DESCRIPTION

_Industrial Crops and Products_ is an International Journal publishing academic and industrial research on industrial (defined as non-food/non-feed) crops and products. Papers concern both crop-oriented and bio-based materials from crops-oriented research, and should be of interest to an international audience, hypothesis driven, and where comparisons are made statistics performed. The following are examples of research that fit within the scope of the journal.

The emphasis must be on plants. Non-plant research, for instance animal, algae, microorganisms, and medical oriented research are not within the scope of the journal. Non-food/non-feed products (bio-based materials) from specific crops. Food/feed uses can be mentioned, but the majority of data and emphasis in the Discussion must be on non-food/non-feed uses of plants and plant products. Cultural practices to improve production of industrial crops and products. Experiments should be run at least twice, whether performed in the field, greenhouse, growth chamber, and in tissue culture or micropropagation, to account for environmental variation and/or genotype x environment interactions. Germplasm development and breeding of industrial crops. New or alternative crops with potential industrial uses.

a) The manuscript should include an evaluation of the real potential to make a plant an industrial crop, not just information on plants gathered in natural habitats (many plants make products, but they will not become a crop). An economic analysis may be included as appropriate.

b) Industrial Crops and Products is a crop oriented journal; these can be field crops, horticultural crops, or forest crops, but they must be managed, not just collected natural stands. The focus should be on agricultural production as an end result. Plant products, tied to specific crops/plants, and their modification to meet new industrial uses. For instance, for nanoparticles, a direct link is required with an industrial crop or with the respective value-chain. Testing industrial uses of specific plant products. Processing research to improve recovery of specific plant products.

**Benefits to authors**

We also provide many author benefits, such as free PDFs, a liberal copyright policy, special discounts on Elsevier publications and much more. Please click here for more information on our [author services](http://www.elsevier.com/locate/indcrop).

Please see our [Guide for Authors](http://www.elsevier.com/locate/indcrop) for information on article submission. If you require any further information or help, please visit our [Support Center](http://www.elsevier.com/locate/indcrop).
AUDIENCE

Scientists in the areas of agronomy, crop protection, post-harvest and processing research, product testing and evaluation, distribution, marketing and economics.

IMPACT FACTOR

2018: 4.191 © Clarivate Analytics Journal Citation Reports 2019

ABSTRACTING AND INDEXING

Engineering Village - GEOBASE
Current Contents - Agriculture, Biology & Environmental Sciences
CAB International
EMBiology
Elsevier BIOBASE
AGRICOLA
Chemical Abstracts
Embase
Environmental Abstracts
Scopus
INSPEC

EDITORIAL BOARD

Editors-in-Chief
N. Belgacem, International Graduate School of Paper Print Communication and Biomaterials, St Martin d’Heres, France
M.T. Berti, North Dakota State University, Fargo, North Dakota, United States
E. Frollini, University of Sao Paulo Institute of Chemistry of Sao Carlos, SAO CARLOS, Brazil
O. Koul, Society of Biopesticide Sciences India and Insect Biopesticide Research Centre, Jalandhar, India
R.C. Sun, Dalian Polytechnic University Center for Lignocellulose Science and Engineering School of Light Industry and Chemical Engineering, Dalian, China

Managing Editors
S. Amaducci, University Cattolica Sacro Cuore Department of Sustainable Crop Production, Piacenza, Italy
Agronomic evaluation of industrial crops (particularly for fibre and biomass production); Management strategies to increase sustainability of agricultural systems
D.S. Bajwa, Montana State University Department of Mechanical & Industrial Engineering, Bozeman, Montana, United States
M. Blohm, Loyola University Maryland, Baltimore, Maryland, United States
W. Thielemans, KU Leuven - Kulak Kortrijk Campus, Kortrijk, Belgium
lignin; surface modification; composites; starch and cellulose nanoparticles; self assembly

