

The contribution of Mediterranean connectivity to morphological variability in Iron Age sheep of the Eastern Mediterranean: Review

Overall, the paper's format needs revision. There are fragments of the introduction found in the materials & methods section, and vice versa. This mixing of sections makes it challenging for readers to follow. Additionally, the statistical method is not well-explained, making it difficult to comprehend the obtained results. The results are inadequately discussed in the conclusion; incorporating comparisons with bibliographic references could add weight to the findings. These various problems of form make it difficult to appreciate the substance.

The sample sizes for the analyses conducted are adequate. However, it is regrettable that other sites, particularly from Cyprus, are not included (if possible). Including additional sites could have strengthened the obtained results and helped account for the potential bias of the island effect.

The discussion does not clearly address the question regarding variance. It would be beneficial to enhance clarity in both the stated objectives and, more importantly, in the provided answers.

Abstract & Introduction

The abstract lacks a clear link between the scarcity of studies on Mediterranean fauna and maritime connections in the Eastern Mediterranean. Additionally, it would be beneficial to delve into hypotheses and factors explaining the obtained results. Consider discussing anthropogenic and environmental factors influencing phenotypic variations in livestock

The introduction contains valuable insights but requires reorganization. Consider placing objectives after establishing the context for better flow. Avoid incorporating methodological details; focus on the significance of geometric morphometrics without delving into procedural descriptions. It would be relevant to mention Ariadna Nieto Espinet's work on Iron Age livestock movements in Catalonia and Languedoc

Lines 17-18: The link between the scarcity of studies on Mediterranean fauna and the maritime connections in the Eastern Mediterranean is missing in the abstract/context. Clarify the relationship between these two aspects.

Line 23: It would have been interesting to elaborate further on the hypotheses and the different factors that may explain the results you found.

Line 25: Perhaps it could be interesting to discuss the different factors involved in the phenotypic variations of livestock (anthropogenic and/or environmental).

Lines 26-28: The statement is possibly true for the Eastern Mediterranean but seems less applicable to the Western Mediterranean (eg the work of Silvia Valenzuela, Ariadna Nieto Espinet, Allowen Evin, Angela Trentacoste...).

Lines 29-31: The sentence is a bit complicated, containing a lot of information. It might be preferable to split it into several sentences.

Lines 36-39: The objectives come a bit early, without a clear context beforehand. Inverting the order might improve fluidity. The context should precede the objectives.

Line 51: It might be interesting to mention the work of Ariadna Nieto Espinet on livestock movements during the Iron Age in Catalonia and Languedoc.

Line 75: Be careful, morphotype and phenotype are not synonymous. Phenotype is a broader term encompassing all observable traits, including morphological traits. Morphotype specifically refers to morphological traits.

Line 75: In my opinion, it would be more relevant to present the objectives at this stage.

Line 75: Avoid citing figures in the introduction. This figure relates solely to the material and methods section. Be careful to make the distinction (likewise for Lines 79-82). Overall, the distinction between the introduction and the material and methods in this paragraph is not clear. Stick to context for the introduction, while this paragraph already delves into methodological considerations.

Lines 82-90: Be cautious about shortcuts involving size= human impact & shape=phylogeny. An object's shape can also be influenced by other factors (e.g., pathology in bovines, mobility, etc.). GMM simply separates these two components, providing distinct information.

Lines 92-99: Methodological considerations.

Lines 101-118: We haven't seen the results yet, or any chronology. This will be discussed later in the discussion

Materials & Methods

Globally, the material and methods section would benefit from more clarity. It is challenging to navigate, and some parts are missing, particularly the section on statistics and graphical representations. Methodological considerations are crucial for a clear understanding of the presented results.

Lines 121-123: Introductory contextual elements.

Line 132: Add a reference to Figure 1.

Line 136: "with refs." What does it mean?

Figure 1: It is easy to confuse sea/land. Why not use clearer colors? (e.g., light blue for the sea, brown for the land, for example). You mention different cities; they could be added to the map for a clearer interpretation.

