DESCRIPTION

*Animal Reproduction Science* publishes results from studies relating to reproduction and fertility in animals. This includes both fundamental research and applied studies, including management practices that increase our understanding of the biology and manipulation of reproduction. Manuscripts should go into depth in the mechanisms involved in the research reported, rather than a give a mere description of findings. The focus is on animals that are useful to humans including food- and fibre-producing; companion/recreational; captive; and endangered species including zoo animals, but excluding laboratory animals unless the results of the study provide new information that impacts the basic understanding of the biology or manipulation of reproduction.

The journal's scope includes the study of reproductive physiology and endocrinology, reproductive cycles, natural and artificial control of reproduction, preservation and use of gametes and embryos, pregnancy and parturition, infertility and sterility, diagnostic and therapeutic techniques. The Editorial Board of *Animal Reproduction Science* has decided not to publish papers in which there is an exclusive examination of the in vitro development of oocytes and embryos; however, there will be consideration of papers that include in vitro studies where the source of the oocytes and/or development of the embryos beyond the blastocyst stage is part of the experimental design.

Submission is encouraged of manuscripts that are focused on reproduction in aquatic animals. Manuscripts focused on reproduction in insects, however, do not fit the scope of the Journal and will be rejected without peer review.

Authors with any concerns are encouraged to contact the Editor-in-Chief to enquire about the suitability of the content of their paper for submission. There are no page charges for manuscripts published in *Animal Reproduction Science* and publication of papers only takes place after rigorous peer review.

AUDIENCE


IMPACT FACTOR

2018: 1.817 © Clarivate Analytics Journal Citation Reports 2019
ABSTRACTING AND INDEXING

Biological Abstracts
Current Awareness in Biological Sciences
PubMed/Medline
Animal Breeding Abstracts
Bibliography of Reproduction
Current Contents - Agriculture, Biology & Environmental Sciences
Scopus
Elsevier BIOBASE
Science Citation Index

EDITORIAL BOARD

Editor-in-Chief
James Kinder, The Ohio State University Department of Animal Sciences, Columbus, Ohio, United States

Associate Editors
Christine Aurich, University of Veterinary Medicine Vienna, Austria
Robert Cushman, USDA, Clay Center, West Virginia, United States
Marc Yeste, University of Girona, Girona, Spain

Editorial Advisory Board
B.M. Alexander, Laramie, WY USA
L.L. Anderson, Ames, IA USA
F.W. Bazer, College Station, TX USA
H. Cardenas, Columbus, OH USA
J.F. Cavaliere, Cairns, QLD, Australia
D. Cavestany, Montevideo, Uruguay
P. Comizzoli, Washington, DC USA
R.A. Dailey, Morgantown, WV USA
J.A. Delgadillo, Torreon, Coahuila, Mexico
M.G. Diskin, Athenry, County Galway, Ireland
M-A. Driancourt, Boulogne Billancourt, France
A.D. Ealy, Gainesville, FL USA
W.L. Flowers, Raleigh, NC USA
J. Ford, Maryville, MO, USA
D.L. Garner, Reno, NV USA
C.L. Gasser, Cedar City, UT USA
S.P. de Graaf, Sydney, NSW, Australia
W.V Holt, London, United Kingdom
K. Imakawa, Kumamoto, Japan
A.L. Johnson, University Park, PA USA
R.J. Mapletoft, Saskatoon, SK, Canada
J.F. Mee, Carlow, Ireland
J.C.F. Moraes, Bage, Brazil
T. Nagai, Tsukuba, Japan
N. Parvizi, Neustadt, Germany
J.R. Pursley, East Lansing, MI USA
J.P. Ravindra, Bangalore, India
R.R. Santos, Lelystad, Netherlands
D.C. Sharp, Gainesville, FL USA
Y-L. Shiue, Kaohsiung, Taiwan
J.F. Smith, Auckland, New Zealand
D.L. Thompson, Baton Rouge, LA USA
A. Turner, Burwood, VIC Australia
S. Uzbekova, Nouzilly, France
GUIDE FOR AUTHORS

INTRODUCTION

Types of Paper
1. Original Research Papers (Regular Papers)
2. Review Articles

For Original Research Papers (Regular Papers), a reporting of research results that comprise one or a series of experiments is required. The paper should contribute to increasing understanding of the biology and/or manipulation of reproduction in animals. The material should not have been previously published elsewhere, except in a preliminary form. Original Research Papers should not be longer than 8,000 words (including Introduction, Materials and Methods, Results, Discussion and Conclusions). Figures and Tables should not exceed eight items. The authors may provide additional data, especially with regard to a detailed methods section, and large datasets as supplementary materials.

