

Instructions to Authors - Canadian Journal of Animal Science

General Publication Policies

Authors may publish in Canadian Journal of Animal Science regardless of membership in the Agricultural Institute of Canada or its affiliated societies. Papers may be written in either English or French. Abstracts in both English and French are required for papers, short communications and reviews and, if not submitted by the author, will be prepared by the journal at a nominal cost to the author or the institution.

Content. We welcome manuscripts in the field of animal science that contain new information of national or international interest and application. Manuscripts submitted to CJAS must cover work related to animals or animal products.

1. *Papers.* Submission of a manuscript implies that it is based on research not previously published. All authors must be aware of and agree to the data presented and conclusions drawn in a manuscript.

2. *Short Communications.* Short communications are open to short preliminary reports of important findings. They might contain research results that are complete but characterized by a rather limited area or scope of investigation, descriptions of new or improved techniques or equipment including data on performance. Short communications should contain only a few (usually not more than nine) references. Illustrative material should be kept to a minimum, usually not more than two tables or figures. Short communications should not generally exceed 2000 words. Abstracts are obligatory and shall be no longer than 100 words.

3. *Letters to the Editor.* Letters commenting on published papers are accepted. The author(s) of the paper being commented on are given the opportunity to reply in the same issue as the one in which the comment appears. Letters must be signed and should be sent to the Editor. The full page charge is payable by the author of the letter on publication.

4. *Review Papers.* Review articles will be considered for publication, but authors must seek permission from the Editor prior to submission.

These review papers should provide an in-depth critical review of an area in which the authors are knowledgeable. Review manuscripts will go through the normal review process.

Submission of Manuscripts. Manuscripts must be submitted online via the Canadian Journal of Animal Science [ScholarOne System](#).

Authors submitting manuscripts to CJAS must suggest two potential reviewers (names, address, telephone number, and email). They may also list reviewers whom they consider unacceptable because of potential conflict of interest. However, the final selection of reviewers will be done by the Associate Editor in charge.

When reference is made to manuscripts that are “in press”, copies of the in-press manuscripts must accompany the manuscript submitted for review. An electronic version of the in-press manuscript must be uploaded to the appropriate section in ScholarOne.

Manuscripts submitted to the journal must not have been concurrently submitted to, or accepted by, any other publication nor published in full or in part in any other refereed publication nor posted on Internet websites, either personal or institutional. Authors should declare any possible conflict with this policy when they submit papers.

Authors are required to complete a [manuscript submission form](#), which must be signed by all the authors. The form may be returned by fax (613 594-5190), e-mail journals@aic.ca or mail. The form is available on the journal's web site (http://www.aic.ca/journals/pdf/Submissions/CJAS_submission_form_2012.pdf).

To contact the journal production office: Mr. T. Fenton (tel: 613 232-9459 ext 309) or Ms. Laurie Scott (tel: 613 232-9459 ext 308),
Agricultural Institute of Canada, 176 Gloucester Street Suite 320,
Ottawa, ON K2P 0A6 Canada
Fax (613) 594 5190, journals@aic.ca.

Page Charge. For submissions with at least one author who is a current member of a sponsoring scientific society (CSAS, CSA, CSHS, CWSS, CSSH) the page charge is \$30.00 per page. For submissions from non-members the page charge is \$90.00 per page. Reprints will be available at a nominal cost; quotations will be sent with proofs. Authors buying

reprints may request a pdf file of the final version of their paper. Authors may be charged for excessive changes in proof.

The manuscript

General. Submitted papers must be in 1-column format; the automatic word processor line numbering must be turned on. View a [sample](#) of a published paper -- note the format is the same for CJAS, CJPS, and CJSS. For more detail see the journal's [Operations Manual](#) available in pdf format on the journal's web page. For matters not covered by the Operations Manual refer to Scientific Style and Format, The CBE Manual for Authors, Editors and Publishers, 6th edition, available from the [Council of Science Editors](#), 11250 Roger Bacon Drive, Suite 8, Reston, VA 20190-5202, USA. Webster's Third New International Dictionary, the Oxford English Dictionary or the Larousse Dictionary may be consulted for acceptable spelling. Consistency of spelling must be maintained throughout individual papers. Authors are urged to have one or more colleagues read the manuscript critically prior to submission.

Animal Care. Authors must certify that animals were cared for under guidelines comparable to those laid down by the [Canadian Council on Animal Care](#) (Guide to the care and use of experimental animals, available from CCAC, Constitution Square – Tower 2, 1510-130 Albert Street, Ottawa, ON, Canada K1R 1B1).