Associate Editors
J. Bras, International Graduate School of Paper Print Communication and Biomaterials, St Martin d’Heres, France
Nanocellulose; surface treatment of lignocellulosics; fibres functionalisation; smart fibre-based packagings
J. González-Álvarez, University of Santiago de Compostela, Santiago de Compostela, Spain
H. Kaddami, Cadi Ayyad University Faculty of Science and Technology Gueliz, Marrakech, Morocco
Composites; Aerogels; Nanocelluloses; Polymers and Biopolymers; Synthesis; Properties; Interfaces; Chemical modifications of fibers; Applications
J. Labidi, University of the Basque Country Department of Chemical and Environmental Engineering, San Sebastian, Spain
biorefinery processes; pulp and paper; lignin; process simulation/optimization
Z. Liu, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois, United States
L. S. Severino, Brazilian Agricultural Research Corporation Cotton, Campina Grande, Brazil

Editorial Advisory Board
H. Abdel-Haleem, USDA-ARS Arid Land Agricultural Research Center, Maricopa, Arizona, United States
Agronomics; biodiesel; biofuel; new industrial crops; oil seed crops; plant breeding; plant genetics; plant genomics; plant genetic resources; plant physiology (abiotic stress); natural rubber; natural rubber plants.

M. Acaroğlu, Selçuk University, Konya, Turkey
Energy Engineering; Mechanical Engineering; Automotive Engineering

A.A. Aires
Plant composition; Secondary metabolites; Polyphenols; Glucosinolates; Crop wastes; Agro-food valorization; Antioxidant activities; Antimicrobial properties; Extraction and purification; HPLC

E. Alexopoulou, Centre for Renewable Energy Sources, Pikermi, Greece
Non-Food Crops

E.R. Amante, Federal University of Santa Catarina, Florianópolis, Brazil
Green chemistry; Cleaner production; Food chemistry; Food processing; Wastes minimization; Food biochemistry

M.P. Arraiza, Polytechnic University of Madrid, Madrid, Spain
Aromatic plants; Medicinal plants; Essential oils; Natural products; Antioxidant activity; Bioactivity

M. Arslan, Erciyes University, Kayseri, Turkey
Genetics; Plant breeding; Oil crops; Medicinal plants; Essential oil

A. Ashori, Iranian Research Organization for Science and Technology, Tehran, Iran, Islamic Republic of
Non-wood fibers; pulp and paper technology; wood-plastic composite; wood cement bonded composite; fibres

T. Baj, Medical University of Lublin, Lublin, Poland
Essential oils; Medicinal plants; Extraction methods; Statistical optimization methods; Industrial pharmacy

R. Balti, University of Jendouba Higher Institute of Biotechnology off Beja, Beja, Tunisia
Biological Function Engineering; Enzyme engineering; Biorefinery; Bioactive compounds from natural resources; Functional polymers from renewable resources; Natural antioxidants; Phytochemicals and phytopharmaceuticals; Nutraceuticals and functional foods, Protein preparations and biopeptides; Seafood processing and utilization of processing by-products; Biopolymers; Membrane technology for separation of biomolecules; Biodegradable packaging films; Innovations in Food Packaging; Food processing; Preparation of value-added products

A Biswas, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois, United States

J-F. Bloch, International Graduate School of Paper Print Communication and Biomaterials, St Martin d’Heres, France
Mechanics of fibres and fiber mats; structure; simulation; heat and mass transfer; optics

S. Boufi, University of Sfax, Sfax, Tunisia
Natural fibres based composites; nanocomposite based on nanosized cellulose filler; surface modification of cellulose fibres

A.A. Carbonell-Barrachina, Higher Polytechnic School of Orihuela, Orihuela, Spain
Farming practices; Herbs and essential oils; Medicinal plants; Antioxidant activity; Antifungal activity; Isolation of natural plant compounds with industrial interest

A.J.F. Carvalho, University of Sao Paulo Department of Materials Engineering, SAO CARLOS, Brazil
Starch; thermoplastic starch; polymers and monomers from renewable resources; cellulose fibers and nanofibers

E. Castro Galiano, University of Jaen, Jaen, Spain
Conversion of biomass into biofuels and other added-value products; Techno-economic and environmental issues related to the development of the biorefinery concept

S.C. Cermak, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois, United States
Chemistry; Organic; New Crops; Lubricants; Distillation

R. Chhabra, Indian Institute of Technology Ropar Department of Chemical Engineering, Rupnagar, India
Non-Newtonian behaviour; rheology; viscoelasticity; yield stress; shear-thinning; shear-thickening; thixotropy; food processing; baking characteristics.

