

Taxonomy and conservation of grassland earless dragons: new species and an assessment of the first possible extinction of a reptile on mainland Australia

Jane Melville, Kirilee Chaplin, Mark Hutchinson, Joanna Sumner, Bernd Gruber, Anna J. MacDonald and Stephen D. Sarre

Article citation details

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Review timeline

Original submission: 7 February 2019

Revised submission: 28 March 2019

Final acceptance: 2 April 2019

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Review History

RSOS-190233.R0 (Original submission)

Review form: Reviewer 1

Is the manuscript scientifically sound in its present form?

Yes

Are the interpretations and conclusions justified by the results?

Yes

Is the language acceptable?

Yes

Is it clear how to access all supporting data?

Yes

Do you have any ethical concerns with this paper?

No

Have you any concerns about statistical analyses in this paper?

I do not feel qualified to assess the statistics

Recommendation?

Accept with minor revision (please list in comments)

Comments to the Author(s)

The authors use a range of methods to conduct a taxonomic revision of an Australian agamid genus (*Tympanocryptus*). They re-describe 2 existing species, and provide descriptions for 2 new species. Importantly, they outline the conservation implications of their study, and discuss the possibility that *T. pinguicolla*, last seen in 1967, is extinct.

This is a well-executed study, and undoubtedly contains the most comprehensive set of approaches and analyses that I've ever seen for a species description. It is innovative with regard to the wide range of methods employed (mtDNA, genomics, external morphology, CT scans), and the sophistication with which the key taxonomic issues are addressed (identity of the lectotype), and resolved. It is well-written, and clearly suitable for publication in the journal.

I only have 2 relatively minor comments on the MS.

1. The title should be revised to make it clear that it is potentially the first reptile extinction on mainland Australia. This distinction is important to make, as there is one Christmas Island species listed as Extinct, and another two listed as Extinct in the Wild.

2. Given, the presumed high conservation concern for all taxa within the genus, the authors should provide the key information that will be needed for listing on the IUCN Red List (& Australian EPBC Act; which uses the IUCN criteria). This includes known information on population trends, population size, threats, estimated generation time, and geographic range (extent of occurrence, area of occupancy). It would be great if the authors could even suggest a potential Red List category for each species. This would fast-track subsequent Red Listing of these new taxa, and revising existing listings for the redefined taxa.

Review form: Reviewer 2

Is the manuscript scientifically sound in its present form?

Yes

Are the interpretations and conclusions justified by the results?

Yes

Is the language acceptable?

Yes

Is it clear how to access all supporting data?

Yes

Do you have any ethical concerns with this paper?

No

Have you any concerns about statistical analyses in this paper?

No

Recommendation?

Accept with minor revision (please list in comments)

Comments to the Author(s)

This is an excellent revision of a group of Australian lizards. It is very much state of the art in terms of the diversity and quality of the data collected and the modern treatment of those data. This is also an important example paper about how basic and thorough taxonomic research can have real world conservation implications. This is well known example in Australia and the authors have done a great job with crushing the problem. I was particularly impressed with the number of different data sets the authors used in their studies.

I think the paper is high quality in every way - the writing is clear and succinct, the figures and tables are informative and attractive, and the taxonomic detail and presentation is impressive. I have only one suggestion that the authors should consider. I did initially find reference to all the Species A-G confusing and it wasn't until I had read some bits a couple of times that I understood that Species A and B were to be designated as newly described species. That's OK, but the thing I didn't like was the reference to all the other putative species C-G. You call them "putative" species in the text sometimes but in the figures and in parts of the text you call them species. You say that they are the subject of a separate taxonomic work, but I don't think you gain anything by calling them species here. I think it would be safer to call all of these simply Clades A-G, rather than species, and then say that Clades C-G are the subject of separate taxonomic work. For these additional clades, you also did not have all the additional data, or do species delimitation analyses, which further supports in my mind that you shouldn't call them species here. Save that for the other paper. This is a very minor point and fixing it takes nothing away from this paper. Well done!

