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Royal Society Open Science Fri, May 5, 2017 at 1:22 AM
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04-May-2017

Dear Ms Gawel,

The editors assigned to your paper ("Contrasting ecological roles of non-native ungulates in a novel ecosystem") have now received comments from reviewers. We would like you to revise your paper in accordance with the referee and Associate Editor suggestions which can be found below (not including confidential reports to the Editor). Please note this decision does not guarantee eventual acceptance.

Please submit a copy of your revised paper within three weeks (i.e. by the 27-May-2017). If we do not hear from you within this time then it will be assumed that the paper has been withdrawn. In exceptional circumstances, extensions may be possible if agreed with the Editorial Office in advance.We do not allow multiple rounds of revision so we urge you to make every effort to fully address all of the comments at this stage. If deemed necessary by the Editors, your manuscript will be sent back to one or more of the original reviewers for assessment. If the original reviewers are not available we may invite new reviewers.

To revise your manuscript, log into http://mc.manuscriptcentral.com/rsos and enter your Author Centre, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision. Revise your manuscript and upload a new version through your Author Centre.

When submitting your revised manuscript, you must respond to the comments made by the referees and upload a file "Response to Referees" in "Section 6 - File Upload". Please use this to document how you have responded to the comments, and the adjustments you have made. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response.

In addition to addressing all of the reviewers' and editor's comments please also ensure that your revised manuscript contains the following sections as appropriate before the reference list:

• Ethics statement (if applicable)
If your study uses humans or animals please include details of the ethical approval received, including the name of the committee that granted approval. For human studies please also detail whether informed consent was obtained. For field studies on animals please include details of all permissions, licences and/or approvals granted to carry out the fieldwork.

• Data accessibility
It is a condition of publication that all supporting data are made available either as supplementary information or preferably in a suitable permanent repository. The data accessibility section should state where the article's supporting data can be accessed. This section should also include details, where possible of where to access other relevant research materials such as statistical tools, protocols, software etc can be accessed. If the data have been deposited in an external repository this section should list the database, accession number and link to the DOI for all data from the article that have been made publicly available. Data sets that have been deposited in an external repository and have a DOI should also be appropriately cited in the manuscript and included in the reference list.

If you wish to submit your supporting data or code to Dryad (http://datadryad.org/), or modify your current submission to dryad, please use the following link:
http://datadryad.org/submit?journalID=RSOS&manu=RSOS-170151

• Competing interests
Please declare any financial or non-financial competing interests, or state that you have no competing interests.

• Authors' contributions
All submissions, other than those with a single author, must include an Authors' Contributions section which individually lists the specific contribution of each author. The list of Authors should meet all of the following criteria; 1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published.

All contributors who do not meet all of these criteria should be included in the acknowledgements.

We suggest the following format:
AB carried out the molecular lab work, participated in data analysis, carried out sequence alignments, participated in the design of the study and drafted the manuscript; CD carried out the statistical analyses; EF collected field data; GH conceived of the study, designed the study, coordinated the study and helped draft the manuscript. All authors gave final approval for publication.

• Acknowledgements
Please acknowledge anyone who contributed to the study but did not meet the authorship criteria.

• Funding statement
Please list the source of funding for each author.

Once again, thank you for submitting your manuscript to Royal Society Open Science and I look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Yours sincerely,
Andrew Dunn
Senior Publishing Editor
Royal Society Open Science

on behalf of Kevin Padian
Subject Editor, Royal Society Open Science
openscience@royalsociety.org

Comments to Author:

Reviewers' Comments to Author:
Reviewer: 1

Comments to the Author(s)
See attached review

Reviewer: 2

Comments to the Author(s)
RSOS-170151
Review « Contrasting ecological roles of non-native ungulates in a novel ecosystem » by Gawel et al.
General comments
Interesting paper that tries to disentangle deer and pig effects on vegetation though different interactions (endozoochory, herbivory at the species and the community level). However it is not possible to establish a definitive statement on the relative effects of both species. I think that the authors should be cautious to push not too far the interpretations of their results. For instance, I am not sure the gradient of pig scat density to be sufficient to really test its effects on vegetation community composition.
I have tried to access the dryad deposit as the origin of some data (vegetation surveys, number of sites not precisely indicated) is unclear and so it is difficult to interpret the data. However the data are not yet accessible.
I would advise the authors the following recommendations. The current version of the paper is acceptable pending major revisions
Specific comments
First of all, you have to give more details about the protocols:
- How did you calculate the proportional abundances for vegetation surveys (seedling counts in nature) and for pig scats and deer dungs?
- It is not mentioned how many sites have been sampled for vegetation surveys, looking at figure 3, it seems that there are 14 ? Please clarify
- Concerning deer dung and pig scat counts, they are measured on each site in a square transect of 800m², it is not really clear the way it is described in the material and methods. May be a scheme would help, that present both vegetation and ungulates faeces surveys.
- We need a map for Guam highlighting the karst forests in global and the eight (14 vegetation surveys ?) ones that have