M.J. Cocero Alonso, University of Valladolid, Valladolid, Spain
K. Cornish, The Ohio State University Ohio Agricultural Research and Development Center, Wooster, Ohio, United States
rubber; plant physiology; biomass; biofuels; resins.

S.L. Coscentino, University of Catania, Catania, Italy
Agronomy; Field crops; Biomass crops; Lignocellulosic crops; Agrometeorology; Crop Physiology; Water use efficiency; Soil erosion; Leaf gas exchange; Models

A. Cruz-Hernandéz, University of La Salle Bajo, Leon, Mexico
Genomics; Molecular biology; Plant biotechnology; Proteomics; Secondary Metabolites; Tissue culture

V.M.V. Cruz, Bridgestone Americas, Inc., Guayule Research Farm, Eloy, Arizona, United States
Crop breeding and genetics; Plant genetic resources conservation and management; Oilseed crops; New industrial crops
M.D. Curt, Polytechnic University of Madrid, Madrid, Spain
Crops for biomass and biofuels; agronomy; improvement and processing

D.A. Dierig, Bridgestone Americas, Inc., Guayule Research Farm, Eloy, Arizona, United States
Oilseeds, plant genetic resources, new industrial crop breeding.

R.L. Evangelista, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois, United States
Postharvest handling of crops; crop processing; oilseed processing; vegetable oil refining; plant oil characterization; seed protein characterization

M. Faisal, King Saud University, Riyadh, Saudi Arabia
Plant Biotechnology; in vitro morphogenesis, tissue culture, micropropagation, germplasm conservation, genetic transformation, molecular markers and environmental phytotoxicity of nanoparticles and bisphenols.

A. L. Fernando, New University of Lisbon Department of Engineering and Environmental Sciences, Caparica, Portugal
Food Chemistry; Natural Products; Nutraceuticals; Functional Foods; Natural ingredients/additives

E.J. Foster, Virginia Tech University Bookstore, Blacksburg, Virginia, United States
Cellulose nanomaterials; Nanocomposites; Polymers; Characterization; Byproducts; Nanocellulose; Supramolecular; Unctional; Implantable materials; Biomaterials

M. Ghorbanpour, Arak University, Department of Medicinal Plants, Faculty of Agriculture and Natural Resources, Arak, Iran, Islamic Republic of
Phytonanotechnology, Diversity of Natural Products and Bioactive Compounds in Medicinal and Aromatic Plants, Bioavailability of Emerging Contaminants, Environmental Stresses, Fertilization, and Plant Secondary Metabolism Pathways.

X. He, USDA-ARS Foodborne Toxin Detection and Prevention Research, Albany, California, United States
Molecular biology; Protein detection methods; Food safety; Food contaminants and Protein toxins

M.A. Jackson, USDA-ARS National Center for Agricultural Utilization Research, Peoria, Illinois, United States
Catalytic conversion of fats and oils

D. Jasso de Rodriguez, Antonio Narro Agrarian Autonomous University, Saltillo, Mexico
medicinal and nutraceuticals; antioxidants; waxes; resins; latices; guayule and phytochemicals of the plants of the semiarid lands

S. Korkut, Duzce University, Düzce, Turkey
Fibres and fibre compounds; natural fibres-based composites; waxes; resins; gums; rubber and other polymers; composites and reconstituted products; energy and chemicals from forest biomass; non-wood forest products; adhesives for wood; bonding strength; contact angles; adhesion by chemical bonding; mechanical properties of adhesives; surface roughness/morphology; wood-based composite materials and their applications.

