

Palaeo-biodiversity & Prehistoric mega fauna in Sri Lanka

Aravinda Ravibhanu Sumanarathna¹,
S.M.K. Abayawardana², A.U. Sudasinghe³

^{1,2,3} South Asian Astrobiology & Palaeobiology Research Unit of Eco
Astronomy Sri Lanka., Postgraduate Institute of Archaeology, Colombo 7,

¹Faculty of Environment & Natural Sciences, University of
Southampton, United Kingdom

ecoastronomysrilanka@gmail.com

Keywords: Pleistocene, Miocene, Fossils, Sabaragamu Basin, Rathnapura fauna

Introduction

Presently Sri Lanka is an island existing in the Indian Ocean. It was a part of Gondwanaland during middle Jurassic epoch and began breaking up from the Indian continent during the late Jurassic as a separate single land mass. During the early Miocene era Sri Lanka was further shifted south-east direction forming the Cavary basin where a huge amount of lime mud had been deposited. During the Quaternary period eustatic changes have made a land bridge between the Indian subcontinent and Sri Lanka allowing plants and animal passing on both sides. Disconnection of the land bridge

again has made an important impact on evolution by isolation. Hence some extinct animals and plants can be found in different places of the country as fossil evidence. The geological records in sediments and rocks give further strong details on paleoclimate proving the paleo existing of those animals and plants. Therefore, by studying Palaeo-Biodiversity it can be discussed the ancient life and its diversity that is hidden in geological formations and role of geological processes in preservation of them, human evolution, extinct animals, climax of the biological, diversity of prehistoric man's tools, prehistoric

man's hunting and gathering systems and belief, customs and interaction with the environment can be studied.

Methology & Materials

Fossil identification was carried out according to the special characters that found in those fossils and anatomical comparisons also were done. *Relative dating* was used to place those fossils in the correct positions of the geological times scale (Biostratigraphy was used to place them in a correct order but we do not yield any numerical estimates. As primary sources early research and publications were studied. For fossil characterization and studying of the special features digital caliper (150mm|6"), digital weighing machine and scale bars were used. For locating those fossil-bearing places Garmin 30 GPS with BaseCamp GIS was also used.

Results and Discussion

Jurassic Era of Sri Lanka (201.3⁺0.2-145) Ma

There are three major Jurassic beds in Sri Lanka, Tabbowa, Pallama and Andigama in the North Western Province (Cooray, 1983).

Those sedimentary beds are occupied in the Proterozoic rocks of Wannu complex. During the formation of those sedimentary beds on the metamorphic land, the country was a part of the Gondwanaland where present



Fig : 01 Stem Part of *Pteridophyta* deposited in mudstone

Period : Jurassic lower

Laocation: Thabbowa, Sri Lanka

Current status of fossil: 10-15 stem parts of *Pteridophyta* that deposited in 23cm² surface area of rock (mudstone), (total mass of rock = 195.05g)

Major rock type of area: DL1- Reddish brown earths and low humic gley soils, DL3- Red Yellow latasols & regosols

Collected year : 2013 September

India, Australia, Antarctica, South America, Africa and Madagascar were together. During Jurassic era vertebrates, Chondrichthys,

Osteichthyes, Amphibia, Reptilia and Mammalia have been evolved. The studied fossils were extracted from the sediment beds in Thabbowa tank located in Putalam-Anuradhpura road near 8th mile post.

Thabbowa Jurassic fossils are found in mudstones and siltstone. In these fossils leaves and small offshoots of Jurassic flora had been imprinted and preserved safely. Coniferous trees, Cycade and *Pteridophyta* plant fossils are found in this bed.

Miocene Period of Sri Lanka (23.03-5.333) Ma

The important events which took place during the Miocene period were: elevation of the Himalayan Mountain ranges, separation of parts of Asia from the mainland to form large islands (Sri Lanka, Sumatra, Borneo). Sri Lanka contains two tertiary deposits; they include the North and North-Western deposit which spans the entire Jaffna peninsula and Minihagalkanda in South-Eastern extremity of the island. These two deposits are considered to be marine deposits.

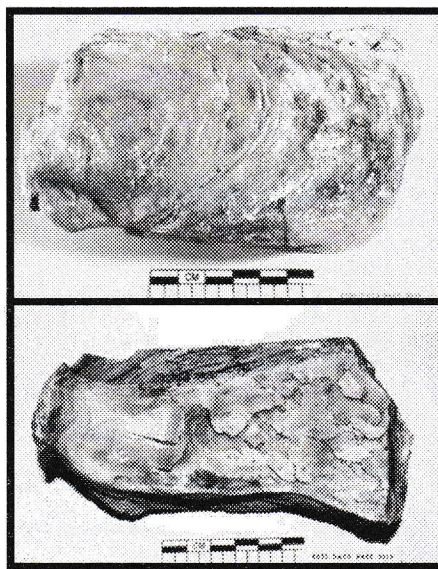


Fig : 02 : Inoceramus bivalve fossil that found in Aruwakkalu, Srilanka |2013



Fig :03: Turritella gastropods fossil deposited in limestone that found in Aruwakkalu, Srilanka 2013