Line 167: Why only one site from Cyprus? Are there no other sites that could be included in these analyses?

Line 226: Why choose the first 10 axes and not another number (arbitrary choice)?

Line 228: What tests are performed to answer your hypothesis? We have no data on the statistics used. They appear gradually with the results, while we should already know in the methods what will be tested and how. We have no information on the visualizations that will be used (CVA? PCA? Why?).

Results

In general, for the results, it is challenging to draw meaningful conclusions without a clear understanding of the statistical methods. The section combines methodological aspects (presentation of performed statistics), result presentation, and comparisons with other studies, which should be reserved for the discussion. Therefore, this section needs refinement to clearly delineate its purpose: presenting the results only. A clearer presentation of the methods and statistics used will enhance the readability of the results.

Line 234: The calculation of the error percentage is introduced in the results, whereas it should be explained in the methods. Consider using Claude's method (CLAUDE, J. 2008. Morphometrics with R. Springer-Verlag New York. Montpellier: Springer-Verlag New York.). Additionally, a nearly 30% variation due to landmark placement seems substantial. How does this compare to studies using the same protocol? Have you conducted tests with different individuals?

Lines 242-248: These sentences involve interpretation and should be moved to the discussion section. Results should only contain a description of the obtained results without comparisons with other studies, which should be reserved for the discussion.

Line 248: It is unclear what you are testing or how, as it has not been explained in the methods. Therefore, it's uncertain whether such statements can be made.

Figure 3: It could be beneficial to use different symbols for different types of sites (coastal or inland) for easier and quicker interpretation. Adding significant differences in pairwise tests between sites could also enhance the figure.

Lines 259-260: The information about the geographical structure similarity between CVA and the neighbor-joining tree has already been mentioned in the preceding paragraph. This similarity isn't surprising, given that both representations are based on discriminant analysis. These are two different representations that can complement each other.

Line 261: Throughout the text, you refer to your GMM points as landmarks. However, according to Pollath et al.'s protocol, there are also sliding semi-landmarks, which have different characteristics than landmarks. Be cautious about this quick shortcut.

Figure 4A: It is unclear why there is another tree compared to Figure 3C (although the visualization of Figure 4 is preferred). What new information does this figure provide? However, an interesting aspect is that inland sites are much closer to each other than coastal sites.

Table 2: Some numbers are in italics. Are these significant figures? If so, some are missing. How are the pairwise absolute differences between sample variances calculated? What are the differences with p-values, and why include both?

Discussion

In my opinion, the discussion lacks references for authors to discuss their results, compare them to lend weight, and contextualize them within previous research. It also seems challenging to address the initially posed question in this paper. Additionally, it might be interesting to include potential avenues for future research.

Lines 291-296: The authors' intended message is not entirely clear. It might be worthwhile to refine the bibliography in this regard.

Line 295: Does this trend of greater variation on coastal sites exist elsewhere? For other periods? The result is presented here but not thoroughly discussed.

Line 294: Indeed, the site with the largest sample comes from a single ensemble, so it seems normal for the variance to be relatively low.

Lines 295-298: Similarly, the result is not discussed or compared to other bibliographic references, which could add weight to the presented results.

