DESCRIPTION

Journal of Genetics and Genomics (JGG), founded in 1974 and previously known as Acta Genetica Sinica, is an international journal publishing peer-reviewed articles of novel and significant discoveries in all areas of biology and biomedicine.

JGG publishes papers reporting findings of general interest that provide significant insights into important biological processes in any living organisms, from microbes to plants, animals, and humans. The primary criterion for publication in JGG is whether the results report novel discoveries, mechanistic insights, or new technologies/tools and resources. In addition to research articles, we also publish reviews or opinion articles on recent cutting-edge studies and advances. We also welcome fast-track papers and presubmission inquiry.

Please see Guide for Authors for more information.

IMPACT FACTOR

2022: 5.900 © Clarivate Analytics Journal Citation Reports 2023

ABSTRACTING AND INDEXING

Science Citation Index Expanded
PubMed/Medline
Embase
BIOSIS Previews
Elsevier BIOBASE
Scopus
Biological Abstracts
Chemical Abstracts

EDITORIAL BOARD

Editor-in-Chief
Jianru Zuo, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Nitric oxide signal transduction in plant and regulation mechanism of crop nitrogen nutrition
Honorary Editor-in-Chief

Yongbiao Xue, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant Molecular and Reproductive Biology

Associate Editors

Hongbin Ji, Chinese Academy of Sciences Center for Excellence in Molecular Cell Science, Shanghai, China
Cancer genetics, epigenetics and metabolism

Renjie Jiao, Guangzhou Medical University, Guangzhou, China
Cell signaling and immunity in Drosophila

Guohong Li, Institute of Biophysics Chinese Academy of Sciences, Chaoyang District, China
Chromatin structure and functions, Epigenetics

Yijun Qi, Tsinghua University, Beijing, China
Small and long non-coding RNAs in plants

Wenfeng Qian, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Molecular evolution, directed evolution, translational regulation, and plant single-cell biology

Yongyong Shi, Shanghai Jiao Tong University, Shanghai, China
Genetics of Complex Traits, Behavioral Genetics, Synthetic Genomics, Bioinformatics

Jia-Wei Wang, Institute of Plant Physiology and Ecology Shanghai Institute for Biological Sciences, Shanghai, China
Plant developmental timing and regeneration

Huijun Yuan, Army Medical University, Medical Genetics Center, Chongqing, China

Fangqing Zhao, Beijing Institutes of Life Science Chinese Academy of Sciences, Beijing, China
Bioinformatics, microbiome, noncoding RNA

Hongyu Zhao, Yale University School of Public Health, New Haven, United States of America
Biostatistics, Data Science and Genetics

Advisory Board

Xiaofeng Cao, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant epigenetics

Bin Han, Institute of Plant Physiology and Ecology Shanghai Institute for Biological Sciences, Shanghai, China
Plant genomics

Li Jin, Fudan University, Shanghai, China
Human genetics

Le Kang, Institute of Zoology Chinese Academy of Sciences, Beijing, China
Ecological genomics, Phenotypic Plasticity, Epigenetics, Molecular evolution, Ecology, Entomology

Jiayang Li, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant molecular genetics

Jinsong Li, Chinese Academy of Sciences Center for Excellence in Molecular Cell Science, Shanghai, China
Stem cells and embryonic development

James Lupski, Baylor College of Medicine, Houston, United States of America
DNA replicative recombination repair, Mutation, Human genetics & , , genomics, Genomic disorders, Genomic medicine

Anming Meng, Tsinghua University, Beijing, China
Developmental genetics

Qian Qian, China National Rice Research Institute, Hangzhou, China
Functional genomics and germplasm resources of rice

Xiao-Fan Wang, Duke University, Durham, United States of America
Cancer biology

Wei-Cai Yang, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant reproductive biology

Zhenglin Yang, Sichuan Academy of Medical Sciences and Sichuan People's Hospital, Chengdu, China
Medical Genetics and Genomics

Ya-Ping Zhang, Kunming Institute of Zoology Chinese Academy of Sciences, Kunming, China
Evolutionary genetics

