

An Archaeological Study of Ungulates Found in Prehistoric Excavations in Sri Lanka

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Abstract

The prehistoric archaeological records of Sri Lanka, spanning from the Late Pleistocene to the Holocene epoch, provide significant zooarchaeological evidence regarding human-animal interactions. Among the animal remains found in cave dwellings and open-air sites, hoofed animals (ungulates) represent the main food component of Balangoda Man (*Homo sapiens sapiens*). This paper examines the taxonomic diversity, distribution, and relative abundance of hoofed animals,

including the Sambar deer (*Rusa unicolor*), Spotted deer (*Axis axis*), Wild boar (*Sus scrofa*), and the extinct Gaur (*Bos gaurus*). By analyzing data obtained from major sites, including Batadomba Lena, Pahiyangala (Fa Hien Cave), and Bellanbandi Palassa, the presence of these animal species is presented quantitatively. Furthermore, their role within the prehistoric economy is interpreted here. These findings indicate a high prevalence of deer and boar species, revealing strategic hunting patterns and the existence of a stable paleoenvironment.

Keywords: Balangoda Man, extinct species, faunal abundance, hoofed animals (ungulates), paleoenvironment, prehistoric Sri Lanka, zooarchaeology.

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Received: 4 February 2025, Accepted revised version: 10 June 2025.

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Introduction

The history of human settlement in Sri Lanka dates back beyond 38,000 years, and according to the latest radiocarbon dating from sites like Fa-Hien Lena cave and Batadomba-lena cave, it is confirmed to extend as far back as 48,000 years. Throughout this long period, the anatomically modern human who lived on the island, known as 'Balangoda Man' (*Homo sapiens balangodensis*), ensured survival through a direct and complex relationship with the natural environment. The primary strategy of this interaction was hunting and gathering.

Analysis of faunal remains found in excavations of wet zone caves in Sri Lanka (Belilena, Batadomba-lena, Fa-Hien Lena) reveals that various animal parts were utilized to meet the protein requirements of the prehistoric human diet. Although small arboreal species were hunted extensively, it is clear that they paid special attention to hunting 'hoofed animals' or ungulates, which provide high nutritional value and meat quantity (Deraniyagala 1992; Sumangala, 2019).

According to zooarchaeological evidence, several major ungulate species hunted during this era can be identified:

- Sambur (Sambar Deer - *Rusa unicolor*): The largest deer species in Sri Lanka; their bone fragments and teeth are found abundantly in cave excavations.
- Spotted Deer (*Axis axis*):

Commonly found in dry and intermediate zones, they were a primary food source for humans.

- Barking Deer (*Muntiacus muntjak*): A small deer species frequently found in cave layers.
- Wild Boar (*Sus scrofa*): Hunted as a major source of protein and fat.
- Mouse Deer (*Moschiola meminna*): Although a small ungulate, it was significant as an easily huntable animal.

The recovery of bone remains from these animals helps understand not just dietary patterns but also the paleoenvironment of that time. For instance, the abundance of Sambur and Barking Deer suggests the prevalence of dense forests and water sources. Furthermore, the Balangoda Man used advanced stone technology to hunt these animals. By integrating geometric microliths with bow and arrow technology, they were able to hunt these fast-moving ungulates.

Additionally, the bones and antlers remaining after consumption were used to create bone tools, reflecting the technical knowledge of prehistoric humans in maximizing animal resources. Accordingly, it can be concluded that ungulates were not merely a source of food, but a critical factor in determining the survival of Mesolithic human culture and technology (Sumangala, 2025).

Research Objectives

- To document the major ungulate species found in prehistoric

excavations in Sri Lanka.

- To analyze quantitative data of faunal remains found at sites such as Batadomba-lena, Fa-Hien Lena, and Bellan-bandi Palassa.
- To interpret the paleoenvironmental conditions through the distribution of ungulates.

Research Problem

The problem addressed in this research is: How has the utilization of ungulates been characterized in prehistoric research?