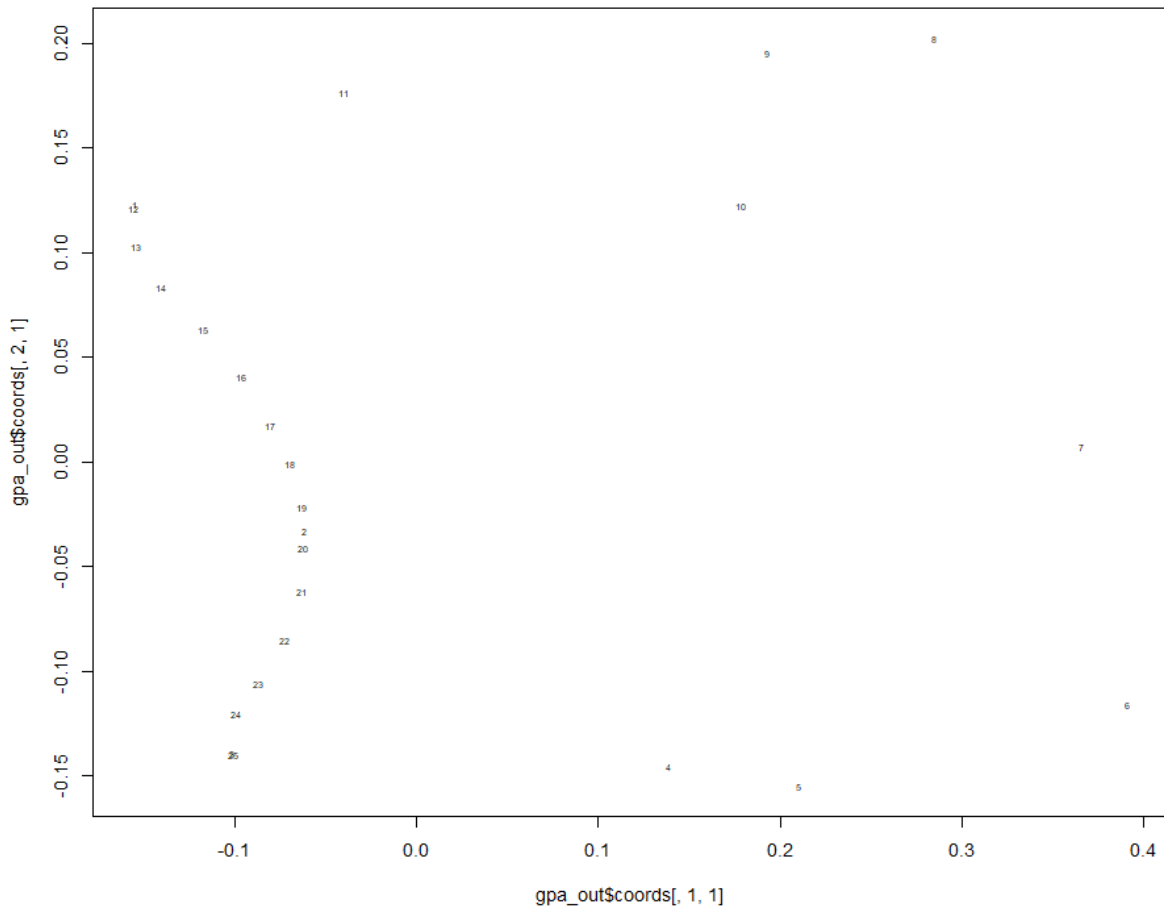
Lines 300-305: This paragraph presents important elements but lacks references.

Figure 5: This figure has not been presented in the results nor mentioned. It appears only in the discussion. A presentation of the method in the appropriate section, followed by the presentation of results, seems more fitting. Also, there is uncertainty about understanding this figure.

Supplementary Data

In the sheep_specinfo, linear measurements such as GLL, Bd, etc., are recorded, but it appears they are not utilized in the paper. Could you provide insights into what additional information these measurements could have offered alongside GMM? Alternatively, why include them in the supplementary data if they are not analyzed?

During geometric morphometrics analysis, be attentive to removing duplicate points. For instance, in the sliding procedure, landmarks 1 & 3 are duplicated (refer to attached figure). To address this, remove slidings 12 & 25 to avoid having points counted twice, which could introduce bias.



It would be beneficial to present the results of ANOVA in a table, either within the results section or as supplementary data, with clear and visible formatting rather than coded (with a legend). Additionally, the ANOVA indicates differences between groups, but have you investigated whether these differences are due to inter-site variations regardless of the group? Running pairwise tests between each site could provide more detailed insights.

In the code, you calculate disparity in two different ways. The first is based on the linear model, while the second relies on Procrustes coordinates. However, you only present results based on Procrustes coordinates. Could you elaborate on why both methods are included?

Adding PCA as supplementary data would enhance the completeness of the analysis.

The supplementary data is not well-explained. Providing clear annotations and legends for this data would improve its clarity and interpretation.