Editorial Board

Jin-Xin Bei, Sun Yat-Sen University, Guangzhou, China
Oncology study and precision medicine for cancer

Wan-Jin Chen, Fujian Medical University, Fuzhou, China
Neurology, Neurogenetics

Xuefeng Chen, Wuhan University, Wuhan, China

Wu-Min Deng, Tulane University, New Orleans, United States of America
Drosophila development and tumor models

**Jin-Tang Dong**, Southern University of Science and Technology, Shenzhen, China
Gene regulation, epithelial cell, prostate cancer, transforming growth factor beta (TGF-B), cancer biology, gene transcription, epithelial-mesenchymal transition (EMT), hormone receptor, carcinogenesis, cancer, androgen receptor, cell invasion, Kruppel-like factor (KLF), metastasis, promoter

**Shaojun Du**, University of Maryland Baltimore, Baltimore, United States of America
Developmental genetics, genetic regulation of muscle development and diseases in zebrafish model

**Xiangdong Fu**, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
GA signaling and plant growth-metabolism coordination

**Caixia Gao**, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Genome Editing

**Fei Gao**, Institute of Zoology Chinese Academy of Sciences, Beijing, China
Sex differentiation and Germ cell development

**Qiang Gao**, Fudan University, Shanghai, China
Tumor heterogeneity

**Anton Gartner**, Ulsan National Institute of Science and Technology, Ulsan, South Korea
C. elegans genetics, apoptosis, and the DNA damage response

**Liang Ge**, Tsinghua University, Beijing, China
Mechanism and function of autophagy and unconventional protein secretion

**Yan Guo**, China Agriculture University, Beijing, China
Plant stress response

**Xin-Jian He**, National Institute of Biological Sciences, Beijing, China
Plant epigenetics

**Jiancheng Hu**, National Cancer Centre Singapore, Division of Cellular and Molecular Research, Singapore, Singapore
Proto-oncogene and tumor suppressor

**Ying Hu**, Harbin Institute of Technology, Haerbin, China
Plant Genomics, Plant Breeding, Molecular Biology

**Xuehui Huang**, Shanghai Normal University, Shanghai, China
Immune Regulation, FOXP3+Treg, Tumor Immunity, Autoimmunity, Transplantation Tolerance, Infection and immunity

**Menghua Li**, China Agricultural University, Beijing, China
Molecular Genetics, Genomics, Transgenic Models, Y Chromosome Genes and X-homologues, Sex Differences in Human Diseases and Cancers

**Bin Li**, Shanghai JiaoTong University, Shanghai Institute of Immunology, Shanghai, China
Bacterial cell cycle and bacterial cancer therapy

**Feng Liu**, Institute of Zoology Chinese Academy of Sciences, Beijing, China
Hematopoiesis, stem cell, epigenetics, transcriptional regulation, and single cell omics

**Hai-kun Liu**, Heidelberg University German Cancer Research Center, Division of Molecular Neurogenetics, Heidelberg, Germany
Qiang Liu, University of Science and Technology of China Division of Life Sciences and Medicine, Hefei, China
Brain aging, Neurodegenerative diseases, Learning and memory, Epigenetic regulation mechanism

Xingguo Liu, Chinese Academy of Sciences Guangzhou Institutes of Biomedicine and Health, Guangzhou, China
Crop metabolic regulation and metabolomics

Jie Luo, Hainan University, Haikou, China

Lingfei Luo, Southwest University, Chongqing, China

Fei-Long Meng, Chinese Academy of Sciences Shanghai Institute of Biochemistry and Cell Biology State Key Laboratory of Cell Biology CAS Center for Excellence in Moleculer Cell Sciences, Shanghai, China

Zhong-Fu Ni, China Agriculture University, Beijing, China
Wheat molecular genetics and breeding

Cahir O’Kane, University of Cambridge, Cambridge, United Kingdom
Axonal endoplasmic reticulum and axon degeneration, using Drosophila as a model