Research Methodology

This study is a zooarchaeological analysis, and the following methods were followed:

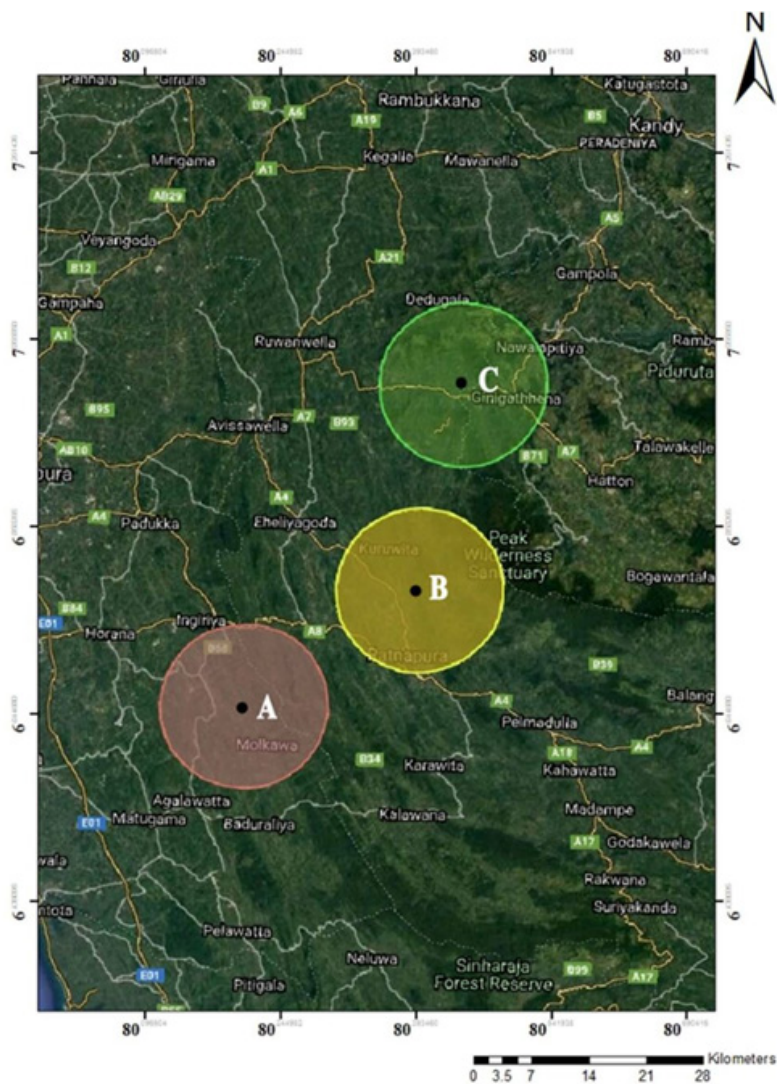
- Data Collection: Analyzing the excavation reports of Mr. P.E.P. Deraniyagala and Mr. S.U. Deraniyagala, and data from zoo archaeologist N. Perera (Perera 2010).
- Quantitative Analysis: Utilizing NISP (Number of Identified Specimens) and MNI (Minimum Number of Individuals) data obtained from each site.

Discussion

Prehistoric research in Sri Lanka began in the 19th century. Domestically, these excavations were primarily contributed to by Mr. P.E.P. Deraniyagala and subsequent prehistoric researchers. Research conducted across various

provinces of Sri Lanka has analyzed and provided interpretations for the data found. Accordingly, the maximum chronometric dating for prehistoric human settlements in Sri Lanka extends to 125,000 years. Humans lived in various regions of Sri Lanka and used animals, plants, and various grains for food.

