

Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures

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Article citation details

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Review timeline

Original submission: 5 September 2019

Revised submission: 30 October 2019

Final acceptance: 30 October 2019

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

Review History

RSPB-2019-2078.R0 (Original submission)

Review form: Reviewer 1

Recommendation

Accept with minor revision (please list in comments)

Scientific importance: Is the manuscript an original and important contribution to its field?

Good

General interest: Is the paper of sufficient general interest?

Good

Quality of the paper: Is the overall quality of the paper suitable?

Good

Is the length of the paper justified?

Yes

Should the paper be seen by a specialist statistical reviewer?

No

Do you have any concerns about statistical analyses in this paper? If so, please specify them explicitly in your report.

No

It is a condition of publication that authors make their supporting data, code and materials available - either as supplementary material or hosted in an external repository. Please rate, if applicable, the supporting data on the following criteria.

Is it accessible?

Yes

Is it clear?

Yes

Is it adequate?

Yes

Do you have any ethical concerns with this paper?

No

Comments to the Author

Comments on RSPB-2019-2078

Title: Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures

This review focuses on published literature on embryonic adaptations to spatiotemporal heterogeneity in nest temperatures. Although relatively few taxa have been studied in detail and proximate mechanisms remain unclear, this review identifies gaps in our understanding of thermal adaptations of early (embryonic) phases of the life history and suggests opportunities for future research.

I think this review paper was concise and well organized.

Major comments:

1) examples for birds were relatively less, perhaps due to the fact of less work?

I suggest a few added cases (see below).

2) lines 217-232:

The title "4.2. Nest warming in the context of global change" was good.

However, the context only mentioned a few about urban island effect, less about global warming, and the relationship between the twos.

I suggest this part should be improve a bit more.

Minor comments:

Line 109:

expect to find...

Lines150-154:

Most birds have clutch sizes small enough to minimize within-nest variation in temperature (but see Yang et al. 2018 Sci Nat; Cao et al. 2018 BJLS), ...

Lines 254-261:

For eggs using physiological mechanisms to adjust developmental rate and the embryo's capacity to increase its heart rate, a case of russet sparrow (*Passer cinnamomeus*) by Huo et al. (2018) should be added to.

Lines 274-275:

"phenotypic trait values" causes variation in trait values?

Please make it clear for "...relationships between phenotypic trait values and fitness optima causes corresponding variation in trait values...", and perhaps add a reference.

Lines 344-349:

"Nest temperature decreases at higher elevations, so we expect local adaptation of embryonic development to produce a match between embryonic thermal tolerance..."

Here, cases for blood pheasant by Jia et al. (2010, Auk) and for grouse by Shi et al. (2019, Avian Res) may be added to.

Review form: Reviewer 2

Recommendation

Accept with minor revision (please list in comments)

Scientific importance: Is the manuscript an original and important contribution to its field?

Good

General interest: Is the paper of sufficient general interest?

Good

Quality of the paper: Is the overall quality of the paper suitable?

Excellent

Is the length of the paper justified?

Yes

Should the paper be seen by a specialist statistical reviewer?

No

Do you have any concerns about statistical analyses in this paper? If so, please specify them explicitly in your report.

No

It is a condition of publication that authors make their supporting data, code and materials available - either as supplementary material or hosted in an external repository. Please rate, if applicable, the supporting data on the following criteria.

Is it accessible?

Yes

Is it clear?

Yes

Is it adequate?

Yes

Do you have any ethical concerns with this paper?

No

Comments to the Author

This well written manuscript provides a very timely review of the adaptations of oviparous embryos to thermal variation across local and latitudinal scales and temporal scales. The authors have used some good examples from the literature to support their key points, and it was hard to find any faults with this manuscript. I have some minor comments and suggestions for the authors below.

L344-346: "so we expect local adaptation of embryonic development to produce a match between embryonic thermal tolerance and microhabitat temperatures along an elevational gradient."

I don't see the relevance of thermal tolerance here. Should this phrase read "we expect local adaptation to produce a match between embryonic development and microhabitat temperatures along an elevational gradient."

L438-439 The reference you cite here is 7 years old; several recent studies (not cited) have used mark-recapture techniques to estimate fitness consequences of variation in traits (see Dayananda et al. *Global Change Biology* 22: 2405-2414, and *Biology Letters* 13: 20170002

Decision letter (RSPB-2019-2078.R0)

18-Oct-2019

Dear Dr Du:

Your manuscript has now been peer reviewed and their comments (not including confidential comments to the Editor) are included at the end of this email for your reference. As you will see, the reviewers like your article but have raised some concerns and I would like to invite you to revise your manuscript to address them. This should not take you long.