Jinrong Peng, Zhejiang University, Hangzhou, China
Genetic control of liver development and regeneration, biological functions of nucleolar proteins during organogenesis

Zhongjun Qin, Institute of Plant Physiology and Ecology Shanghai Institute for Biological Sciences, Shanghai, China
Synthetic biology, genomic engineering, microbial genetics

Jing Qu, Institute of Zoology Chinese Academy of Sciences, Beijing, China
Cell invasion, stem cell regulation, and cell-matrix interactions in C. elegans

Ling Shuai, Nankai University, Tianjin, China
Insights into development via haploid genetic screening

Wei Song, Wuhan University Medical Research Institute, Wuhan, China
Temporal control of cell fate decisions in neural stem cell lineages

Zhixi Tian, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Oocyte, follicle, fertilization, embryo, epigenetics

Kenichi Tsuda, Huazhong Agricultural University, Wuhan, China

Haoyi Wang, Institute of Zoology Chinese Academy of Sciences, Beijing, China
Development and application of genome engineering technologies

Hongyan Wang, Fudan University, Shanghai, China
One carbon metabolism and birth defect research in medical genetics

Jun Wang, Institute of Microbiology Chinese Academy of Sciences, Beijing, China
Microbiome, bioinformatics, computational biology, high-throughput sequencing

Lei Wang, Fudan University, Shanghai, China
Human Medical genetics, Reproductive genetics, Genetics of Human diseases

Xiaochen Wang, Institute of Biophysics Chinese Academy of Sciences, Beijing, China
Lysosome-dependent cellular degradation, lysosome homeostasis

Zhixi Tian, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Oocyte, follicle, fertilization, embryo, epigenetics

Mingfu Wu, Albany Medical College, Albany, United States of America
Molecular genetic mechanism and accurate diagnosis and treatment of nervous system diseases

Hua Xiang, Institute of Microbiology Chinese Academy of Sciences, Beijing, China
Archaea Genetics, CRISPR-Cas System, Synthetic Biology of Extremophiles

Shuhua Xu, Partner Institute for Computational Biology Chinese Academy of Sciences and Max Planck Society, Shanghai, China
Human Population Genomics

Xun Xu, BGI-Research, Guangdong, China

Jianbing Yan, Huazhong Agricultural University, Wuhan, China
Genetic basis of quantitative traits, QTL fine mapping and cloning and Molecular breeding

Jinghua Yan, Institute of Microbiology Chinese Academy of Sciences, Beijing, China
Monoclonal antibody for infection disease and tumor therapy, Subunit vaccine development of viruses, Structure-based novel vaccines design and antibody drug development, mRNA vaccine design

Chonglin Yang, Yunnan University, Kunming, China
Metabolic regulation of mitochondria and lysosomes

Jian-Rong Yang, Sun Yat-Sen University, Guangzhou, China
Evolutionary Genomics

Sihai Yang, Nanjing University, Nanjing, China
Evolutionary genomics and focused on how mutations arise
Yun-Gui Yang, Beijing Institute of Genomics Chinese Academy of Sciences, Beijing, China
RNA epigenetics

Yong-Gang Yao, Kunming Institute of Zoology Chinese Academy of Sciences, Kunming, China
Genetics of neuropsychiatric disorders, molecular anthropology

Fengwei Yu, National University of Singapore, Singapore, Singapore
Neuronal development, remodeling and diseases in Drosophila

Jia Yu, Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Wenwen Zeng, Tsinghua University, Beijing, China

Bo Zhang, Peking University, Beijing, China
Genome editing technology, vertebrate heart development and regeneration

Feng Zhang, Fudan University, Shanghai, China
Genetics of human infertility and birth defects

Hua Zhang, University of Pittsburgh School of Medicine, UPMC Hillman Cancer Center, Pittsburgh, United States of America

Jian Zhang, Yunnan University, Kunming, China
Early vertebrate development

Qing Zhang, UT Southwestern Medical Center, Dallas, United States of America

Jian-Min Zhou, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant-microbe interactions

