Review for Louail et al. "New insights on feeding habits of *Kolpochoerus* from the Shungura Formation (Lower Omo Valley, Ethiopia) using dental microwear textures"

I am happy to provide suggestions and recommendations for this paper. Please excuse the long delay for this review, and thanks for everyone's patience.

General remarks

Louail and colleagues provide an interesting contribution to dietary ecology and dental wear in both extant suids and the extinct genus *Kolpochoerus* by using dental microwear texture analysis – a wear-based proxy that evaluates microscopic wear patterns on enamel using semi-automated, objective quantification of these wear marks. Their data expands available dataset of extant suids, thus both contributing to our understanding of how extant dietary diversity is reflected in dental wear, and on how *Kolpochoerus* from the Omo Valley differed in its diet from extant counterparts. This kind of study is also interesting, because it allows a better understanding of the palaeohabitat at the Lower Omo valley, as habitat and food availability are directly connected. It is, of course, still a local snapshot of only one species from Lower Omo valley, and specific to suids, but still the potential to derive general habitat reconstruction is given. Therefore, I would assess the novelty and impact of this study positively.

There are a few points that need attention, especially design of the figures and selection of reference, and the composition of the dataset. It is unclear which tooth positions were exactly used, and if lumping together different tooth position is justified 8and does not weaken the analysis). But I am positive that the authors will be able to account for them. If I were to give a suggestion for acceptance in a journal, it would be "minor revisions".

Specific remarks

Title

I would suggest using the complete name of the method in the title (dental microwear texture analysis).

Abstract

Ll. 56ff: It could be better to already mention the direction of the offset here – what came earlier, graminoid consumption or hypsodonty/elongated third molars?

Ll. 57ff: You should give reasons for why it is advantageous to apply DMTA, instead of saying that is has not been done often. Only a few studies have used morphometrics or isotopic analysis either. So try to emphasize why using DMTA will be helpful to answer which question

Ll. 62ff: I would build the argument the other way. You wanted to understand *Kolpochoerus* diets (this comes first), so you studied extant suids with well known, diverging dietary habits.

L. 69: Does the reconstructed dietary preference for young, low-abrasive grasses help to understand the potential temporal mismatch between dental morphology adapted towards abrasive grasses, and onset of graminoid consumption? What else can you conclude from these results?

Introduction

L. 79 : I would suggest to better use "morphologies" instead of phenotypes, as the phenotype may be subject to adaptive plasticity, while morphology covers the overall form/bauplan.

Ll. 82ff : Please provide a bit more detail on which groups show this trend during the Quarternary.

L. 86: Please provide a citation for the adaptations towards increased graminivory.

L. 94: Add “third” to “elongated molars”.

Ll. 105ff: Again, please describe the direction of temporal offset – what came earlier, graminivory or morphological change?

Ll. 112-113: Please specify “wide distribution”. It would be interesting from where to where, different habitats, climates? How versatile and flexible was *Kolpochoerus*? What would you expect regarding its dietary ecology from this wide geographic distribution?

Ll. 138ff: The details on the asynchronous diet/morphology change come a bit late here. I would advise to restructure the introduction, so that this information is included earlier.

Ll. 146-147. Consider rewording “better appreciation”, e.g. as “more concise”, “detailed” or “consistent”.

Ll. 173ff: You should introduce the extant sample and their dietary habits, and why you chose them. The research question needs more focus: resolve the dietary habits of *Kolpochoerus*, better understand its diet through comparison with extant species, enlarge the dataset etc.

Material and Methods

L. 250: Even if the info is in the supplements, please be more specific here. Are these 68 specimens isolated teeth of different tooth positions, or 68 different individuals, of whom teeth were selected?

L. 260: The wear facets used should maybe be defined with a figure, or at least through a citation, so that the reader understands what shearing phase I is, and where these facets are located (on the different molar teeth).

Ll. 306-307, Fig. 2 Description: Is the location of shearing facet for m2 only? Did you only use m2 for *Kolpochoerus*?

L. 333: There is a bunch of studies from archaeological sciences, and of course it depends on which geographic region you want to report isotopic values on, but please consider the following:

Hu Y, Luan F, Wang S, Wang C, Richards MP. 2009. Preliminary attempt to distinguish the domesticated pigs from wild boars by the methods of carbon and nitrogen stable isotope analysis. Science in China Series D: Earth Sciences. 52(1):85-92.