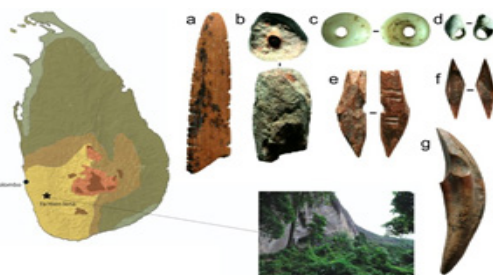
In this research, our special focus is on the remains of ungulates used by them. Many animal bones have been found and investigated in excavations of their habitats; these investigations show that ungulates fulfilled the protein requirements of prehistoric humans. Although they consumed various medium and small-sized animals, the primary food requirement of humans living in groups was met by these ungulates (Sumangala, 2019). Accordingly, this research studies the animals found so far at sites like Batadomba-Lena cave and Fa-Hien Lena cave. Formal archaeological excavations at Batadomba-lena cave were started in the 1980s by Dr. S.U. Deraniyagala. Radiocarbon (C14) dating confirmed that habitation in this cave spans from 28,500 BP to 11,500 BP (Deraniyagala 1992). Recent research has further confirmed this timeframe, representing the late Pleistocene epoch.

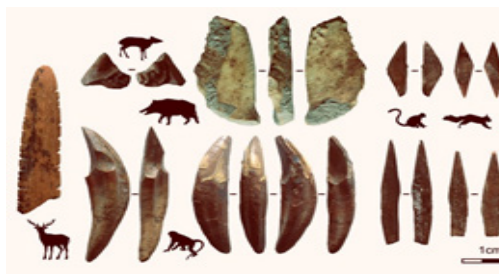


(Figure 01)

Figure 1) Map showing the Daily Exploitation Radius of 10 km as per [99]. Note that A-Fahien Lena cave, B-Batadomba-Lena cave, and C-Kithulgala Beli-Lena cave could not reach the Dry zone or even the Fringes of the present dry zone within a 10 km or 2 hours of walking

(<https://www.researchgate.net/figure/Map-showing-the-Daily-Exploitation-Radius>)





(Figures 2, 3) Fa-Hien Lena in the Sri Lankan rainforest yielded a range of artefacts recovered from its 48,000-year-old archaeological deposit. (Credits: M. C. Langley / SWNS)

(<https://www.google.com/search?q=bone+tools+technology+in+sri+lanka&ca>)

Human Remains and Genetic Continuity

Human bone fragments aged 16,000 and 28,500 years have been found at Batadomba-lena. K.A.R. Kennedy, who conducted formal anthropological studies on these remains, points out a clear genetic continuity between this Balangoda Man and the current Vedda population of Sri Lanka (Kennedy et al. 1987). Their cranial bones were thick, and their teeth were larger than those of modern humans (Kennedy 1974).

Microlithic and Bone Tool Technology

Batadomba-lena is considered one of the oldest sites in South Asia where geometric microliths were found. Even as far back as 28,500 years ago, the humans living here produced crescent-shaped and triangular small tools using quartz (Deraniyagala 1992: 266; Sumangala, 2024).

Bone Tools: Large quantities of sharp bone points and scraping tools made from animal bones have been found here (Perera 2010). Shutterstock



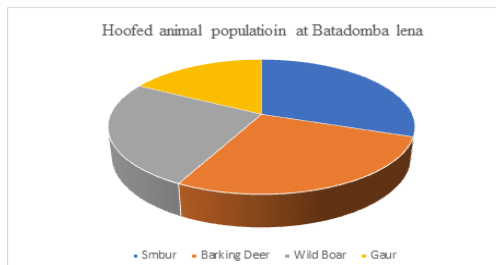
(Figures 4, 5) Bone tools made of Wild boar

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Zooarchaeological Evidence

Faunal remains from Batadomba-lena reveal much about the hunting patterns and environment of that time. Main Prey: Over 30% of the faunal remains found here represent Sambur (*Rusa unicolor*), while Wild Boar and Barking Deer were also major food sources (Deraniyagala 1992: 451). Extinct Animals: Significantly, bone and teeth fragments of the extinct Gaur (*Bos gaurus*) were found in the lower layers (Layers 6 and 7) of the cave (Deraniyagala 1958). Small animals, monkeys, porcupines, and snails (*Acavus*) were also included in their daily diet. This is a site where

faunal remains are exceptionally well-recorded. A high density of ungulates is observed from layers 4 to 10 (16,000 - 28,000 BP) (Deraniyagala 1992: 451).