In Aruwakkalu, a part of Jaffna

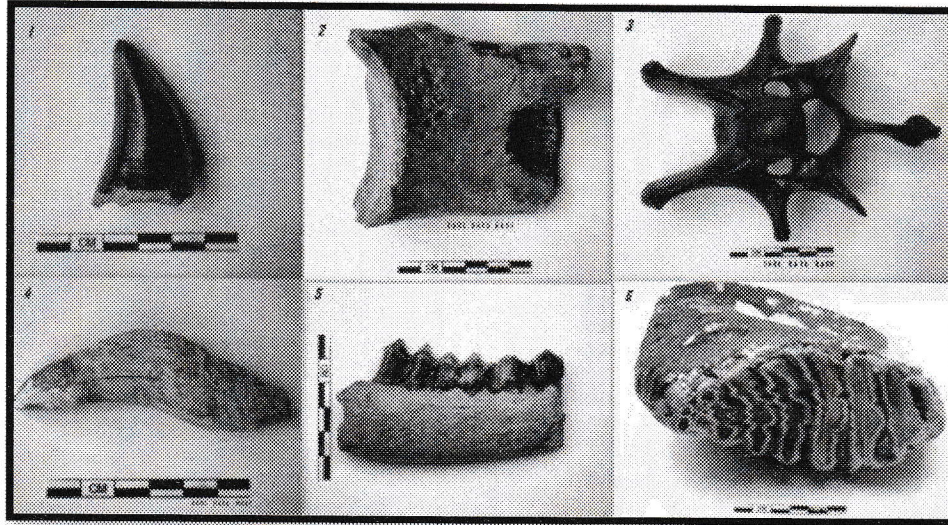


Fig. : 4 recent fossils that have found in sabaragamu Basin 1990-2013

1. *Pantheratigris* or *Pantheraleosinhaleyus* .Canine tooth in right lower mandible. Location – GalukagamaMahaEla, Puwakattaovita, Kuruwita 2008: by Kamal &Aravinda
2. *Rinocerosinhaleyus* –proximal portion of Scapula. Location-Kuruwita P 2001: by Kamal &Aravinda
3. *Bibossinhaleyus* –BovinVertibra .Location – OvitaKumbura, Khenagaa West Kuruwita [20 feet below] 2005: by Kamal &Aravinda
4. *Crocodylus*sp.Location – Khengama, OvitaKumbura, Kuruwita, 2013 March: by Kamal &Aravinda
5. *Rusa unicolor* – Right mandible, outer or ducal expects with 2 pre molars and molars. Location- Edandawela, Kuruwita, 2007: by Dr.Kamal&Aravinda
6. *Elephasmaximussinaleyus*-premolars, Location – MaweeKubura, Kuruwita -1993: by Kamal &Aravinda. © *Eco Astronomy Data Base*

Limestone is located 25km North of Puttalam, has found a number of Miocene fauna of both vertebrates and invertebrates. Therefore, assembly of fossils represents Foraminifers, Gastropods, Echinoids, Corals and Calcified algae.

Pleistocene Epoch In Sri Lanka (1.806-0.0117) Ma

The commences 2-1.67 million before present about 12,00 - 10,00 years(Bp). In this period most parts of the Northern Hemisphere were covered with glaciers creating a cold climate. Due to this glacial formation the main sea level was much lower than today. The low

sea level facilitated the connection of Sri Lanka with the Indian mainland with land bridge. Therefore, a number of mega and micro fauna was able to cross to Sri Lanka from India. The last land bridge was made 7500 years BP. In Pleistocene era Sri Lanka experienced heavy rainfall and covered with rain forest. These heavy showers in the Sabaragamu basin providing habitats for a number of Marsh loving mammals and other animals. However, at the end of Pleistocene the climate change resulting in the extinction of a number of animals. Pleistocene fauna in Sri Lanka known as Rathnapura Fauna. These fossils found in alluvial deposits of Sabaragamu basin.

Discussion

Sri Lanka consists of fossils bearing deposits formed in different time periods of the past. Though we have a number of fossils yet there is no law or an act has been made to protect and preserve these fossils. Studying of those fossils are important in identifying the paleoclimate and its recurrences and as well as preserving the deposits for future endeavor. It seems that Palaeo –

Biodiversity heritage in Sri Lanka is gradually destroying by human activities. People are using bacos in gem industry to dig gem pits in Sabaragamuwa basin cause to destroy the fossils of Pleistocene era. North-Western area in Sri Lanka for mega industries fossil zone are used. Because of this Miocene and Jurassic period fossils are getting destroyed.

Acknowledgment:

We would like to thank all the gem pits owners for spending their valuable time to find the fossils and very special thanks to Dr. Kamal Abeywardana for allowing us to find these valuable fossils. Also thanking to Dr. Pathmakumara Jayasingha who guided us well.

References

- Deraniyagala, P.E.P., The Pleistocene of Ceylon, Ceylon National Museum, 1958, 36 pg.
- Deraniyagala P.E.P., VOL.24 Part 1 Spolia Zeylanica, Director of Museums Ceylon, 1944, 22-56 pg
- Deraniyagala P.E.P., VOL.28, Part 2 Spolia Zeylanica, Director of Museums Ceylon, 1958, 223 pg

- De Silva P.H.D.H, VOL. 32, Part1,
Spoila Zeylanica, Director of
Museum Ceylon, 1971, pg
- Deraniyagala P.E.P, *Some Extinct
Elephants, Their Relatives And
The Two Living Species*,
Director of Museum Ceylon,
1955
- Perere, Nimal, *Prehistoric Sri
Lanka: Late Pleistocene rock
shelters and the open-air site*,
BAR International Series 2142,
2010, 3, 11, 43, 75 pg
- Garmin 30 satellite based
navigation system 2010 ,
<http://www.garmin.com/us/maps.2>
013
- International chronostratigraphic
chart 2015,
www.stratigraphy.org
2013 image landsat data, SIO.
NOAA, Us Navy, NGA,
GEBCO with import garmin 30
way points