Decision letter (RSOS-190233.R0)

15-Mar-2019

Dear Dr Melville

On behalf of the Editors, I am pleased to inform you that your Manuscript RSOS-190233 entitled "Taxonomy and conservation of Grassland Earless Dragons: new species and an assessment of the first possible extinction of a reptile in Australia." has been accepted for publication in Royal Society Open Science subject to minor revision in accordance with the referee suggestions. Please find the referees' comments at the end of this email.

The reviewers and handling editors have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the comments and revise your manuscript.

• Ethics statement

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 has 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 has 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-190233>

- 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.

Please ensure you have prepared your revision in accordance with the guidance at <https://royalsociety.org/journals/authors/author-guidelines/> -- please note that we cannot publish your manuscript without the end statements. We have included a screenshot example of the end statements for reference. If you feel that a given heading is not relevant to your paper, please nevertheless include the heading and explicitly state that it is not relevant to your work.

Because the schedule for publication is very tight, it is a condition of publication that you submit the revised version of your manuscript before 24-Mar-2019. Please note that the revision deadline

will expire at 00.00am on this date. If you do not think you will be able to meet this date please let me know immediately.

To revise your manuscript, log into <https://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." You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript and upload a new version through your Author Centre.

When submitting your revised manuscript, you will be able to respond to the comments made by the referees and upload a file "Response to Referees" in "Section 6 - File Upload". You can use this to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the referees. We strongly recommend uploading two versions of your revised manuscript:

- 1) Identifying all the changes that have been made (for instance, in coloured highlight, in bold text, or tracked changes);
- 2) A 'clean' version of the new manuscript that incorporates the changes made, but does not highlight them.

When uploading your revised files please make sure that you have:

- 1) A text file of the manuscript (tex, txt, rtf, docx or doc), references, tables (including captions) and figure captions. Do not upload a PDF as your "Main Document";
- 2) A separate electronic file of each figure (EPS or print-quality PDF preferred (either format should be produced directly from original creation package), or original software format);
- 3) Included a 100 word media summary of your paper when requested at submission. Please ensure you have entered correct contact details (email, institution and telephone) in your user account;
- 4) Included the raw data to support the claims made in your paper. You can either include your data as electronic supplementary material or upload to a repository and include the relevant doi within your manuscript. Make sure it is clear in your data accessibility statement how the data can be accessed;
- 5) All supplementary materials accompanying an accepted article will be treated as in their final form. Note that the Royal Society will neither edit nor typeset supplementary material and it will be hosted as provided. Please ensure that the supplementary material includes the paper details where possible (authors, article title, journal name).

Supplementary files will be published alongside the paper on the journal website and posted on the online figshare repository (<https://rs.figshare.com/>). The heading and legend provided for each supplementary file during the submission process will be used to create the figshare page, so please ensure these are accurate and informative so that your files can be found in searches. Files on figshare will be made available approximately one week before the accompanying article so that the supplementary material can be attributed a unique DOI.

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Royal Society Publishing. You can find out more about the charges at <http://rsos.royalsocietypublishing.org/page/charges>. Should you have any queries, please contact openscience@royalsociety.org.

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.

Kind regards,
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor Michael Bruford (Associate Editor) and Kevin Padian (Subject Editor)
openscience@royalsociety.org

Associate Editor Comments to Author (Professor Michael Bruford):

Thanks for submitting your manuscript to RSOS. It has been reviewed by two referees who both like it very much and recommend very minor revisions, which I concur with. Please make these revisions and your paper will be accepted. Congratulations! Mike Bruford.

Reviewer comments to Author:

Reviewer: 1

Comments to the Author(s)

The authors use a range of methods to conduct a taxonomic revision of an Australian agamid genus (*Tympanocryptus*). They re-describe 2 existing species, and provide descriptions for 2 new species. Importantly, they outline the conservation implications of their study, and discuss the possibility that *T. pinguicolla*, last seen in 1967, is extinct.

