Peer Community In Archaeology

A zooarchaeological perspective on testudine bones from Hoabinhian hunter-gatherer archaeological assemblages in Southeast Asia

Ruth Blasco *based on peer reviews by* ***Noel Amano*** *and* ***Iratxe Boneta***

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The study of the evolution of the human diet has been a central theme in numerous archaeological and paleoanthropological investigations. By reconstructing diets, researchers gain deeper insights into how humans adapted to their environments. The analysis of animal bones plays a crucial role in extracting dietary information. Most studies involving ancient diets rely heavily on zooarchaeological examinations, which, due to their extensive history, have amassed a wealth of data.

During the Pleistocene–Holocene periods, testudine bones have been commonly found in a multitude of sites. The use of turtles and tortoises as food sources appears to stretch back to the Early Pleistocene [1-4]. More importantly, these small animals play a more significant role within a broader debate. The exploitation of tortoises in the Mediterranean Basin has been examined through the lens of optimal foraging theory and diet breadth models (e.g. [5-10]). According to the diet breadth model, resources are incorporated into diets based on their ranking and influenced by factors such as net return, which in turn depends on caloric value and search/handling costs [11]. Within these theoretical frameworks, tortoises hold a significant position. Their small size and sluggish movement require minimal effort and relatively simple technology for procurement

and processing. This aligns with optimal foraging models in which the low handling costs of slow-moving prey compensate for their small size [5-6,9]. Tortoises also offer distinct advantages. They can be easily transported and kept alive, thereby maintaining freshness for deferred consumption [12-14]. For example, historical accounts suggest that Mexican traders recognised tortoises as portable and storable sources of protein and water [15]. Furthermore, tortoises provide non-edible resources, such as shells, which can serve as containers. This possibility has been discussed in the context of Kebara Cave [16] and noted in ethnographic and historical records (e.g. [12]). However, despite these advantages, their slow growth rate might have rendered intensive long-term predation unsustainable.

While tortoises are well-documented in the Southeast Asian archaeological record, zooarchaeological analyses in this region have been limited, particularly concerning prehistoric hunter-gatherer populations that may have relied extensively on inland chelonian taxa. With the present paper Bochaton et al. [17] aim to bridge this gap by conducting an exhaustive zooarchaeological analysis of turtle bone specimens from four Hoabinhian hunter-gatherer archaeological assemblages in Thailand and Cambodia. These assemblages span from the Late Pleistocene to the first half of the Holocene. The authors focus on bones attributed to the yellow-headed tortoise (*Indotestudo elongata*), which is the most prevalent taxon in the assemblages. The research include osteometric equations to estimate carapace size and explore population structures across various sites. The objective is to uncover human tortoise exploitation strategies in the region, and the results reveal consistent subsistence behaviours across diverse locations, even amidst varying environmental conditions. These final proposals suggest the possibility of cultural similarities across different periods and regions in continental Southeast Asia.

In summary, this paper [17] represents a significant advancement in the realm of zooarchaeological investigations of small prey within prehistoric communities in the region. While certain approaches and issues may require further refinement, they serve as a comprehensive and commendable foundation for assessing human hunting adaptations.

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Reviews

Evaluation round #2

Reviewed by Iratxe Boneta, 15 August 2023

Bochaton and colleagues have responded to and satisfactorily resolved all the comments and reported mistakes. That's why I consider that the manuscript is ready for its publication. I congratulate the team on their interesting research.

Evaluation round #1

DOI or URL of the preprint: https://www.biorxiv.org/content/10.1101/2023.04.27.538552v1
Version of the preprint: 1

Authors' reply, 09 August 2023

Dear Editor,
Our letter and answers to the referees' comments are included in the attached PDF file.
Sincerly,
Corentin Bochaton
Download author's reply
Download tracked changes file

Decision by Ruth Blasco, posted 06 July 2023, validated 06 July 2023

PCIArchaeology #329: Revision

Dear Bochaton and colleagues

Thank you for submitting your manuscript to PCI Archaeol.

We have received comments from two reviewers on your study. You will see that, while they find your work of interest, they have raised some points that need to be addressed. I think the paper should become acceptable for recommendation pending suitable moderate revision and modification in light of the appended comments (please note the reviewers have provided two attachements).

One point that both reviewers emphasize is that equifinality issues (ie, different actions resulting in the same taphonomic signatures) could be explained in more detail. Similarly, the subsistence strategies and their cultural signficance could also be discussed in greater depth in the points of critical interpretation. Lastly, please pay special attention to the language. The manuscript needs to be deeply edited to facilitate comprehension and have a proper language check.

While revising the manuscript please consider all the reviewers' comments carefully, and explain in detail how you addressed the reviewers' criticisms (by providing suitable rebuttals for any comments not addressed).

We look forward to receiving your revised manuscript as soon as possible.

Kind regards,
Ruth

Reviewed by Noel Amano, 06 June 2023

The paper provides one of the first systematic analyses of turtle/tortoise remains from Southeast Asia archaeological contexts and is a start of an important contribution to the field of Southeast Asian zooarchaeology. The methodology employed by the authors is detailed and robust and could be replicated/adapted to study materials from other sites in the region.

I have very little to add in terms of the zooarchaeological/methodological aspect of the research as I believe it is very well done. The protocol described is very good, the zooarchaeological counts sound and the figures are noteworthy.

My main comments (which I appended in the attached pdf file) pertain to the language (as a non-native English speaker, I understand the challenges. Perhaps the paper could benefit from having a native English speaker colleague go over it, especially the introduction and results sections) and some points in the interpretation (comments of equifinality, and defining cultural aspects based on subsistence economies/strategies).

Download the review

Reviewed by **Iratxe Boneta**, 05 June 2023

Download the review