- Sambur (Rusa unicolor): Represents over 30% of the total faunal remains.
- Barking Deer (Muntiacus muntjak): A significant amount has been found.
- Wild Boar (Sus scrofa): Shows high consumption according to teeth and jaw fragments found.
- Gaur (Bibos gaurus): Several teeth and bone fragments of this extinct animal were found in layers 6 and 7 (Deraniyagala 1958).

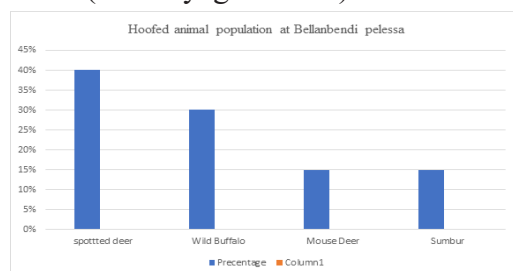
Bellan-bandi Palassa

Bellan-bandi Palassa is located near the village of Walgampaya, close to the Udawalawe National Park, south of the Balangoda area in the Ratnapura District of Sabaragamuwa Province. Systematic exploration of Bellan-bandi Palassa began in the mid-1950s. Dr. P.E.P. Deraniyagala, the then Director of National Museums, was the lead scholar who conducted excavations. His research between 1956 and 1961 opened a new dimension in the prehistory of Sri Lanka.

Key Discoveries

The most important factor found at this site is the collection of human skeletal remains. Bone remains of more than 20 individuals were discovered. Several facts were revealed through these findings. Physical Nature: Bone examinations confirmed that Balangoda Man was of medium height, with strong jaws and protruding brows. Dietary Patterns: Examination of animal bones and burnt materials found here confirmed they ate deer, wild boar, monkeys, and snails, relying on hunting and gathering. Stone Tools: Many microliths or very small, sharp stone tools were found here, used for hunting and cutting meat. This is an open-air settlement showing dry zone characteristics.

- Spotted Deer (Axis axis): The most abundant animal here (approximately 40%).
- Wild Buffalo (Bubalus arnee): Large bone fragments have been found.
- Mouse Deer (Moschiola meminna): Though small, a large number (according to the MNI index) appear to have been hunted (Deraniyagala 1992).



Fa-Hien Lena cave - Bulathsinhala

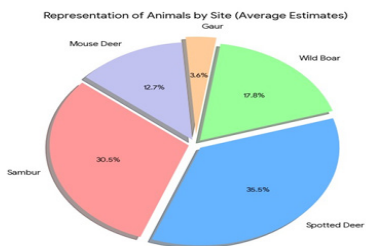
The first scientific excavations at Fa-Hien Lena began in the 1960s and 1980s under the leadership of Dr. S.U. Deraniyagala, former Director General of the Department of Archaeology, Sri Lanka. Radiocarbon (C14) dating confirmed that habitation in this cave is older than 33,000 BP (Deraniyagala 1992). Subsequent modern research has confirmed this date extends back to 38,000 years (Perera et al. 2011). Fa-Hien Lena is world-famous as a site where the oldest remains of anatomically modern humans in South Asia were found. Skull fragments and bones older than 30,000 years were found, and these humans were identified as 'Balangoda Man' (Kennedy 2000). Secondary burial features and the custom of applying red ochre found on these human remains provide important evidence of their rituals (Deraniyagala 1992).

Food Consumption and Zooarchaeology

According to zooarchaeological studies at Fa-Hien Lena, the humans living there were accustomed to a diet based on the rainforest. Flora and Fauna: According to data, they mostly hunted wild boar, sambur, barking deer, and various types of monkeys (Perera et al. 2011). The deer family (Cervidae) accounts for over 65% of the total faunal sample, with Sambur and deer making up about 45%. Wild Boar: Represents between 15-20% (Perera 2010: 168).