been sampled. That would allow to see how the different samples are spatially organised.
Analysis
Why did not you consider treatment and species in the same model to explain seedling survival. That will allow to really discuss the differences among species. You should also add a continuous variable for the time the seedlings are exposed to ungulates (varying from 4 to 15 months), the same measures are repeated over time. This would be much more clearer than now, when you are discussing differences among species but without testing for them.
The dependent variable would be survival (yes=1 or no=0) for a given seedling as a function of time, treatment and species and taking site into account as a random factor.
Figure 1. Put a star for the significant differences for treatment, and ns for the two last ones. Effect of length of monitoring to be tested ? Order the species according to length of exposures to ungulates. We might expect longer times of exposure to lead to higher differences between treatments for the species concerned.

Figure 3, there are inconsistencies between the r^2 in the figure and the ones given in the text. In this figure 3 and associated analysis, why did not you use multiple regressions to see if boar and deer have complementary effects on different functional groups abundances?
The range for wild boar is 10 times shorter (0-10 dungs/800m²) than the one for deer (0-80/800m²). That is surely the reason why we cannot conclude about any effect from pigs concerning vegetation community composition. Again in Fig 3, it seems that there are 14 sites but it is not said anywhere in the manuscript. Please clarify and correct.
Figure 2. It is really unclear how proportional abundance is calculated for native and non-native plants in the field and in both types of dungs. Please clarify and justify in the mat and meth. You could in that figure add native and non-native to the species heading on the left and then avoid the double similar X-axis.
Table 1. Please identify the non-native species, but it would be better to do that table according to the full model proposed treatment*species*(time of exposure) with main effects and interactions. I do not understand why authors did not analyze these data with the full model.
Table 2. Add number of deer and boar samples in the table. Rather than 0, put – in lines without data. Average number of seedlings per dung for a given species with standard errors when it is possible.
May be it is worth analysing your “endozoochory” data using hurdle models ? With “seedling species richness”and/or “seedling abundance” as dependent variable, then you might be able to test for differences between ungulate species. Related to that analysis we need the information about the number of seeds per fruit somewhere in the material and method for the different species dispersed (why not converting in fruit numbers, the results of seed dispersal). For the moment that issue is solely in the discussion.
Is Rusa marianna a browser or a grazer ? Please clarify.
L11P1 effects instead of impacts
L12P1 dungs or pellets instead of scats for deer, here more native species dispersed by pigs but not only native species, may be highlight the relative proportion.
The authors speak of seedling abundance L62P3/plant community structureL10P1/plant community characteristics P4L65 (3 different manners which are related to the same analysis in the text but is then unclear). Please use the same wording throughout the text. However the variables used are more related to plant community composition than structure.
P4L67 whether the presence/the effects instead of impacts
P4L83 which one is exotic, please specify
Seedling plot measures roughly 19.25 m². according to the plan, it allows 153 available places for seedlings for a total of 79 planted seedlings. Can you comment on how seedlings planted were spatially arranged (random ?), this may lead to interspecific neighbouring effets ?
P5L88 Why “on the island they have been collected”, please clarify
P5L96 3 species among the 6 tested planted during drier months, which months? To clarify in relation to times of exposures to ungulates by plant species or group of species.
P5L103-4 why separately tested? See above comments on this specific analysis.
P6L116-118 Please clarify how proportional abundances have been calculated in faeces et vegetation surveys. A priori there are 14 sites for vegetation surveys!
P6L121 You present different functional groups that are nor used, neither presented later on. Be consistent please or justify why some functional groups are not tested.
Deer pellet and pig scat abundance is an indicator of animal presence. But keep scat or dung abundance per 100m² in the text and do not use deer abundance or pig abundance in the text because it is false and misleading. Faeces count is only an indicator, because you do not justify how it is really related to animal abundance.
P7L133 You could use multiple linear regressions to test deer and pig effects together, but there is probably a problem of range of faces abundance between ungulates ! May be is it simply not possible to test for pig scat abundance effect, because the gradient is too short. So be cautious in the interpretation.
P7L137 Forest characteristics not in agreement with the functional groups defined previously, why ?Native vs. non-native should be crossed with each functional group.
P7L153 the dependant variable is survival or not after 4-15 months exposure to ungulates. See comments above on the model. I really think that time of exposure should be taken into account.
P8L157 erase did not (twice)
P8L159 pellets instead of scats for deer
P8L160 (4/20) instead of 20%, idem (25/31) instead of 80.6%. How many species for pigs, how many native and non native ? One unidentified ! All of these informations have to be presented here and not only in the attached table.