M-P. Laborie, University of Freiburg, Freiburg im Breisgau, Germany
particle boards; wood; wood adhesive; nanocellulose; cellulosic composites; adhesion; interface properties; bio-based adhesives

D. Lachenal, International Graduate School of Paper Print Communication and Biomaterials, St Martin d'Heres, France
pulpings; lignin; bleaching; biorefinery from lignocellulosics

M.D. López Belchí, University of Concepcion Plant Production Department, Chillan, Chile
Natural Products from Plants; Analytical Techniques; Antioxidants; Enzymatic Assays; Encapsulation and Ingredients

B.M. Mvumi, University of Zimbabwe, Harare, Zimbabwe
Biologically active compounds for pesticides; Postharvest treatment and storage; Product testing and development

M.J. Pascual-Villalobos, Instituto Murciano de Investigacion y Desarrollo Agrario y Alimentario, La Alberca, Spain
oil seed crops; plant breeding; genetics; agronomy; GC oil analysis
A. Pizzi, University of Lorraine, Nancy, France
particle boards; wood; wood adhesive

Y. Popineau, National Research Institute for Agriculture Food and Environment Pays de la Loire Center, Nantes, France
natural Insecticides; essential oils; plant chemistry

D.T. Ray, University of Arizona, Tucson, Arizona, United States
Lignocellulosic agricultural crop; Pretreatment; Cellulose; Hemicellulose; Lignin; Conversion; Biofuels; Chemicals; Biomaterials

C. Regnault-Roger, University of Pau and Pays de l'Adour, Pau, France
Abiotic stress, Castor bean, Crop Physiology, Metabolomics, Transcriptomics

J.L. Ren, South China University of Technology, Guangzhou, China
soil science; agronomic aspects of crop production

H. Ruiz, Autonomous University of Coahulia, Saltillo, Mexico
Renewable energy, specifically in biorefinery process and bioethanol production of second generation using lignocellulosic materials (agricultural residuos); Hydrothermal process (autohydrolysis); Simultaneous saccharification; Bioethanol fermentation and modeling of enzymatic hydrolysis

D. Scordia, University of Catania, Catania, Italy
extractives; GC-MS

P.C. Stevenson, University of Greenwich Natural Resources Institute, Chatham, United Kingdom
Natural Products Chemistry; Bioactive compounds from plants; Botanical Insecticides; Chemical Ecology; Pollination Biology

V.K. Thakur, Cranfield University School of Engineering, Bedford, United Kingdom
Bio-Renewable Materials; Cellulose Fibres; Bio-Resins; Lignin; Membrane; Agricultural biomass; Hydrogels; Polymer Composites; Nanocomposites; Green Synthesis of Nanomaterials

D. Turley, National Non-Food Crops Centre Ltd, York, United Kingdom
Non food crops in general; economic aspects; processing; rural strategies; agronomy of non-food crops; biofuels and bioenergy applications; bio-based materials

E.A. Turumtay, Recep Tayyip Erdogan University, Rize, Turkey
Modern Liquid Chromatography Techniques; Chromatographic Analysis of Plant Based Natural Products; Phenolic Profiling; Spectroscopic Assays for Antioxidant Properties of Plant Extracts; Traditional and Modern Extraction Techniques for Bio-active compounds from Medicinal Plants; Determination of Anticancer Activities of The Natural Compounds on some Cancer Cell lines and animal models

N. Tzortzakis, Cyprus University of Technology Department of Agricultural Sciences Biotechnology and Food Science, Lemesos, Cyprus
Plant physiology; Abiotic stress; Postharvest sanitation; Medicinal/Aromatic Plants; Soilless Culture/ Hydroponics

P. Velmurugan, Jeonbuk National University, Jeonju, Korea, Republic of
Pesticides; Environmental Technology; Biorefineries; Analytical methods; Biomimetic processes; Catalytic processes; Informatics; Computational quantum chemistry; Quantitative structure-activity relationships; Statistical modeling

M. Viuda-Martos, Miguel Hernandez University of Elche Agro-Food Technology Department, Orihuela, Spain
Plant cell wall Polysaccharides; Biomass processing and fractionation; Carbohydrate chemistry; Wood chemistry; Cellulose; Biobased, biopolymer; Biorefinery

J.J. Villaverde, National Institute for Agricultural and Food Research and Technology Department of Variety and Phytosanitary Products Evaluation, Madrid, Spain
Crop production, nutrient management, crop rotation, and tillage management.