Review Articles should fit within the scope for the journal and be of current interest in the realm of animal reproduction in those species on which the journal focuses. Submission of Review Manuscripts to Animal Reproduction Science is encouraged. The manuscripts may be submitted without invitation or be invited reviews and should be submitted using the same process as that for Original Research manuscripts. Review Articles developed by conducting a systematic research review including those resulting from meta-analyses are encouraged; however, high quality review articles developed not using this approach will also be considered for publication. Review Articles should be no longer than 10,000 words and contain no more than eight Figures and Tables. The use of illustrations explaining the mechanisms referred to in the Review is strongly encouraged.

Contact details for submission
For queries concerning the submission process or journal procedures please visit the Elsevier Support Center. Authors can check the status of their manuscript within the review procedure using Elsevier Editorial System.

Submission checklist
You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements
Multiple Corresponding Authors:
Please note that only one Corresponding Author can be responsible for the submission in EVISE. If your article is accepted, however, multiple Corresponding Authors can be listed on the final published article. If multiple Corresponding Authors are required, please include this in your corrections at author proof stage.

Animal Reproduction Science: Submission Checklist
All authors should complete and include in their submission the ANIREP Submission Checklist. PLEASE NOTE: This is a mandatory file for all submissions to Animal Reproduction Science.

Animal Reproduction Science: important formatting to which all manuscripts should adhere
1. Only the first letter of the manuscript title should be capitalized unless there are specific words that should be capitalized (e.g., breed names, species)
2. The abbreviation "et al." in the text of the manuscript should be in regular font and never be italicized
3. The letter "n" indicating number and letter "g" representing relative centrifugal force should always be lower case and italicized and the letter "P" indicating probability values needs to be upper case and italicized throughout the manuscript.
4. There should be indentation of the first line of all paragraphs except for the Abstract of the manuscript
5. There should not be a line spacing between paragraphs
6. Proper Animal Reproduction Science format has been used for all headings and subheadings throughout the manuscript

BEFORE YOU BEGIN

Ethics in publishing
Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Studies in humans and animals
If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms sex and gender should be used correctly.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

Research conducted that includes cruelty in animal experimentation will not be considered for publication in Animal Reproduction Science.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted.
2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Submission declaration and verification
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

Preprints
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Author contributions
For transparency, we encourage authors to submit an author statement file outlining their individual contributions to the paper using the relevant CRediT roles: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; Writing - review & editing. Authorship statements should be formatted with the names of authors first and CRediT role(s) following. More details and an example

Authorship
All authors should have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

Changes to authorship
Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Copyright
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.
Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

**Author rights**
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.

**Role of the funding source**
You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

**Funding body agreements and policies**
Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online. After acceptance, open access papers will be published under a noncommercial license. For authors requiring a commercial CC BY license, you can apply after your manuscript is accepted for publication.

**Open access**
This journal offers authors a choice in publishing their research:

**Subscription**
- Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
- No open access publication fee payable by authors.
- The Author is entitled to post the accepted manuscript in their institution's repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

**Gold open access**
- Articles are freely available to both subscribers and the wider public with permitted reuse.
- A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

*Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)*
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is **USD 2500**, excluding taxes. Learn more about Elsevier's pricing policy: https://www.elsevier.com/openaccesspricing.
Green open access
Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. Find out more.

This journal has an embargo period of 12 months.

Elsevier Researcher Academy
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

Language (usage and editing services)
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

Submission
Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

Submit your article
Please submit your article via https://www.evise.com/profile/api/navigate/ANIREP.

Referees
Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our Support site. Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

PREPARATION
Editorial Structure and Preliminary Assessment
The Editor-in-Chief, who decides whether the Manuscripts fit the scope of manuscripts published in this journal, firstly evaluates manuscripts. Associate Editors also make a preliminary evaluation of the Manuscript, with or without the involvement of other Editorial Board members, and then decide whether or not the Manuscript deserves to be sent out for peer review. These preliminary assessments made by the Editorial Board are based on the scope, novelty, interest, potential contribution to the field, and quality of science and narrative (in the case of review articles). Manuscripts that are not consistent with Journal standards will be returned to the author without peer review.

Peer review
This journal operates a single blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of one independent expert reviewer to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.