Manuscript Preparation

1. Title

The title of the paper should be brief but should reflect all aspects of the work published. Generally, titles should be indicative rather than informative, i.e., they should state the subject of the paper rather than its conclusions but should identify the main topics of the paper. Titles may be used by abstracting companies and indexing services for information retrieval. Avoid the use of superfluous words such as “effect of”, etc. Serial titles are generally discouraged. Include the name of the organism used if appropriate. Use the common names of plants except for little-known species and weeds.

2. By-line

The by-line consists of the name(s) of the author(s) and their addresses (use the address of the institution where the research was carried out). Names and addresses are set on separate lines. Following the addresses and continuous with them are contribution numbers (if any) and received and accepted dates (day, month, year). Either the full given name or initials may be used but use of the full name will prevent confusion in future citation. Do not include academic degrees or professional titles. The e-mail address of the corresponding author should be supplied. When a paper has several authors from different institutions, key the author to the address with superscript Arabic numerals. (The numeral should follow the author's name and precede the address.) When addresses are given in a language other than English or French, do not translate them but use the English name of the country and city. Canadian and American addresses should be spelled out in full in the first citation

only and abbreviated on second and subsequent citations; include postal and zip codes. Addresses for reprints, changes of address and disclaimers should be given as footnotes and should use the same number system as addresses. Naming an author on a paper implies that the person named is aware of the research reported, agrees with and accepts responsibility for any results or conclusions reported. The corresponding author shall ensure that all authors are aware of, agree with, and support publication of the manuscript.

All authors are required to sign a submission form (available: <http://www.aic.ca/journals/submissions.cfm>).

3. Abstract

An abstract must be included with every paper or short communication submitted to the journals. The abstract should express precisely the most important information in the paper and should be intelligible in itself without reference to the paper, since abstracts are often published separately by abstracting journals. Include in the abstract the rationale for the study, the objectives, materials and techniques used, the names of relevant organisms, new theories and terminology and a conclusion. Do not include tables, figures or references or any information not carried in the text of the paper. Avoid acronyms, if possible. The abstract is published in both English and French. The translation of the abstract also carries a translation of the title and key words. Authors should submit this material in both English and French if they are able to do so. The Publications Office will arrange for translation of the abstract

if it is not provided by the authors. Abstracts of papers should not exceed 200 words; abstracts of short communications should not exceed 100 words.

4. Short Title (Running Head)

The short title appears at the top of every right-hand page of a journal paper. It should not exceed 60 characters (excluding word spaces) and must include the name(s) of the author(s) (use et al. for three or more co-authors.)

Short titles are used as subentries in the annual subject index. A short title should therefore be an abbreviation of the paper title that will give a brief but accurate description of the main topic of the paper. The main title of the paper may be used in full as the short title if it is not too long. For cultivar descriptions the short title will usually be the same as the full title.

5. Key Words

A maximum of six key words or short phrases should be included with the manuscript. These will appear below the abstracts of the paper and will be translated into French. Key words should be suitable for information retrieval systems and for the annual subject index (in conjunction with the short title) published in the journals (key words form the main entry of the index). Key words should be chosen from the title, abstract and body of the paper and should reflect its central topics, and must contain the species of animal in question. Avoid the use of vague nonspecific terms such as “yield”, “growth”, “in vitro”, etc. Adjectives are usually inverted unless they form part of an anatomic term or specific name or if the modified noun is nonspecific. For example:

Not acceptable

lactating cattle

winter wheat

low temperature

residue

in vitro propagation

Acceptable cattle,

lactating wheat

(winter) propagation

(in vitro) lactic acid

6. Introduction

The introduction (no heading) should state clearly the rationale for conducting the research stating the problem, justifying the research and the findings of earlier research and the objectives of the study.

7. Materials and Methods

Subjects, materials and methods used should be described so that the work may be evaluated or repeated by other researchers. Well-known procedures and tests should not be described in detail but simply named or cited as a reference. Chemical procedures that are referenced should include a brief statement of the basic principles of the method.

8. Results and Discussion

Results and discussion may be presented as separate sections or combined under one heading. The Discussion section should interpret the data presented in the Results section with regard to the reason for the research presented in the introduction. Relate findings to previous research. Discuss agreement or conflict with previous work. State the conclusions of the research presented and present practical applications and avenues of future study. Scientific speculation should be identified as such; it should be reasonable, firmly founded in observations related in the manuscript and subject to experimentation.

