

There are some minor concerns and issues with writing and presentation of material that need to be addressed - I have indicated them in the list below

In [blue](#) are the responses to the reviewer #1

102: Roff 1992 not listed in References section

[This was changed.](#)

#106: Zera & Harshman 2001 not listed in References section

[This was changed.](#)

#110: Ketterson & Nolan 1999; Crespi et al. 2013 are not listed in References section

[This was changed.](#)

#114: Winfield 2005 not listed in References section

[This was changed.](#)

#114, 115,116.....: use "&" or "and" in the reference format when citation includes two or three authors. Please check the entire manuscript and the References section.

[This was changed.](#)

#119: Is it Sapolsky et al. 2000 or Sapolsky 2002?

[It's Sapolsky 2000.](#)

#119: don't capitalize "Stress"

[Ok.](#)

#120: use a colon after "...the term".

[This was changed.](#)

#120: I think that you mean that several authors have been researching " the allostasis theory", so use this last word.

[Ok.](#)

#121: "Mc Ewen & Wingfield 2003" is cited as "Mc Ewen & Wingfield 2010" in the References section

[This was changed.](#)

#121: "Romero et al 2011" not listed in the References section

[This was changed.](#)

124: Could you give a brief description of the reactive scope model?. I think it will be useful to improve the understanding of your predictions.

[This was changed, but I recommend see Romero 2009 the reactive scope model to improve the understanding.](#)

#136: use ")") after "Creel et al. 2013"

[This was changed.](#)

#137: Some citation to this last sentence? If this sentence is what you are expecting, should begin with ...”It is expected...” or something like that, I think.

Agreed, I have change this.

It’s expected that in both social and non-social animals, the frequency and type of interaction with conspecifics, as well as status in social species, can affect HPA and HPG axis activity and ultimately the reproductive success of animals.

#140: “Cavigelli & Parer “ is cited as “Cavigelli..Pareira..” in References section

This was changed.

#141: use “)” after “Creel et al. 2013”

This was changed.

#144: “Wingfield et al. 1990” is cited as “Wingfield et al. 1997” in References section

This was changed.

#144: “Hirschenhauser and Oliviera 2006” not listed in References section

This was changed.

#145: “McGothilin et al. 2010” not listed in References section

This was changed.

#145: use “)” after ..”et al. 2010”

This was changed.

#147: “et al” no in italics

The Journal use Italics.

148: delete colon before “(McGlot....)”

This was changed.

#150: should be “(Wingfield et al. 1997)”

This was changed.

#152: the citations should be in brackets (same as #150)

This was changed.

#155: “Sapolsky (2005)” not listed in References section, may be is 2002?

This was changed.

#162 to 165# you forgot to include almost all citations in References section (except Marino and Baldi 2008, Bank et al. 2003 and Ovejero 2013).

This was changed.

#163: remove comma after “ecological studies”

This was changed.

#168: the citation should be in brackets (same as #150)

This was changed.

#169: use “To understand how physiology mediates the relationship between life history and the environment in a free-living guanaco population, we predict....

Sorry but I don't understand which is the change that I had to made

#175: I don't understand why those predictions provide a description of the relative scope model (see #124). So I can't figure out easily what you mean in this complete sentence.

Reactive scope presumes that hormones and other physiological mediators of the stress response exist in four distinct ranges (see Romero 2009). My prediction give as information about how allostasis changes due to physiological mechanisms in response to changes in energetic demands on guanacos.

#196: indicate how many males and females comprise the sample.

This was changed.

198: indicate the months

This was changed.

199: Can you briefly explain the way you obtained the samples? How you did unequivocally indentified animals? How did you identified the different ages if all sampled individuals were adults? What are the environmental variables? (did you used it in this work?). May be explaining here the social system of guanacos across the sample period will clarify the reader your methods in the field.

Yes of course, I collect fresh sample (feces) for each individual and I label the sample with the age,date,social structure, that are well defined for us and my team, we are working with guanacos since 2000 and with this population since 2004. The focal distance to identified each adult individual and to collect samples was no more than 100 mts.

Agreed, I do I briefly description on the MS.

200: replace “froze” with “frozen”

This was changed.

201: What is the meaning of “LARLAC-IMBECU-CCT CONICET-MENDOZA”?

This was changed.

#202: Could you indicate which months?

This was changed.

#228: “R Development Core Team 2012” not listed in the References section

This was changed.

#233: Delete the subtitle

This was changed.

#244: What do you mean with “The second prediction.....accepted” just saying this tell nothing to the reader.

This was changed.

