

The discovery of fossil mammals on the coastal and highlands of Eritrea represents the earliest evidence for the today's favourite Africa's mammals, the elephants. These evidences are known from two prominent sites that are, the Dogali (near the port city of Massawa) and Kudo-Felassi (Mendefera) sites. These sites preserved, fossil evidence of a primitive Proboscideana, a very old relative of modern elephants. It is known by scientists that early elephant evolution have occurred entirely in Africa, and these new fossils from Eritrea provided new evidences on the early phases of the evolutionary history of these fascinating animals. Such ancestral early elephants were much smaller than today's African elephants, reaching about 1000 kg in body size. This species of elephant were thriving in the Miocene from the Arabian land mass to Africa; during this period Africa and Arabia were still joined as a single continent. This time period is a portion of the African mammalian evolutionary history, which is substantially unknown to science.

- Dogali Elephants

In November 2006, a team led by the late Paleontologist Dr. Jeheskel Shoshani have published in the online Journal of Proceedings of the National Academy of Sciences (PNAS) a stunning discovery of fossil remains of an extinct Elephant species from the site of Dogali (locality of Wedeg Melatse Farm) near the port city of Massawa. According to these researchers, this extinct Elephant belong to a late Oligocene proboscidean species, dated to ~ 27 Million years. Throughout Africa, there is a gap in the proboscidean record in the late Oligocene, 34 to 24 million years ago. Whenever there is a gap in the record, it's significant when you find specimens from that period. These specimens date from exactly the time where there is a gap. In this account, the discovery of Eritrean Elephant taxon points to the importance of East Africa as a major area for the knowledge of the early evolution of Elephants before the faunal exchange between Eurasia and Africa and also, helps to better understand the biogeographical inferences of early proboscidean radiation between Africa and Arabia.

Restoration of *Eritreum melakeghebrekristosi* from Dogali (small individual) and the larger

The Evidence of Oligocene Elephants from Eritrea

Written by shabait Administrator

Saturday, 22 October 2016 00:58 - Last Updated Saturday, 22 October 2016 01:03

individual *Gomphotherium angustidens*, an extinct genus of proboscoid that evolved in the

Early Miocene of North America. After Shoshani et al., 2006. Artwork by G.H.M

The fossil jawbones were discovered by an Eritrean farmer belong to a “missing link” species that connects modern elephants to their ancient ancestors. These fossil bone fragments belong to an animal in the order Proboscidea (large mammals with trunks), that is same order that includes living elephants. The name *Eritreum* represents the name of the nation of Eritrea, and *melakeghebrekristosi* in honor of the farmer, Melake Ghebrekristos, who found the specimen and realized its importance. Therefore, the researchers name the new Elephant species *Eritreum melakeghebrekristosi*.

This is a small-sized elephantimorph proboscidean. The molars are smaller than those of all other early elephantimorph proboscideans. The jawbone pieces were discovered with teeth in place, allowing researchers to hypothesize that the animal replaced its teeth through a process called horizontal tooth displacement— the same “conveyor belt” style seen in living elephants. If this theory is correct, *E. melakeghebrekristosi* would be the earliest known proboscidean to exhibit this characteristic. The size of the teeth is another indication of the intermediate evolutionary stage of the species. These fossil specimens are currently housed at the paleontological laboratory of the National Museum of Eritrea, in Asmara.

-Present times

Today, elephants both the African and Asian species are some of the most critically endangered creatures on Earth. African elephants are listed as vulnerable by the International Union for Conservation of Nature (IUCN), while the Asian elephant is classed as endangered. Just in Africa where they were very common south of the Sahara, its range and numbers have shrunk as human population, development and poaching have increased. To have an idea by the early 1980's there were approximately 1.3 million African elephants in the wild. As Ivory became more valuable an indiscriminate killing of elephants occurred, and by the end of that decade, 80% of the African elephant population had been decimated.

Map shows, range of the African Elephants at present times

The Evidence of Oligocene Elephants from Eritrea

Written by shabait Administrator

Saturday, 22 October 2016 00:58 - Last Updated Saturday, 22 October 2016 01:03

What about in Eritrea? Recent research on Eritrean Elephants shows that, only about 100 elephants persist in the Gash-Barka administrative zone. The study reports, Eritrea Elephants are known as the most completely isolated species, with no gene flow from other elephant populations and they are mostly savanna elephants, with closer genetic affinity to Eastern than to North Central savanna elephant populations. Today, habitat loss is a great threat to Eritrean elephants and faces their existence. As a result, human-elephant conflicts have increased over the years as humans have encroached more and more upon elephant habitat and migratory routes. Researchers recommend that conservation efforts should aim to protect Eritrean elephants and their habitat in the short run, with restoration of habitat connectivity and genetic diversity as long-term goals.