Jin-Qiu Zhou, Chinese Academy of Sciences Center for Excellence in Molecular Cell Science, Shanghai, China
Chromatin and telomeres

Jian Zhang, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Plant-microbe interactions

Jin-Qiu Zhou, Chinese Academy of Sciences Center for Excellence in Molecular Cell Science, Shanghai, China
Chromatin and telomeres

Youwei Ai, Institute of Genetics and Developmental Biology Chinese Academy of Sciences, Beijing, China
Early vertebrate development

Shuhui Bian, Nanjing Medical University, Nanjing, China

Chao Chen, Central South University, Changsha, China

Dijun Chen, Zhejiang University, Hangzhou, China

Jiyu Chen, Tongji University, Shanghai, China

Ning-Bo Chen, Northwest A&F University, Yangling, China

Qing Zhang, Zhejiang University, Hangzhou, China

Fenghua Lv, China Agricultural University, Beijing, China

Epigenetic modifications, post-translational modifications, gene transcription, heterochromatin, metabolism
INTRODUCTION

AIMS AND SCOPE

The *Journal of Genetics and Genomics* (JGG, formerly known as Acta Genetica Sinica) is an international journal publishing peer-reviewed articles of novel and significant discoveries in the fields of genetics and genomics. Topics of particular interest include but are not limited to molecular genetics, developmental genetics, cytogenetics, epigenetics, medical genetics, population and evolutionary genetics, genomics and functional genomics as well as bioinformatics and computational biology.

The main article types include original research, review, method article, letter to the editor, resource, highlight, and meeting report. Currently, JGG is indexed by Science Citation Index Expanded (SCI-E), Medline, Scopus, Biosis Previews and Chemical Abstracts. JGG publishes papers in English only and is distributed internationally.

Types of article

**Original Research** The original research article including method article should be organized in the following order: Title page, Abstract, Introduction, Results, Discussion, Materials and methods, Acknowledgements, References, Tables, and Figure legends. Figures and regular Supplementary data should be uploaded as separate files and not as part of the manuscript. These files will be converted, along with the manuscript, into a single PDF on upload.

**Review** The review article should be focused on topics of interest to broad readership. It should be organized in the following order: Title Page, Abstract, Introduction, Text with labelled topics and subtopics, Concluding remarks (Perspectives), Acknowledgements, References, Tables, and Figure legends. Figures should be separately uploaded and not enclosed in the text. The length is usually not less than 5000 words.

**Research Communications** Research Communications is a brief report on novel findings without sufficient depth to qualify as an original research article. There is no abstract, and only one composite figure and/or table reflecting the main results is included. The additional results and important materials and methods should be showed as Supplementary Data. The length of main text (excluding the references) is limited to less than 2000 words, and the total number of the references is limited to 20. The author's name(s) and affiliation(s) should be put at the end of the text.

BEFORE YOU BEGIN

**Ethics in publishing**

Please see our information on Ethics in publishing.

**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 Research Council's Guide for the Care and Use of Laboratory Animals 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.

**Declaration of interest**

The *Journal of Genetics and Genomics* follows the ICMJE recommendations regarding conflict of interest disclosures. All authors are required to report the following information with each submission: (1) All third-party financial support for the work in the submitted manuscript. (2) All financial
relationships with any entities that could be viewed as relevant to the general area of the submitted manuscript. (3) All sources of revenue with relevance to the submitted work who made payments to you, or to your institution on your behalf, in the 36 months prior to submission. (4) Any other interactions with the sponsor of outside of the submitted work should also be reported. (5) Any relevant patents or copyrights (planned, pending, or issued). (6) Any other relationships or affiliations that may be perceived by readers to have influenced, or give the appearance of potentially influencing, what you wrote in the submitted work. As a general guideline, it is usually better to disclose a relationship than not. This information will be acknowledged at publication in a Transparency Document link directly in the article. Additional information on the ICMJE recommendations can be found at: http://www.icmje.org/. The form for conflict of interest disclosure can be downloaded here: http://www.icmje.org/coi_disclosure.pdf (if this link does not display properly in your browser, please right-click the link and select “Save Target As...” or “Save Link as...” from the pop-up menu).