9. References

Cite only references that are highly pertinent; avoid multiple citations. Reference may be made to journal papers, books, theses, dissertations, proceedings, bulletins, reports and published abstracts as well as to unpublished documents held in a library or archive to which the public has access. Unpublished material not accessible to the public such as letters, memos, etc., should be included in the text, followed parenthetically by the statement, "personal communication" or "unpublished observation", but should not be included in the reference list (see examples). Authors are responsible for ensuring that references are complete and accurate. Do not cite references in the abstract or in the conclusion.

Text Citations

The journal uses the name-and-year system (Harvard system) in which the author's(s') name(s) followed by the year of publication is cited in the text. If there are three or more authors, use the first author's name

followed by et al. (do not underline or italicize) on all occurrences. The use of parentheses depends on the sentence structure, for example:

Smith et al. (1990) observed fall growth...
Fall growth was observed (Smith et al. 1990).
Fall growth was observed [see, for example, Smith et al. (1990)]

If the cited author(s) and year are identical for more than one reference insert lower case letters after the year in both text citation and reference list e.g.:

Graham (1986a)
Graham (1986b)
(Graham et al. 1990a, b), etc.

Articles or reports issued by a government agency, committee or association should be cited using the name of the agency, which should be abbreviated on second and subsequent citations; the abbreviation should be given parenthetically on first citation:

One citation in text: (National Academy of Sciences–National Research Council 1990).

Two or more citations in text: [Association of Official Analytical Chemists (AOAC) 1989] and on second and subsequent citations: (AOAC 1989).

Citations should be inserted in the text immediately before a punctuation mark or at a logical break in the sentence.

When more than one reference is cited at the same location in a sentence, they should be arranged chronologically:
Several authors (Thomas 1982; Alex et al. 1983; Smith 1990) have shown...

The Reference List

References should be listed in the reference list alphabetically then chronologically if all authors are the same. A series of references with the same first author should be listed with the single author first, followed by two authors arranged alphabetically, and then multiple authors (et al. in text) arranged alphabetically thus:

Brown, A. B. 1980
Brown, A. B. 1983
Brown, A. B. and Clark, T. 1989
Brown, A. B. and Smith, S. 1988
Brown, A. B., Adams, B. and Smith, S. 1990
Brown, A. B., Smith, S. and Adams, B. 1989

If the senior author appears in more than one citation from multiple author papers then insert lower case letters after the year in both the text citation and the reference list:

Brown, A. B., Smith, S. and Adam, B. 1989a
Brown, A. B., Smith, S. and Miller, C. 1989b

Information for a reference should be taken from the original work being cited. Basic components for a journal reference are: Last name, initials. Year. Title of paper. Journal title (abbreviated). Volume number: page numbers (first and last). and for a book are: Last name, initials. Year. Title of book. Edition. Publisher, place of publication. (See examples for treatment of chapters, sections, edited works, etc.)

Family names of authors (in upper and lower case) are followed by initials. When different authors share the same family name and the same initial, the first given name for each author should be written in full. In names of Dutch, French or German origin the article precedes the family name when transposed: e.g.

van Gogh, V.

de Maupassant, G.

von Schiller, J.

Jr. (Junior) and II, III, etc. follow the name when transposed, e.g.

Smith, Jr., T.

Publications issued by government agencies, committees, etc., carry the name of the organization, which is treated as an author's name. The name of the editor, followed by the abbreviation (ed.), may be used. If authorship cannot be determined, the reference may be listed under "Anonymous". Journal titles are abbreviated according to *BIOSIS Serial Sources* (2100 Arch Street, Philadelphia, PA 19103-1399). One-word journal titles are never abbreviated.

References should supply sufficient information to allow readers to trace the original material. Names of publishers should be given in full followed by the place of publication. For material originating in Canada or the United States of America, it is sufficient to supply the city and province or state. For material originating in other countries, the name of the country should also be given. The names of provinces and states are abbreviated in the reference list.

EXAMPLES OF REFERENCES

Standard journal article

Waterer, J. G. and Evans, L. E. 1985. Comparison of Canadian and American hard red spring wheat cultivars. *Can. J. Plant Sci.* **65**: 831–840.

Article with subtitle

Ackerson, R. C. 1981. Osmoregulation in cotton in response to water stress. I. Alterations in photosynthesis, leaf conductance, translocation and ultrastructure. *Plant Physiol.* **67**: 484–488.

Abstract/supplement

Robertson, J. B. and van Soest, P. J. 1977. Dietary fiber estimation in concentrate feedstuffs. *J. Anim. Sci.* **44** (Suppl. 1): 257 (Abstr.).