Appeals
In case of a rejection decision, authors are allowed to submit an appeal, which may be considered by the Editorial Board. Priority of appeals is less than that of new submitted Manuscripts with regard to the Journal's workload. Only one appeal is permitted per Manuscript. If the authors wish to submit an appeal, they must provide evidence that substantial errors of fact and/or biases were made during the reviewing process; a decision will only be reversed if the Editorial Board is convinced that the
original decision was a mistake. Should an appeal merit consideration, the Editor-in-Chief will request the authors to provide a response to the reviewers’ and Associate Editors’ comments and will be then sent out for further peer review. Decisions after submitting an appeal are made by the Editor-in-Chief and are final.

**Article structure**

Manuscripts should have numbered lines (continuous numbering across pages) with wide margins and double spacing throughout (i.e., also for abstracts, footnotes and references). Every page of the manuscript, including the title page, references, tables, etc., should be numbered. In the text no reference should be made to page numbers; however, if necessary, one may refer to sections. Avoid excessive usage of italics to emphasize part of the text. The structure of the manuscript must be Abstract, Introduction, Materials and Methods, Results, Discussion, Conclusions, Acknowledgements, Author Contribution Statement, Competing interests statement, References, Figure legends and Tables (if the latter are provided with the Main text file).

Tables and Figures should be inserted separately at the end of the manuscript. Furthermore, the format used for the Table and Figure legends should be consistent with that of manuscripts published in this journal.

**Abstract**

The ABSTRACT can be no longer than 250 words in length and details about what should be included in the ABSTRACT are described subsequently in this document.

**Introduction (labelled with the number 1)**

State the objectives of the research and provide an adequate background, avoiding a detailed literature survey or a summary of the results. The introduction "sets the scene" for the research. Do not over-reference statements; two or three key references should suffice unless each adds something specific. The introduction should not normally be more than 500 words (approximately two manuscript pages).

**Materials and Methods (labelled with the number 2)**

Provide sufficient details to allow the research to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

**Description of analytical methods**

The description of analytical methods (e.g., hormone analysis, immunohistochemistry) must include information on quality assessment and method validation for the respective laboratory where sample analysis has been performed.

**Gene names**

Authors must use standard gene names, as provided by HGNC. Gene names must be italicized. If the case of mammalian species and if gene names refer to rodent species, they must be upper case (i.e. HspA1A); if they refer to non-rodent species they must be written in capitals (e.g., HSPA1A). If they refer to other species, they must written lower case (e.g., hspa1a). Protein names are written in capitals and are not italicized.

**Quantitative PCR**

If authors have used quantitative PCR, the Methods section must be written following Bustin et al. The MIQE Guidelines: Minimum Information for Publication of Quantitative Real-Time PCR Use of terminology - relative abundance of mRNA transcripts as compared with the abundance of mRNA for a reference gene(s).

Experiments. Clin Chem 2009; 55: 611-622. The authors should also ensure that the following information is provided:

- Protocol for DNA/RNA extraction, including quantitation and determination of purity;
- Reverse transcription: amount of RNA, concentration of all reagents: primers concentration (either random primers or oligonucleotides), reverse transcriptase and master mix components; For qPCR: sequence of Forward and Reverse primers, amplicon size, accession number of Genebank; Thermocycler parameters (i.e. denaturation, annealing and extension steps, number of cycles, melting curves);
- Validation of PCR products; Non-template controls for Reverse Transcription and qPCR should be included in all reactions; and Data analysis: details for the quantitative or relative determination.
Flow cytometry

When performed, the Methods section should provide technical details for flow cytometry experiments, following the recommendations set by the International Society for Advancement of Cytometry (Lee J et al. MIFlowCyt: The minimum information about a flow cytometry experiment. Cytometry A 2008; 73: 926-930). Amongst others, the following information should be provided: technical specifications of the equipment, laser wavelength, BP and LP for filters, sheath rate, how populations have been gated, concentration of cells during analysis, calibration of the equipment, linear or logarithmic representation, number of technical replicates, data compensation and software used to analyze histograms. The Editorial Board may request, at any point, the authors to provide the original files (.FCS/.LMD) or the histograms and dot-plots.

Use of antibodies

Validation of antibodies through peptide blocking experiments is required when immunoblotting (Western blot), immunofluorescence, immunohistochemistry or immunocytochemistry are performed. The authors may cite a previous reference in which the specificity of the antibody used for the species reported in the submitted Manuscript has been validated and published.