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, your manuscript will be sent back to one or more of the original reviewers for assessment but, if you do a comprehensive job, I would hope that this isn't necessary. However, please note that we cannot guarantee eventual acceptance of your manuscript at this stage.

To submit your revision please log into <http://mc.manuscriptcentral.com/prsb> 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.

When submitting your revision please upload a file under "Response to Referees" in the "File Upload" section. This should document, point by point, how you have responded to the reviewers' and Editors' comments, and the adjustments you have made to the manuscript. We require a copy of the manuscript with revisions made since the previous version marked as 'tracked changes' to be included in the 'response to referees' document.

Your main manuscript should be submitted as a text file (doc, txt, rtf or tex), not a PDF. Your figures should be submitted as separate files and not included within the main manuscript file.

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Use of animals and field studies:

If your study uses animals please include details in the methods section of any approval and licences given to carry out the study and include full details of how animal welfare standards were ensured. Field studies should be conducted in accordance with local legislation; please include details of the appropriate permission and licences that you obtained to carry out the field work.

Data accessibility and data citation:

It is a condition of publication that you make available the data and research materials supporting the results in the article. Datasets should be deposited in an appropriate publicly available repository and details of the associated accession number, link or DOI to the datasets must be included in the Data Accessibility section of the article (<https://royalsociety.org/journals/ethics-policies/data-sharing-mining/>). Reference(s) to datasets should also be included in the reference list of the article with DOIs (where available).

In order to ensure effective and robust dissemination and appropriate credit to authors the dataset(s) used should also be fully cited and listed in the references.

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If you have already submitted your data to dryad you can make any necessary revisions to your dataset by following the above link.

For more information please see our open data policy <http://royalsocietypublishing.org/data-sharing>.

Electronic supplementary material:

All supplementary materials accompanying an accepted article will be treated as in their final form. They will be published alongside the paper on the journal website and posted on the online figshare repository. 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. Please try to submit all supplementary material as a single file.

Online supplementary material will also carry the title and description provided during submission, so please ensure these are accurate and informative. Note that the Royal Society will not edit or typeset supplementary material and it will be hosted as provided. Please ensure that the supplementary material includes the paper details (authors, title, journal name, article DOI). Your article DOI will be 10.1098/rspb.[paper ID in form xxxx.xxxx e.g. 10.1098/rspb.2016.0049].

Please submit a copy of your revised paper within three weeks. If we do not hear from you within this time your manuscript will be rejected. If you are unable to meet this deadline please let us know as soon as possible, as we may be able to grant a short extension.

Thank you for submitting your manuscript to Proceedings B; we look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Best wishes,
Innes Cuthill

Reviews Editor, Proceedings B
mailto:proceedingsb@royalsociety.org

Reviewer(s)' Comments to Author:

Referee: 1

Comments to the Author(s)
Comments on RSPB-2019-2078

Title: Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures

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I think this review paper was concise and well organized.

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1) examples for birds were relatively less, perhaps due to the fact of less work?
I suggest a few added cases (see below).

2) lines 217-232:

The title "4.2. Nest warming in the context of global change" was good.

However, the context only mentioned a few about urban island effect, less about global warming, and the relationship between the twos.

I suggest this part should be improve a bit more.

Minor comments:

Line 109:

expect to find...

Lines 150-154:

Most birds have clutch sizes small enough to minimize within-nest variation in temperature (but see Yang et al. 2018 *Sci Nat*; Cao et al. 2018 *BJLS*), ...

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For eggs using physiological mechanisms to adjust developmental rate and the embryo's capacity to increase its heart rate, a case of russet sparrow (*Passer cinnamomeus*) by Huo et al. (2018) should be added to.

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"phenotypic trait values" causes variation in trait values?

Please make it clear for "...relationships between phenotypic trait values and fitness optima causes corresponding variation in trait values...", and perhaps add a reference.

Lines 344-349:

"Nest temperature decreases at higher elevations, so we expect local adaptation of embryonic development to produce a match between embryonic thermal tolerance..."

Here, cases for blood pheasant by Jia et al. (2010, *Auk*) and for grouse by Shi et al. (2019, *Avian Res*) may be added to.