#247: I think that you want to introduce the reader into the third prediction statement, but you just copied and pasted line #173. This needs to be reworded.

Agreed, this was changed.

#252 to #259: I don't understand your model, this paragraph is confusing. It may better be explained like in the Figure 2.

Agreed, this was changed.

#253: capitalize “figure”

Agreed, this was changed.

#262: you enunciation seems to be a hypothesis. Change it by the prediction you enunciated in the Introduction or redact it in other way.

Agreed, this was changed.

#262: don't capitalize “Social”

This was changed.

#266: don't capitalize “Male”

This was changed.

#269: in general Figures are not included in the discussion; please check this with PeerJ standards.

Ok, This was changed.

#269 to 271: should go to Results section or you can delete it.

Ok, but I don't be sure what section do you mean.

#280: the citations should be in brackets (same as #150) and both are lacking in Reference

This was changed.

#283: use the cite

This was changed.

#284 to 286: the experiment you describe is confusing; do you mean that monogamous males became polygamous when implanted with T? and maintain higher levels of T than who? when T was implanted in normally monogamous males, high T levels were maintained for longer than average periods than when these males became polygynous, this was the idea but I agreed that is a little bit confuse sentence so i changed.

#287: delete “and south american camelid wildlife”

This was changed.

#288 to 291: I find this statement a little speculative. Have some authors observed this behavior in polygynous animals? Can you provide some evidence? I find this inconsistent in the way that it is explained. The first thing that I thought when reading this passage is the Alee effect, in this case the possible reduction in population number due to the disruption of their social behavior as a consequence of habitat fragmentation.

This was changed.

#293: delete Figure 1

This was changed.

#296: same as “262”

This was changed.

#300: delete “;” before citing Wingfield and it should be in brackets (same as #150).

This was changed.

#303: same as #150

This was changed.

#304: brackets...

This was changed.

#305: same as #150

This was changed.

#308: same as #150

This was changed.

#315: same as #150

This was changed.

#321: replace ...”are detrimental, costly...” with... ..”will be detrimental, costly...”

This was changed.

#329: same as #150. Use a colon before the citation.

This was changed.

#334: same as #150

This was changed.

#339: same as #150

This was changed.

#355: that prediction was not formulated, join it to the others (and in future tense)

This was changed.

#359: capitalize “figure 2” or delete it.

This was changed.

#363: delete “figure 2”

This was changed.

#References: check the entire section, and omissions and inconsistencies with the text.

Agreed, This was changed.

Best wishes,
Sonia Zapata

Reviewer 2 (Cristian Bonacic)

Basic reporting

This paper uses a non-invasive technique collecting feces from wild guanacos during an entire year to measure cortisol and testosterone.

The introduction is extremely long an attempt to explain many aspects of life history and natural/anthropogenic factors that are not measured later.

Agreed, I change This.

I suggest to focus more specifically in the actual question and what was measured making the introduction shorter.

This paper speculates a lot about social, ecological and environmental factors that could explain the HPG and HPA axis without actually measuring any of them apart from collecting feces from the ground. It would be ideal to have a detailed description of the groups sizes, population density and a better description of behaviors seen in the wild to link that information with the hormone results.

Agreed I change this in the methods and result's section. However we do not speculate about the factors that we consider to have impacts on the stress response. There are a lot of literature that studies this response many taxa, we recommend to see the special section of the Journal of Functional ecology published on 2013, there remarkable researcher like scott creel (social stress), Romero (acute and chronic stress), Macrostreets, environmental etc.

Here is a short summary about the social organization of guanacos, that are widely published and we not include this because we consider that is new information, however the new data is the link between hormonal response and social structure.

The Guanaco (*Lama guanicoe*) is a social ungulate in which the main social groups are classified as: family groups consisting of a territorial adult male, his harem of females (5 to 12) and the young of the year or chulengos, groups male (in which no offspring and is assumed to consist entirely of males without territories) and single individuals (usually physically and sexually male mature with or without lands, but females), although in some populations also They described family groups and mixed groups without males (Franklin, 1982; Puig, 1986, Ovejero 2013). In the Torres del Paine (Young and Franklin, 2004) and the Provincial National Park Reserve Payunia (Ovejero, unpubl. Data) groups of females with their young moving between the territories of males during the breeding season were observed. The marked flexibility in the social structure of these camelids was the key to success of colonization and expansion in its range throughout South America.

The authors should explain how they avoided to collect samples from the same animal in different days as well.

The Payunia Reserve has 450,000 ha, we collect feces in different places that are separated by 50 km and we are working with at population that has 25,000-30,000 individual.