Vedel G, de la Peña E, Moreno-Rojas JM, Gómez JC, Carranza J. 2022. Stable carbon and nitrogen isotope values in hair reveal management differences and hidden practices in wild boar populations. Science of The Total Environment. 823:154071.

Balasse M, Cucchi T, Evin A, Bălăşescu A, Frémondeau D, Horard-Herbin MP. 2018. Wild game or farm animal? Tracking human-pig relationships in ancient times through stable isotope analysis. Hybrid Communities (pp. 81-96). Routledge.

Russo G, Danieli PP, Primi R, Amici A, Lauteri M. 2017. Stable isotopes in tissues discriminate the diet of free-living wild boar from different areas of central Italy. PloS one. 12(8): e0183333.

Results

Figure 3: It may be beneficial to show individual data points in the biplots. That way, the differences within genera (e.g., for common warthog and desert warthog) could be easily shown by using the same colour but different shapes for data points. So you could decide not to use Fig. 4 and combine everything in one figure. Also, the extremely low epLsar values for some *Kolpochoerus* specimens could be highlighted. You could also show which member they are from to discuss a temporal trend here, instead of only displaying that in Fig 5/6.

Ll. 431ff: The same sentence structure is used here twice ("Nevertheless, no significant difference between members is detected with both post-hoc tests."). Maybe combine this statement for both heterogeneity of complexity and complexity in the beginning, as there seems to be no significant differences between members in general? This could be used to introduce the paragraph. First, the absence of differences between *K*. members, then the detailed description which *K*. members differ from extant species.

Ll. 453-455: This sounds like it belongs to the discussion.

Table 2: I was a bit confused by the table description, and then remembered that epLsar could not be normalized, so you had conducted different test statistics. Maybe this could already be reflected in the general table description, e.g., "Combined Tukey's HSD and Fisher's LSD post-hoc tests following one-way ANOVAs (for Asfc, HAsfc36), and Dunn's test (for epLsar). Parameters in bold are significant ($p < 0.05$) with both post-hoc tests, italics indicate that Dunn's test was significant."

Discussion

L. 468: I'd suggest you give the corresponding citations for previous studies again.

Ll. 467-473: The first paragraph sounds a little weak, as if you just repeated previous analyses and confirmed other data. But you provide new data, and it should be in the centre of attention. So I would advise to revise this paragraph, starting with your findings, what's new, and then that your findings agree with other studies.

L. 476: Here you can reference tables/figures again.

L. 479: *Likely* reflect (it is still your interpretation).

L. 487: Is anything about collection date for the included specimens known? That could directly support the seasonality hypothesis!

L. 498: Why short? Because short = young leaves ?

L. 502: Again, a good point to reference tables and figures

Ll. 515-519: Here you seem to have more direct evidence for seasonality. Maybe this could be elaborated? What is known about diet in spring and winter? Are there specific food items that are chosen in winter, while in spring other foodstuffs are available and preferred?

Ll. 546ff: Is there any isotopic data that could help to elucidate the discrepancies?

L. 572: Just to be sure, was the same area (phase I facets) analysed in these previous studies? Or is the sample also differently composed, i.e. different tooth positions, different enamel areas?

Ll. 578ff: It is getting quite complicated with these many possible influences. What is known about different mastication biomechanics? what would you expect to see because of the differences? Are there reference that detail the differences in mastication?

L. 667: replace this with “these”

Figure 6. This figure includes additional d13C information, but otherwise it is the same as Figure 5. Therefore, figure 5 should be deleted and all information included in one combined figure.

Ll. 698ff: What about feeding on very energy low, bulky diets? If they just had to consume “more” of a low abrasive diet, that might explain the enlarged molars. I have no immediate idea what kind of food that could encompass, but maybe you have an idea?

L. 712. I think Si content is not only linked to growth conditions, but also to C4 grass species.

Electronic supplement

Tooth position should be noted in the supplements. Moreover, the position of the measured facets should be shown in a supplementary figure.

From the photosimulations it becomes clearer which tooth position and enamel location was scanned. But this information is really hidden and should be better accessible.

Also, the question arises if there are systematic differences between tooth positions. I would highly encourage to include an analysis into the supplements where you show that tooth positions within one species do not differ significantly. That would be a requirement for lumping together different tooth positions in the extinct taxon, and justify your approach to use all molar tooth positions 8and different facets).

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