# Recreation of the Andrewsarchus animal from Ancient DNA Technology

## Summary and Introduction

A technology to recreate animals from ancient DNA is the process whereby organisms are created which is either a member or that resembles a species which is extinct including the increase of population of such animals. There are available methods including the closing method which is commonly used and widely proposed. However, selective breeding is also another method which can be used. Most of these methods are applied to endangered animals. The cloning method brings back extinct species (Brown, 2006 p.28). Andrewsarchus is one of the extinct mammals that lived in China. In summary, the Andrewsarchus existed in ancient times and preferably fed on plants and animals due to the nature of the skull.

## Literature and History

The animal Andrewsarchus originated and discovered in Mongolia. There was a number prior discoveries made but it was not until 1923 when it was when it was discovered. These discoveries were conducted by organizations such as American Museum of Natural History (AMNH). Some of the personalities who contributed immensely in the discovery included Kan Chuen and Roy Chapman, and others who were conducting exploration work (MacPhee, and Sues, 2013 p.5). In 1923, many classifications of the skull were done, with some classifying them as mesonychid. In the analysis of the discovery, Osborn was able to show the details of the skull in terms of the teeth and the jaws. The skull was long and narrow having very powerful teeth but thin jaws. However, palaeontologist believed that the Andrewsarchus lies mainly in the class of carrion (MacPhee, and Sues, 2013 p.5). They had hooves instead of sharp nails, however, proving them to have been originated from ungulates. Most of them were feeding on the dead animals. Andrewsarchus was portrayed as the giant wolf due to lack of knowledge of the animal. The entire animal was reconstructed on the basis of the artifacts from North America such as Mesonyx. It was the largest terrestrial mammal. The weight of Andrewsarchus could reach up to 1000kg as compared to wolf brown bear.

Andrewsarchus was described as hoofed carnivore; therefore, they feed on animals. They feed on the only living relation that trailed slowly behind them. Andrewsarchus was described as solitary hunters but the bad weather pattern that is taking place around the globe had forced them to move away from their habitation to seek for more comfort zone. They had been driven from their usual places due to the rising of oceans and the scrub plains beyond that eventually depleted the plants that provided a good environment for the Andrewsarchus to feed on. Generally, Andrewsarchus were carnivores. Andrewsarchus was a prehistoric mammal known as a creodont, a family of man-eaters. Some paleontologists concluded that the Andrewsarchus fed on multiple predictors (Thewissen et al., 2009 p.5). Due to the nature of the jaws and also single skull that was discovered along the shoreline, scientists speculate that they fed on molluscs and turtles. They led them to be termed as omnivorous.

The diet was perhaps seaweeds or beached whales. Feeding plan is the most important factor in the maintenance of the animals. Most of the work should, therefore, dwell on this part. Proper feeding plan will ensure good survival and will provide a well conducive environment for these animals if developed. The protection of these animals is also important. It involves the security and protection from extinction in case of anything. In summary, Andrewsarchus animals were classified in the kingdom Animalia, phylum chordate, class Mammalia, order mesonychia, family trisodontidae, and genus Andrewsarchus. Until today, few other bones have been found and not all details of the animal’s lifestyle are clear (Haugen, 2014 p.94). It had a heavily built, enormous skull, and a long snout with large teeth, long body, long tail, short legs, and hooved toes.

## Feeding Plan Proposal

As pointed out earlier, Andrewsarchus were mostly omnivores and, therefore, they fed on both the plants and animals. According to O’Leary (2013, p.133), the most suitable feeding plan for them are the plant species such as seaweeds, examples including; the brown algae, dulse, carrageen moss kelps, sea lettuce, among others. They also ate the primitive whales (archaeoceti), turtles, shellfish, and molluscs.

Archaeoceti is the group of the primitive whales that lived from early Eocene. Molusks are marine creatures that are the largest in number. These animals are mainly found in bodies of no salty water and swampy areas (Benton, 2005 p. 3). Therefore, in formulating the feeding pan for the Andrewsarchus, the most important factor to consider is the habitation conditions of the mollusks which include freshwater and also terrestrial ones (Hargraves 2004 p.144). This will go hand in hand with their maintenance and protection of these species. Therefore, a good environment should be formulated for breeding a large number of these species to enable the Andrewsarchus to feed on.

Considering that they are herbivores they graze on algae or filter feeders. Therefore, some feed on the microscopic filamentous algae mostly using their ridicule. Molusks also feeds on plants such as kelp. Turtles are types of reptiles characterized by a special bony or shell. They can also feed on turtles. However, a breeding mechanism should also be developed to sustain a large number of these turtles to enable them to feed on. Turtles feed on a variety of food depending on the environment they live in. Most adult turtles eat on aquatic plants and also invertebrates such as insects, snails, and worms. They would also feed on dead marine animals that ensure their growth. The marine animals include whales and fish among others. However, other species are carnivorous eating on small fish and a wide range of aquatic animals (Geisler, and Theodor 2009 p.458). Most of the sea turtles feed on jellyfish sponge and other bodied organisms. Other species such as the green sea turtle do not eat any meat; however, they feed on algae.