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Reviewer: 2

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I have only one suggestion that the authors should consider. I did initially find reference to all the Species A-G confusing and it wasn't until I had read some bits a couple of times that I understood that Species A and B were to be designated as newly described species. That's OK, but the thing I didn't like was the reference to all the other putative species C-G. You call them "putative" species in the text sometimes but in the figures and in parts of the text you call them species. You say that they are the subject of a separate taxonomic work, but I don't think you gain anything by calling them species here. I think it would be safer to call all of these simply Clades A-G, rather than species, and then say that Clades C-G are the subject of separate taxonomic work. For these additional clades, you also did not have all the additional data, or do species delimitation analyses, which further supports in my mind that you shouldn't call them species here. Save that for the other paper. This is a very minor point and fixing it takes nothing away from this paper. Well done!

Author's Response to Decision Letter for (RSOS-190233.R0)

See Appendix A.

Decision letter (RSOS-190233.R1)

02-Apr-2019

Dear Dr Melville,

I am pleased to inform you that your manuscript entitled "Taxonomy and conservation of Grassland Earless Dragons: new species and an assessment of first possible extinction of a reptile on mainland Australia." is now accepted for publication in Royal Society Open Science.

You can expect to receive a proof of your article in the near future. Please contact the editorial office (openscience_proofs@royalsociety.org and openscience@royalsociety.org) to let us know if you are likely to be away from e-mail contact. Due to rapid publication and an extremely tight schedule, if comments are not received, your paper may experience a delay in publication.

Royal Society Open Science operates under a continuous publication model (<http://bit.ly/cpFAQ>). Your article will be published straight into the next open issue and this will be the final version of the paper. As such, it can be cited immediately by other researchers. As the issue version of your paper will be the only version to be published I would advise you to check your proofs thoroughly as changes cannot be made once the paper is published.

On behalf of the Editors of Royal Society Open Science, we look forward to your continued contributions to the Journal.

Kind regards,
Andrew Dunn
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor Michael Bruford (Associate Editor) and Kevin Padian (Subject Editor)
openscience@royalsociety.org

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Appendix A

Associate Editor Comments to Author (Professor Michael Bruford):

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In reference to the last seen in 1967 statement in the paper. It has come to our attention from one of the researchers on the recovery team for *T. pinguicolla* that there were two more high-confidence sightings for this species in 1968 and 1969, published in a local naturalist journal. Based on this we have updated the extinction analyses (dataset, methods and results section) and tightened up the wording around high- confidence sightings versus low-confidence sightings from 1988 and 1990. With these edits, including in the discussion, we make it clear that the most recent sightings are not considered of high-confidence by the recovery team and that further analyses, beyond the scope of our study, should incorporate survey effort and available habitats.

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Title amended as requested.

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Red List (& Australian EPBC Act; which uses the IUCN criteria). This includes known information on population trends, population size, threats, estimated generation time, and geographic range (extent of occurrence, area of occupancy). It would be great if the authors could even suggest a potential Red List category for each species. This would fast-track subsequent Red Listing of these new taxa, and revising existing listings for the redefined taxa.

As requested we have added in a summary of available information for *T. lineata* and *T. osbornei* on population declines, population size and information on trends. This has been added into the remarks section of the taxonomic treatments. We have also provided references that provide more details about these factors and the threats. Although we believe this is important information for determining the conservation status of this species, we believe that it beyond the scope of a taxonomic work to make decisions or recommendations in regards to specific Red List categories for the species and that such decisions should be made in consultation with the national recovery team. Such work will be undertaken by the recovery team once the taxonomic revision has been published.

Reviewer: 2

Comments to the Author(s)

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species delimitation analyses, which further supports in my mind that you shouldn't call them species here. Save that for the other paper. This is a very minor point and fixing it takes nothing away from this paper. Well done!

We see the logic of Reviewer 1's suggestion and as such we have revised the mtDNA phylogenetic section of the results. We now present just the information relevant to the Grassland Earless Dragons, have revised the distribution map and removed the species lettering from the tree. This information will be put into the second taxonomic paper on these earless dragons, which will be submitted to Royal Society Open Science in the next couple of weeks. We believe that these changes provide a better focus for the paper, taking out somewhat irrelevant details that may distract the reader. And as the reviewer suggests, these changes do not detract from the paper or lessen its importance.