G. Wang, The University of Arizona Maricopa Agricultural Center, Maricopa, Arizona, United States
Biomass-based Materials; Cellulose; Hemicellulose; Chitosan; Fiber; Hydrogel; Film; Aerogel; Paper

X. Wang, South China University of Technology, Guangzhou, China
Medicinal plants, polyphenols, flavonoids, natural products, bioactivity, antioxidants Food Nutrition Food Chemistry

C.L. Xu, Åbo Akademi University Physics, TURKU, Finland
Plant cell wall Polysaccharides; Biomass processing and fractionation; Carbohydrate chemistry; Wood chemistry; Cellulose; Biobased, biopolymer; Biorefinery

F. Xu, Beijing Forestry University School of Material Science and Technology Department of Forestry Chemistry, Beijing, China
Oilseed crops; Lignocellulosic crops; Biobased uses; Crop physiology; Abiotic stresses; Natural rubber
INTRODUCTION

*Industrial Crops and Products*, an International Journal, publishes papers reporting the results of original research, short communications and critical reviews on all aspects of industrial crops and products (defined as non-food/non-feed uses of plants and plant products). This covers a wide range of aspects of cultivation, crop improvement, crop compounds, processing, and integrated chain control, all focusing on the exploitation of agricultural crops for industrial use.

The scope of the journal covers a vast range of crops and research disciplines. Crops should contain significant renewable resources such as:

- Fibres and fibre compounds
- Carbohydrates
- Oils and fatty acids
- Waxes, resins, gums, rubber, and other polymers
- Proteins
- Essential oils for ink, lubricants, plastics, cosmetics
- Biologically active compounds for pharmaceutical, herbicides and insecticides, and preservatives.

Some examples of industrial (non-food/non-feed uses) crops are agave, cassava, crambe, cuphea, elephant grass, fibre hemp, flax, guar, guayule, jojoba, kenaf, lesquerella, maize, meadowfoam, oil palm, peas, plantago, potato, pyrethrum, rape seed, safflower, soybean, Stokes aster, sugar beet, sunflower, veronica, and wheat.

Papers within the above indicated frame-work will be accepted if they cover or integrate research on:

- Agronomic production and modelling
- Breeding, genetics, and biotechnology
- Post-harvest treatment and storage
- (Bio)process technology
- (Bio)chemistry
- Product testing, development, and marketing
- Economics, and systems analysis and optimization

**Types of paper**

1. Original research papers (regular papers)
2. Review articles
3. Short Communications
4. Book Reviews

**Original research papers** should report the results of original research. The material should not have been previously published elsewhere, except in a preliminary form.

**Review articles** Review articles should cover subjects falling within the scope of the journal which are of active current interest. We welcome reviews but authors should contact the Editors-in-Chief before submission to ensure appropriateness for publication.

A **Short Communication** is a concise but complete description of a limited investigation, which will not be included in a later paper. Short Communications should be as completely documented, both by reference to the literature and description of the experimental procedures employed, as a regular paper. They should not occupy more than 4 printed pages (about 8 manuscript pages, including figures, tables and references).

**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

For further information, visit our Support Center.

**BEFORE YOU BEGIN**

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

**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 conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors should complete the declaration of interest statement using this template and upload to the submission system at the Attach/Upload Files step. If there are no interests to declare, please choose: 'Declarations of interest: none' in the template. This statement will be published within the article if accepted. 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. 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. These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.
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

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.

Article transfer service
This journal is part of our Article Transfer Service. This means that if the Editor feels your article is more suitable in one of our other participating journals, then you may be asked to consider transferring the article to one of those. If you agree, your article will be transferred automatically on your behalf with no need to reformat. Please note that your article will be reviewed again by the new journal. More information.

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.