Another type of food that the Andrewsarchus feeds on is the shellfish. These are aquatic invertebrates; they also feed on aquatic plants. Considering that Andrewsarchus are herbivores, they feed on some plants species such as the seaweeds and sea plants such as the algae (Geisler, and Theodor 2009 p.458). A comprehensive mechanism should be developed to accommodate the survival of both the plants and animals that the Andrewsarchus feeds on, including the molusks, turtles, and jellyfish. The most important method includes developing the habitation to avoid the depletion of these animals that they feed on and to ensure there is a continuous breeding mechanism (Ketten, 2000 p.43). The huge cost, therefore, would go to the people developing those areas. Most of the funding should be channeled to those developing them. Suitable environmental conditions, however, should be provided to prevent the depletion of these species. This is not limited to the proper disposal of wastes, the proper channeling of waste gases in the air, and also a mechanism for recycling most of the things that are deemed to interfere with the ecosystem of these organisms. The industrial wastes and gases such as carbon (IV) oxide should not be channelled to the ecosystem.

A modern zoological park should be developed. Inside the park, there should be a freshwater lake, as well as a terrestrial environment for the growth of the species that the Andrewsarchus feeds on. The park should be guarded with high security and properly fenced to avoid human interference and encroachment. Proper fencing is required to prevent the animals from escaping the park that would hinder their growth due to extinction. A park should be well selected in a suitable area where plants that Andrewsarchus feed on can grow comfortably without any extinction (Morlo, Miller, and El-Barkooky, 2007 p.145). Most of these environments would be the terrestrial one. The feeding plan is, therefore, on constant suitable plants, and available animals that they will feed on, considering the fact that they must be available in large quantities and throughout the year. A suitable investment should be considered to sustain this plan.

## Cost of Feeding Estimation

| Type of food | Estimated Cost | Reason |
| --- | --- | --- |
| Plants (seaweeds) | $600,000 | This is the cost of bringing up the specific plants and animals that these species feed on. It includes the protection and proper security to avoid the extinction. Initially, proper plants should be natured well and most of the funds will be channeled here. The protection of extinction should be considered. Most of these funds would also go to research and employ the various professionals to maintain them. A proper research should also be conducted to ensure there are other new plants in the ecosystem for the feeding of these animals. |
| Animals (molusks, jellyfish, turtles) | $600,000 | This will be a channel to the breeding of these animals to ensure that food for these species is available. The breeding should be continuous including formulating a feeding plan for them. Employing zoologists and research fellows to maintain these animals and to a lot of research that will ensure that new species are brought on board, estimation of the future longevity of these species in the new zoological environment. Most of these would also go to hiring consultancy services on the other type of foods to be used in the park. This is to ensure that there is a continuous supply of food. |
| Heath related costs and security | $500,000 | Health is also a very important factor in the sustainability of these animals. This is to ensure that they are closely monitored and any suspicious negative health conditions should be responded to immediately. The security of these animals should also be kept into consideration, this is not limited to fencing and protection from human interference and also the extinction of these species  |

## Reliability of the Data

The proposed data is reliable due to the available factors that should be put in place to ensure there is the success of the protection and sustaining of the animals. Most of these factors include the available food which is so paramount, and therefore, heavy investment should be channeled there, the best reason why there is a high cost of rearing these species incorporating the plants and animals that they feed on (Carbone, Teacher, and Rowcliffe, 2007 p.22). The diversity aspect of Andrewsarchus outlines how they are able to meet their needs in terms of food, health, and protection. For the animals to meet their needs to the maximum there is a well-planned investment strategy entailing the costs set in place. It also involves the available means to reconstruct phylogenetic relationships of the organisms. According to Papliński, and Gustafsson (2005, p.81), this measures the evolution diversity of organisms. The interaction between Andrewsarchus and their environment is also one of the major factors; the environment should be favorable and conducive for interaction.

Actual molecular methods that are suitable for Andrewsarchus include protection from pathogens and other infectious diseases which pose biosafety hazards. The plan also involves massive DNA sequencing, microbial profiling, molecular typing of pathogens, and identification of antimicrobial resistance genes, mass spectrometry, and other technologies that are available in diagnosis and control of the infections onto these animals (Renaud, et al, 2016 p.577). Molecular diagnosis is the most important method to identify and control the presence of inhibitors, cross-contamination, and diagnostic of the animals and other causes of microbial identification (Renaud, et al, 2016 p.581). These can be integrated into pathologic and laboratory findings. However, proper validation of such methods is necessary. The approach of this report has covered well the comparative physiology and actual molecular methods that have been cited clearly to ensure there is full protection of the above species.

## Conclusion

Andrewsarchus animals when recreated through the technology can be maintained and sustained if proper measures can be put in place to ensure the sustainability and continued survival of the organisms. It is evident that Andrewsarchus existed from the ancient times. Some of the factors to ensure the sustainability of these animals include food, health, and security. A huge amount of investments should be channeled in those areas. A good ecosystem is necessary for the survival of these organisms. For a more detailed study, it is recommended that all stakeholders and professionals are involved in research and consultancy. Andrewsarchus is one of the endangered animals, therefore, needs care and protection from any interference.

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