**Declaration of generative AI in scientific writing**

The below guidance only refers to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process.

Where authors use generative artificial intelligence (AI) and AI-assisted technologies in the writing process, authors should only use these technologies to improve readability and language. Applying the technology should be done with human oversight and control, and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. AI and AI-assisted technologies should not be listed as an author or co-author, or be cited as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans, as outlined in Elsevier’s AI policy for authors.

Authors should disclose in their manuscript the use of AI and AI-assisted technologies in the writing process by following the instructions below. A statement will appear in the published work. Please note that authors are ultimately responsible and accountable for the contents of the work.

**Disclosure instructions**

Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled ‘Declaration of Generative AI and AI-assisted technologies in the writing process’.

**Statement:** During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.

**Submission declaration**

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.

**Use of inclusive language**

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns (“clinicians, patients/clients”) as default/wherever possible to avoid using “he, she,” or “he/she.” We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or
health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

**Reporting sex- and gender-based analyses**

**Reporting guidance**

For research involving or pertaining to humans, animals or eukaryotic cells, investigators should integrate sex and gender-based analyses (SGBA) into their research design according to funder/sponsor requirements and best practices within a field. Authors should address the sex and/or gender dimensions of their research in their article. In cases where they cannot, they should discuss this as a limitation to their research's generalizability. Importantly, authors should explicitly state what definitions of sex and/or gender they are applying to enhance the precision, rigor and reproducibility of their research and to avoid ambiguity or conflation of terms and the constructs to which they refer (see Definitions section below). Authors can refer to the Sex and Gender Equity in Research (SAGER) guidelines and the SAGER guidelines checklist. These offer systematic approaches to the use and editorial review of sex and gender information in study design, data analysis, outcome reporting and research interpretation - however, please note there is no single, universally agreed-upon set of guidelines for defining sex and gender.

**Definitions**

Sex generally refers to a set of biological attributes that are associated with physical and physiological features (e.g., chromosomal genotype, hormonal levels, internal and external anatomy). A binary sex categorization (male/female) is usually designated at birth ("sex assigned at birth"), most often based solely on the visible external anatomy of a newborn. Gender generally refers to socially constructed roles, behaviors, and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society. Sex and gender are often incorrectly portrayed as binary (female/male or woman/man) and unchanging whereas these constructs actually exist along a spectrum and include additional sex categorizations and gender identities such as people who are intersex/have differences of sex development (DSD) or identify as non-binary. Moreover, the terms "sex" and "gender" can be ambiguous—thus it is important for authors to define the manner in which they are used. In addition to this definition guidance and the SAGER guidelines, the resources on this page offer further insight around sex and gender in research studies.

**Author contributions**

For transparency, we require corresponding authors to provide co-author contributions to the manuscript using the relevant CRediT roles. The CRediT taxonomy includes 14 different roles describing each contributor's specific contribution to the scholarly output. The roles are: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; and Writing - review & editing. Note that not all roles may apply to every manuscript, and authors may have contributed through multiple roles. 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.

**COPYRIGHT**

(Download Publishing Agreement)

The copyright of any paper accepted for publication in JGG is reserved by Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, and Genetics Society of China. All authors are required to complete a copyright transfer form after the acceptance of the manuscript. In signing the transfer of copyright, it is assumed that authors have obtained permission to use any copyrighted or previously published material. All authors must read and agree to the conditions outlined in the Copyright Assignment Form, and must sign the Form or agree that the corresponding author can sign on their behalf. More explanations about copyright information can be found in Elsevier website.
Articles cannot be published until a signed Publishing Agreement has been received.

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 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 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.

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, it is recommended to state this.

Open access
Please visit our Open Access page for more information.

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 Language Editing service available from Elsevier's Language 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.

Suggesting reviewers
Please submit the names and institutional e-mail addresses of several potential reviewers.