Statistical analyses

Authors must provide enough details on how data were evaluated and which statistical package was used to conduct that evaluation. If linear models are used, authors should have previously confirmed that parametric assumptions (normal distribution and homogeneity of variances) are not violated and, when applicable, indicate whether linear transformations of data or non-parametric tests have been conducted. Authors are also encouraged to consult with biometricians and determine which the most suitable statistical test before conducting the study (e.g., GLM, mixed model, linear regression).

Results (labelled with the number 3)

Results should be clear and concise.

Discussion (labelled with the number 4)

In this section, there should be an exploration of the significance of the results of the research, not a repeating of the results. For Research Papers, there needs to be a separate Results and Discussion section. Avoid extensive citations and discussion of published literature. Discussion should range between 1,000 and 1,250 words (approximately 4-5 pages).

Conclusions (labelled with the number 5)

The main conclusions of the study should be presented in a separate, short Conclusions section.

Essential Title Page Information

Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible. Only the first letter of titles should be capitalized unless using words that need to be capitalized (e.g., breed name - Cashmere goats, Holstein cows Author names and affiliations. Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the research was conducted) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author. Corresponding author. Clearly indicate who will manage correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. Ensure that the e-mail address is provided and that contact details are current for the corresponding author. Present/permanent address. If an author has relocated since the research described in the article was conducted, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually conducted the research must be retained as the main affiliation address. Superscript Arabic numerals are used for such footnotes.

Highlights

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.
Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

**Abstract**
A concise and factual abstract is required of not more than 250 words. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential these must be defined when first used in the abstract.

**Graphical abstract**
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of $531 \times 1328$ pixels (h × w) or proportionally more. The image should be readable at a size of $5 \times 13$ cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site. Authors can make use of Elsevier's Illustration Services to ensure the best presentation of their images and in accordance with all technical requirements.

**Keywords**
Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

*Please note:* The first letter of each of the Keywords should be capitalized and with semicolons between each word.

**Acknowledgements**
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

**Formatting of funding sources**
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Nomenclature**
Authors and editors are, by general agreement, obliged to accept the rules governing biological nomenclature, as laid down in the *International Code of Botanical Nomenclature*, the *International Code of Nomenclature of Bacteria*, and the *International Code of Zoological Nomenclature*. All biota (crops, plants, insects, birds, mammals, etc.) should be identified by their scientific names when the English term is first used, with the exception of common domestic animals. All biocides and other organic compounds must be identified by their Geneva names when first used in the text. Active ingredients of all formulations should be likewise identified.
Nomenclature and units
Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI. You are urged to consult IUB: Biochemical Nomenclature and Related Documents for further information.

Math formulae
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

Artwork
Electronic artwork
General points
• Make sure you use uniform lettering and sizing of your original artwork.
• Embed the used fonts if the application provides that option.
• Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.
A detailed guide on electronic artwork is available.

You are urged to visit this site; some excerpts from the detailed information are given here.

Formats
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.
Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.
Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.
Tables
Please submit tables as editable text and not as images. Number tables consecutively in accordance with the appearance of the tables in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Data references
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

Reference management software
Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal’s style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:
http://open.mendeley.com/use-citation-style/animal-reproduction-science

When preparing a manuscript, authors will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Reference style
Text: All citations in the text should refer to:
1. Single author: the author’s name (without initials, unless there is ambiguity) and the year of publication;
2. Two authors: both authors’ names and the year of publication;
3. Three or more authors: first author’s name followed by ‘et al.’ and the year of publication.

Citations may be made directly (or parenthetically). Groups of references can be listed either first alphabetically, then chronologically, or vice versa.

Examples: ‘as demonstrated (Allan, 2000a, 2000b, 1999; Allan and Jones, 1999)…. Or, as demonstrated (Jones, 1999; Allan, 2000)… Kramer et al. (2010) have recently shown …’

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters ‘a’, ‘b’, ‘c’, etc., placed after the year of publication.

Examples:
Reference to a journal publication:

Reference to a journal publication with an article number:

Reference to a book:

Reference to a chapter in an edited book:

Reference to a website:

Reference to a dataset:

**Video**
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

**Data visualization**
Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

**Supplementary material**
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**
This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

**Data linking**
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.
In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Mendeley Data**
This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.

**Data statement**
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

**AFTER ACCEPTANCE**

**Online proof correction**
Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.

If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.

We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Offprints**
The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier’s Author Services. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

**AUTHOR INQUIRIES**
Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.
You can also check the status of your submitted article or find out when your accepted article will be published.

© Copyright 2018 Elsevier | https://www.elsevier.com