Referee: 2

Comments to the Author(s)

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Author's Response to Decision Letter for (RSPB-2019-2078.R0)

See Appendix A.

Decision letter (RSPB-2019-2078.R1)

30-Oct-2019

Dear Dr Du

I am pleased to inform you that your manuscript entitled "Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures" has been accepted for publication in Proceedings B.

You can expect to receive a proof of your article from our Production office in due course, please check your spam filter if you do not receive it. PLEASE NOTE: you will be given the exact page length of your paper which may be different from the estimation from Editorial and you may be asked to reduce your paper if it goes over the 10 page limit.

If you are likely to be away from e-mail contact during this period, let us know. Due to rapid publication and an extremely tight schedule, if comments are not received, we may publish the paper as it stands.

If you have any queries regarding the production of your final article or the publication date please contact procb_proofs@royalsociety.org

Your article has been estimated as being 9 pages long. Our Production Office will be able to confirm the exact length at proof stage.

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Thank you for your fine contribution. On behalf of the Editors of the Proceedings B, we look forward to your continued contributions to the Journal.

Sincerely,
Proceedings B
<mailto:proceedingsb@royalsociety.org>

Appendix A

Author response to editorial and reviewer comments

RSPB-2019-2078

Du et al., Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures

Dear Editor,

*Many thanks for your helpful remarks, and for the suggestions from the reviewers. Below, we have pasted in the reviewers' remarks, and explained our responses and how we have modified the MS in light of the comments. Our responses follow each detailed comment.

Reviewer(s)' Comments to Author:

Referee: 1

Comments to the Author(s)

Comments on RSPB-2019-2078

Title: Adaptive responses of the embryos of birds and reptiles to spatial and temporal variations in nest temperatures

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I think this review paper was concise and well organized.

Major comments:

1) examples for birds were relatively less, perhaps due to the fact of less work? I suggest a few added cases (see below).

*Yes, much less work has been done on this topic in birds than in reptiles. Thank you for bringing some additional case studies in birds to our attention. We have now included these studies in our review.

2) lines 217-232:

The title "4.2. Nest warming in the context of global change" was good.

However, the context only mentioned a few about urban island effect, less about global warming, and the relationship between the twos.

I suggest this part should be improve a bit more.

*Global change includes both climate warming at the global scale and habitat change induced by anthropogenic activities at a local scale. We have modified this paragraph and added some new examples to indicate nest warming induced by global warming. (Lines 218-234)

Minor comments:

Line 109:

expect to find...

*Thank you for your suggestion. However, we prefer "see" than "find" here.

Lines150-154:

Most birds have clutch sizes small enough to minimize within-nest variation in temperature (but see Yang et al. 2018 Sci Nat; Cao et al. 2018 BJLS), ...

* We added a sentence to refer to the temperature difference between cuckoo eggs and host eggs. (Lines 153-154)

Lines 254-261:

For eggs using physiological mechanisms to adjust developmental rate and the embryo's capacity to increase its heart rate, a case of russet sparrow (*Passer cinnamomeus*) by Huo et al. (2018) should be added to.

*Thanks for the information, we now have added references to this phenomenon in avian species. (Lines 260-263)

Lines 274-275:

“phenotypic trait values” causes variation in trait values?

Please make it clear for “...relationships between phenotypic trait values and fitness optima causes corresponding variation in trait values...”, and perhaps add a reference.

* We have now modified the text to clarify our meaning, and have added a relevant reference. (Lines 279-282)

Lines 344-349:

“Nest temperature decreases at higher elevations, so we expect local adaptation of embryonic development to produce a match between embryonic thermal tolerance...”
Here, cases for blood pheasant by Jia et al. (2010, Auk) and for grouse by Shi et al.

(2019, Avian Res) may be added to.

* We have now added the highly relevant example of the blood pheasant.(Lines 357-359)

Referee: 2

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I don't see the relevance of thermal tolerance here. Should this phrase read “we expect local adaptation to produce a match between embryonic development and microhabitat temperatures along an elevational gradient.”

* Revised accordingly. (Line 349)

L438-439 The reference you cite here is 7 years old; several recent studies (not cited) have used mark-recapture techniques to estimate fitness consequences of variation in traits (see Dayananda et al. Global Change Biology 22: 2405–2414, and Biology Letters 13: 20170002

* Thank you for bringing the new studies to our attention. We have now added the references. (Line 445)

*We thank both of the reviewers for their careful and constructive suggestions.