You should not suggest reviewers who are colleagues, or who have co-authored or collaborated with you during the last three years. Editors do not invite reviewers who have potential competing interests with the authors. Further, in order to provide a broad and balanced assessment of the work, and ensure scientific rigor, please suggest diverse candidate reviewers who are located in different countries/regions from the author group. Also consider other diversity attributes e.g. gender, race and ethnicity, career stage, etc. Finally, you should not include existing members of the journal's editorial team, of whom the journal are already aware.

Note: the editor decides whether or not to invite your suggested reviewers.

PREPARATION

Peer review
All manuscripts will be evaluated firstly by the editorial office for conformity to the requirements of the scopes and the Instructions for Authors of this journal. The manuscripts that fail to meet the criteria will be sent back before peer-review. The handling editor will invite 2-3 reviewers reasonably if needed. The Editor-in-Chief will make the final decision based on the editor's definitive recommendation for acceptance or rejection. Decisions will be made as rapidly as possible, and the journal strives to return reviewers' comments to authors within 8 weeks whenever possible. If revision is requested, the editorial board will evaluate revised manuscripts and determine whether outside review is required. The revision should be submitted within 2 months unless an extension is granted; otherwise, it will be treated as a new submission.
Use of word processing software
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

Essential title page information
• **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.

• **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 actual work was done) 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 handle 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 given and that contact details are kept up to date by the corresponding author.**

• **Present/permanent address.** If an author has moved since the work described in the article was done, 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 did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Essential title page information
**Title.** The full manuscript title should be succinct, informative and descriptive. The title should include detail for indexing and should be comprehensible for a broad scientific audience. Authors should avoid using nonstandard abbreviations in titles. The title must mention the subject organism (or general group in the case of comparative work). Latin names should be used for all organisms, while common names are allowed for the model systems (rice, maize and yeast). **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. Present the authors' affiliation addresses (where the actual work was done) 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 handle correspondence at all stages of refereeing and publication, also post-publication. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.** **Present/permanent address.** If an author has moved since the work described in the article was done, 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 did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Abstract and Keywords
The abstract should stand on its own with no reference to the text. It should contain approximately 200 words and must summarize the questions being addressed, the approach taken, the major findings, and the significance of the results. It should be concise, complete, and clearly communicate the importance of the work for a broad audience. At least three key words (for the purposes of indexing) should be supplied following the abstract.
Introduction
The Introduction should provide the necessary background information for the average reader; it should be both complete and concise. Previous publications that form a basis for the work presented must be cited. Citation of reviews is not a substitute for citing primary research articles. Citation of recent research articles is not a substitute for citing original discoveries. An author's own work should not be cited preferentially over equally relevant work of others.

Results
The Results and Discussion can be subdivided if subheadings give the manuscript more clarity.

Discussion
The Discussion should focus on the interpretation rather than a repetition of the Results section.

Materials and Methods
Methods must be described completely enough so that other laboratories can replicate results and verify claims. Generally, standard procedures should be referenced, though significant variations should be described. Appropriate experimental design and statistical methods should be applied and described wherever necessary for proper interpretation of data and verification of claims. All novel materials and the procedures should be described in sufficient detail to allow their reproduction.

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.).

Artwork
Image manipulation
Whilst it is accepted that authors sometimes need to manipulate images for clarity, manipulation for purposes of deception or fraud will be seen as scientific ethical abuse and will be dealt with accordingly. For graphical images, this journal is applying the following policy: no specific feature within an image may be enhanced, obscured, moved, removed, or introduced. Adjustments of brightness, contrast, or color balance are acceptable if and as long as they do not obscure or eliminate any information present in the original. Nonlinear adjustments (e.g. changes to gamma settings) must be disclosed in the figure legend.

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.**

**Figure captions**
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

**Tables**
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance 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 them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

**References**

**Citation in text**
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

**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.

**Preprint references**
Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

**References in a special issue**
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

**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.

**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:

Reference to software:

**Journal abbreviations source**
Journal names should be abbreviated according to the List of Title Word Abbreviations.

**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, which may also include 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).

**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**
To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. 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. 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.