Quantitative Data Table by Animal Species

Scientific names	Common Name	Main Sites Found	Approximate Percentage (of total sample)
<i>Rusa unicorn</i>	Sambur	Batadomba-lena, Fa-Hien Lena	25% - 35%
<i>Axis axis</i>	Spotted Deer	Bellan-bandi Palassa	30% - 40%
<i>Sus scrofa</i>	Wild Boar	All sites	15% - 20%
<i>Bibos gaurus</i>	Gaur	Batadomba-lena, Ramapura	2% - 5% (Extinct)
Scientific names	Common Name	Main Sites Found	Approximate Percentage (of total sample)
<i>Moschiola meminna</i>	Mouse Deer	Batadomba-lena, Belilena	10% - 15%



Analysis of faunal remains from prehistoric excavations in Sri Lanka enables discussion of several key points regarding the relationship between Balangoda Man and ungulates.

Strategic Hunting and Protein Consumption

The Mesolithic people in Sri Lanka appear not to have been merely opportunistic hunters, but rather very organized ones. The abundance of Sambur (*Rusa unicolor*) and deer (*Cervidae*) among faunal remains shows they focused on large animals that could provide more meat (Perera 2010). Many bones found at Batadomba-lena were broken into small pieces, indicating that humans were accustomed to obtaining bone marrow (Deraniyagala 1992: 451). This was a fundamental element of their nutritional needs.

Environmental Diversity and Animal Distribution

The distribution of animal species can reconstruct past climatic conditions. Spotted Deer (*Axis axis*): The abundance of spotted deer in open areas like Bellan-bandi Palassa suggests that even in the dry zone, scrub jungles and savannas were common hunting grounds (Deraniyagala 1992). Dense

Forests: In contrast, the prevalence of Sambur and Wild Boar near Batadomba-lena and Fa-Hien Lena confirms that the wet zone's dense forest system has existed continuously since ancient times (Perera 2010).

Extinct 'Mega Fauna'

Several large ungulates that lived in Sri Lanka during the late Pleistocene are now extinct. Gaur (*Bibos gaurus sinhaleyus*): Remains of the Gaur are found in alluvial deposits of Ratnapura gem pits and early layers of Batadomba-lena (Deraniyagala 1958). Habitat loss due to climate change and over-exploitation by humans are suspected causes of their extinction. Rhinoceros (*Rhinoceros sinhaleyus*): Research by Mr. P.E.P. Deraniyagala (1958) confirms that this animal, endemic to Sri Lanka, along with animals like 'Hippopotamus', lived in Sri Lanka thousands of years ago.

Bone Tool Technology in Sri Lanka

Ungulates provided not only food but also a major contribution to tool production. Using deer and sambur bones as well as antlers, Balangoda Man produced sharp pointed tools and various scraping tools as early as 28,500 years ago (Perera 2010: 168; Sumangala, 2024). This reflects the high technical knowledge of prehistoric humans in Sri Lanka. As mentioned, the bones and antlers of deer and sambur were primarily used for several reasons: the long limb bones and antlers of these animals are very strong, making them suitable for sharp weapons. The natural shape of antlers was a great help

in producing weapons like spears or spikes.

Excavations (Batadomba-lena, Fa-Hien Lena) confirm that Balangoda Man followed several methods in making bone tools. Grinding Technology: Rubbing against a rough stone to sharpen or shape the bone. Cutting and Splitting Technology: Using microliths to cut the bone into the desired shape. Polishing: Smoothing the surface of the tool to increase its functionality and durability.

Types of Tools Produced

Bone Points: Used as spearheads for hunting or as piercing tools. Bi-points: Tools sharpened on both ends; these are found abundantly. Needles: Small points prepared for sewing animal skins or other fine work. Antler Hammers: Antlers were also used as "striking" tools in the production of stone tools.



(Figure 6) Bone point tools

(<https://www.google.com/search?q=bone+tools+technology+in+sri+lanka&ca>)

Conclusion

The study of ungulates found in prehistoric excavations in Sri Lanka clearly shows that the survival of Balangoda Man was almost entirely

dependent on these animals. Sambur and Wild Boar were used as the primary food source, with variations in animal distribution seen from site to site. These faunal remains perfectly reflect the high biodiversity that existed in Sri Lanka during the late Pleistocene. DNA analysis of these animal bones could reveal further new information for future research.

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