P8L172 local flora and associated vegetation surveys not described in the mat and meth.
May be you could test the abundance ranking order between local flora (avoid nature) and dung seedling composition with Spearman correlation tests.
P8L176 effects of ungulates on vegetation community composition (erase abundance)
P9L177 Be more precise: total or per functional group seedling abundance, r^2 different in text and fig. Please check and correct!
P9L184 cylindrocarpa or cylindrica ?
P9L184-187 Proportions given, where do they come from, not clear, please clarify !
Do you have browsing records for the exclosure experiments ? To what is the survival outside the exclosure related to? Only to browsing? Dryness ? Pleas clarify
P9L196 Deer signs not described ! Browsing and rooting are nor estimated neither described.
P9L197 over interpreted and not comparable as pigs scat abundance represent a much shorter gradient (by ten times roughly)
P10L202 Please look at Picard et al. 2016 in JVS "Functional traits of seeds dispersed through endozoochory by native forest ungulates" for differences between other deer species and wild boar !
P10L203 species richness instead of diversity, pellets/dungs instead of scats.
P10L204 many seeded fuits, this information arrives too late please see earlier comments on that point.
P10 L218-220 that is not what is tested please do not overestimate your results (boar vs. deer effects)
P10 L226 This suggests Rusa marianna is a grazer, is that true ? to be specified in the mat and meth. And comment on its potential effects on different vegetation functional groups (at least woody versus non woody species). What do we know from its feeding regime ? Must be interesting to precise somewhere in the mat and method.
It seems that as Cervus elaphus for instance, it is an intermediate mixed feeder (Hoffmann 1989).
Following paragraph from http://www.cabi.org/isc/datasheet/89935
[…] Nutrition
Very little information on diet is available in the Philippines, although a few observations have been published (Balete et al., 2011). Food records from Micronesia are more extensive and reveal a diverse diet comprised of at least 82 plant species, including trees, shrubs, grasses, herbaceous plants, vines, ferns, and mushrooms (Wheeler, 1979; Wiles et al., 1999). Foliage, fruits, shoots, seeds, and tree bark are eaten. Diet includes agricultural plants and fruits. Relative preferences among food plants remain unknown. Conry (1986) reported differences in dietary quality in northern versus southern Guam, based on fecal concentrations of diaminopimelic acid. […]

References list has to be checked as for some of them, we do not have the pages …

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Abstract: Conservation has long focused on preserving or restoring pristine ecosystems. However, understanding and managing novel ecosystems has grown in importance as they outnumber pristine ecosystems worldwide. While non-native species may be neutral or detrimental in pristine ecosystems, it is possible that even notorious invaders could play beneficial roles in novel ecosystems. We examined the effects of two long-established non-native species – Philippine deer (Rusa marianna) and feral pigs (Sus scrofa) – in Guam, Micronesia, where native vertebrate frugivores are functionally absent leaving forests devoid of seed dispersers. We compared the roles of deer and pigs on seedling survival, seed dispersal, and plant community structure in limestone karst forests. Deer, even at low abundances, had pronounced negative impacts on forest communities by decreasing seedling and vine abundance. In contrast, pigs showed no such relationship, and more seeds were found in pig scats than deer scats, suggesting that pigs provide an ecosystem function – seed dispersal – that has been lost from Guam. Our study presents a surprising discrepancy

between the roles of two non-native species that are traditionally managed as a single entity, suggesting that ecological function, rather than identity as a non-native, may be more important to consider in managing novel systems.
EndDryadContent

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