Experimental design

Samples were collected opportunistically from the ground in different seasons and labelled and associated to individual animals. Sex and season were used as independent variables that explained Cortisol and Testosterone levels in collected feces.

Validity of the findings

The data is not provided beyond a summary graph (figure 1). This paper is too speculative and does not describe previous baseline values for South American Camelids that are available. I don't agree that we are speculative, because we describe and explain the principal physiological mechanism that guanacos have to cope with challenges. We measure baseline values during one year and this is the first work that does this. The focus of the Ms is not to compare values between South American camelids, because baseline values and in wildlife conditions are scarce in literature. We cannot compare baseline values because there are different populations, environmental conditions and methods used for extraction are different, so we only can inform but not compare with our results.

Comments for the Author

This paper contributes to understanding hormone values for guanacos in different seasons and describes the cortisol and testosterone levels in feces. Hormone data should be coupled with behavioral and population data in order to sustain predictions and improve the discussion.

I change this in the result and discussion section.

Revisor 3

Hypotheses require review.

Prediction A is rather simplistic: the secretion of T and GC probably shows great inter-individual variability, and surely is affected by social status: dominant males are expected to have large production of T, while subordinate males probably show large GC and suffer more social stress.

I change this that the first reviewers recommend, however the prediction is correct because there are some species of primates, rodents, canids that dominant males have the inverse response that the theory says, that it's dominant males have low T and high GC levels. So we have to test this assumption on wild camelids that we do not know anything about this response pattern.

Prediction B is not a true prediction that can be tested, while it is a vague hypothesis that demands specific predictions.

(B)-Male guanacos will show seasonal variation in the activity of their adrenal and gonadal systems, which perform incompatible functions in different life stages (survival vs

reproduction). This prediction state that if there are different energetics demands between survival vs reproduction, we can able to measure seasonal variation before and after the reproductive season and our results remark and supports this. Prediction C is also vague, because "prolonged" is not defined. (C)-Prolonged elevated baseline levels of GCs in male guanacos due to long periods of intense social interaction will be detrimental, costly, and decrease fitness, and we would expect that in this case HPA inhibits the activity of the HPG. "Prolonged" is in terms of the reproduction season. Our results supports this because we determined that the are mayors energetics demands during the reproduction season, however our results not supported this general assumption and this is a remarkable results.

In general, the Introduction seems to suggest that intense social interactions elicit stress, while in many conditions, they produce the opposite effect: a guanaco foraging alone in the open probably suffers more stress than a guanaco surrounded by others that collaborate in scanning predators, mother-offspring "intense" interactions reduce significantly stress to young in relation to those breed without their mothers.

Experimental design

The submission describes original primary research within the scope of the journal

The techniques used are fine.

Field Methods are not described with sufficient information, specially on the distribution and timing of sample collection.

I change this like first reviewers suggest

The research appears to be conducted in conformity with ethical standards.

Validity of the findings

Values on standard deviation should be given. It is probably better to show results on medias, sd, and t-student tests in a Table.

This data are changed in the results section and I choose to not put a table because I used different statistical approaches to get the results and there are no comparable.

Reproductive and non-reproductive periods should be clearly defined, and precise dates on data collection should be given in Methods.

I change this like first reviewers suggest

Apparently, data on the same individuals and different individuals were mixed, which is not correct: mean for each individualized animal at each season should be taken, and repeated measured statistics should be applied.

I agree with this, but I don't have repeated measure. The Hold set of samples are from different individuals.

T-student tests were incorrectly used. Comparisons between periods within males should be done using post-hoc mean comparisons after the ANOVA.

I not agree because T-test is generally used by analyses when your response variable had only two factors, like our data set compare "breeding and non-breeding season".

Comments for the Author

I do not evaluate the Discussion in detail because I think that the Results section requires substantial improvement.

Minor comments:

101-2. Darwin should be cited instead.

OK.

102-3. Not clear, citation required

OK

133. "T" means testosterone?

YES

141.)

OK

145.)

OK

155 replace ", " by "(", and removed "(" before 2005. What sort of physiological "problems"?

I change this like first reviewers suggest

158-159. What means "establishes important incompatibilities in life stages"?

This is when we think about the energetics demands between breeding an non breeding season.

156-159. The paragraph can be removed.

I change this like first reviewers suggest

161. Remove "these organisms"

I change this like first reviewers suggest

165-8 There are several studies on GCs in South American camelids that should be cited, especially from Zapata & Bocinovic's groups.

I change this like first reviewers suggest

171. remove "individual".

I change this like first reviewers suggest