Open access
Please visit our Open Access page for more information.
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 http://ees.elsevier.com/indcro/

PREPARATION

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 two independent expert reviewers 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.

Use of wordprocessing software
It is important that the file be saved in the native format of the wordprocessor 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 wordprocessor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. Do not embed "graphically designed" equations or tables, but prepare these using the wordprocessor's facility. 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: https://www.elsevier.com/guidepublication). Do not import the figures into the text file but, instead, indicate their approximate locations directly in the electronic text and on the manuscript. See also the section on Electronic Illustrations. Lines should be double-spaced and every line and page should be numbered.

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

Article structure

Subdivision - numbered sections
Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Introduction
State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods
Provide sufficient details to allow the work 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.
Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

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.

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. 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 they must be defined at their first mention in the abstract itself.

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 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 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.

Abbreviations
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article. Try not to over-use abbreviations.

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 and Units
Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI.

Authors and Editor(s) 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.

For chemical nomenclature, the conventions of the International Union of Pure and Applied Chemistry and the official recommendations of the IUPAC-IUB Combined Commission on Biochemical Nomenclature should be followed.

Math formulae
Present simple formulae in the line of normal text where possible. In principle, variables are to be presented in italics.
Number consecutively any equations that have to be displayed separate from the text (if referred to explicitly in the text).
Subscripts and superscripts should be clear.
Greek letters and other non-Roman or handwritten symbols should be explained in the margin where they are first used. Take special care to show clearly the difference between zero (0) and the letter O, and between one (1) and the letter l.
Give the meaning of all symbols immediately after the equation in which they are first used. For simple fractions use the solidus (/) instead of a horizontal line.
Equations should be numbered serially at the right-hand side in parentheses. In general only equations explicitly referred to in the text need be numbered. The use of fractional powers instead of root signs is recommended. Also powers of e are often more conveniently denoted by exp.

Levels of statistical significance which can be mentioned without further explanation are: \* \( P < 0.05 \), \** \( P < 0.01 \) and \*** \( P < 0.001 \).

In chemical formulae, valence of ions should be given as, e.g., \( \text{Ca}^{2+} \), not as \( \text{Ca}^{++} \). Isotope numbers should precede the symbols, e.g., \( ^{18}\text{O} \).

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) in addition to color reproduction in print. 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.

Reference links
Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. In order to allow us to create links to abstracting and indexing services, such as Scopus, CrossRef and PubMed, please ensure that data provided in the references are correct. Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors. Use of the DOI is highly encouraged.

A DOI is guaranteed never to change, so you can use it as a permanent link to any electronic article. An example of a citation using DOI for an article not yet in an issue is: VanDecar J.C., Russo R.M., James D.E., Ambe W.B., Franke M. (2003). Aseismic continuation of the Lesser Antilles slab beneath northeastern Venezuela. Journal of Geophysical Research, https://doi.org/10.1029/2001JB000884. Please note the format of such citations should be in the same style as all other references in the paper.

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.

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.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:
When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.
Reference formatting
There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

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:

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. 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 in Brief**
You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for Data in Brief as an additional item directly alongside the revised version of your manuscript. If your research article is accepted, your data article will automatically be transferred over to Data in Brief where it will be editorially reviewed and published in the open access data journal, Data in Brief. Please note an open access fee of 600 USD is payable for publication in Data in Brief. Full details can be found on the Data in Brief website. Please use this template to write your Data in Brief.
MethodsX
You have the option of converting relevant protocols and methods into one or multiple MethodsX articles, a new kind of article that describes the details of customized research methods. Many researchers spend a significant amount of time on developing methods to fit their specific needs or setting, but often without getting credit for this part of their work. MethodsX, an open access journal, now publishes this information in order to make it searchable, peer reviewed, citable and reproducible. Authors are encouraged to submit their MethodsX article as an additional item directly alongside the revised version of their manuscript. If your research article is accepted, your methods article will automatically be transferred over to MethodsX where it will be editorially reviewed. Please note an open access fee is payable for publication in MethodsX. Full details can be found on the MethodsX website. Please use this template to prepare your MethodsX article.

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. 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.