Article accepted, not yet published

Larveld, B., Kerr, D. E. and Brockman, R. P. 1986. Effects of growth hormone on glucose and acetate metabolism in sheep. *Comp. Biochem. Physiol.* (in press).

Article in foreign language

Ama, H. 1983. An introduction to applied cell biology. *Commun. Appl. Cell Biol.* **2**: 3–5 [in Japanese, English abstract].

Standard book

Cochran, W. G. and Cox, G. M. 1968. *Experimental design*. 2nd ed. John Wiley and Sons, Inc., New York, NY. 611 pp.

Edited book, pages specified

Griffith, R. W., Hodel, C. H. and Matter, B. 1978. Toxicological considerations. Pages 805–851 *in* B. Berde and O. Schilde, eds. Ergot alkaloids and related compounds. Oxford University Press, Oxford, UK.

Edited book, editor referenced

Wood, R. K. (ed.) 1982. Defense mechanisms in plants. Plenum Press, Toronto, ON.

Corporate author

Association of Official Analytical Chemists. 1980. Official method of analysis. 13th ed. AOAC, Washington, DC.

Conference proceedings

Brouwer, R. and de Wit, C. 1968. A simulation model of plant growth. Proc. Easter School in Agricultural Science, University of Nottingham, UK. Butterworths, London, UK.

Thesis

Beck, M. J. 1980. The effects of kinetin and naphthaleneacetic acid on in vitro shoot multiplication and rooting in fishtail fern. M.Sc. thesis, University of Tennessee, Knoxville, TN. 31 pp.

Charts

Royal Horticultural Society. 1966. RHS colour chart. RHS, London, UK.

Unpublished memos, letters, personal communications cited in text only
(A. J. Smith, personal communication, University of Saskatchewan, Saskatoon, SK)
(A. J. Smith, unpublished data).

ELECTRONIC PUBLICATIONS

CD-Rom

Author/editor. Year. Title (edition). [Medium]. Available: Supplier, mailing address; Internet address/database identifier or number.

Dirr, M. A. 1997. Photo-library of woody landscape plants on CD-ROM. [CD-ROM]. Available: Timber Press, Portland, OR; <http://www.timberpress.com/>

Internet site

Author/editor. Year. Title. [Medium] Available: Site/Path/File [Access date]

Irvine, B. 1998. Can producers use an in-row liquid suspension to inoculate pulse crops? [Online] Available: <http://res.agr.ca/brandon/brc/newsnote/news191.htm> [1998 Oct. 01].

Write “Undated” when the electronic publication date is not available. Internet site publication dates are often provided as “last update” information either at the top or bottom of the page.

Parts of works

Author/editor. Year. Title. In Source (edition) [Medium] Available: Site/Path/File. [Access Date]

Kinsman, G. 1986. Blueberries in Nova Scotia. *In* The history of the lowbush blueberry industry in Nova Scotia 1880–1950. [Online] Available: <http://agri.gov.ns.ca/nsbi/wbic/hist/kinsman1880/index.htm> [2001 Sep. 27].

Electronic journal articles

Author. Year. Title. Journal Title. Volume. [Medium] Available: Site/Path/File [Access Date]

Bustamente, P. I. and Hull, R. 1998. Plant virus gene expression strategies. *Electronic J. Biotech.* 1. [Online] Available: <http://www.ejb.org/content/voll/issue2/full/3/> [2010 Aug. 31].

Magazine articles (Internet)

Author. Year. Month. Article Title. Magazine Title. Volume. [Medium]. Available: Site/Path/File [Access Date].

Kupferman, E. 1999. March. How to prevent diseases of fruit in storage. *Good Fruit Grower* [Online] Available: <http://www.goodfruit.com/archive/Mar1-99/cursplt.html> [2009 Aug. 03].

Newspapers (Internet)

Author. Year. Day. Month. Article Title. Newspaper Title. [Medium] Available: Site/Path/File [Access date].

Raine, M. 1998. 24 Sept. Fall fertilizing should be as late as possible. The Western Producer [Online]. Available: http://www.producer.com/docs/news/Sep_24_98/prod3.htm [1998 Oct. 10].

Certain media have been omitted from these guidelines. Bulletin board listings, discussion group threads, electronic mail, etc., are not included since they usually represent nothing more than “personal communication” and can be cited as such according to present guidelines.

10. Trademarks

Authors are required to provide registered trademark notification for proprietary products.

11. Footnotes

Footnotes can be used and are required on the title page and in tables (see section on tables). On the title page, footnotes will generally fall into one of the following categories:

(a) Notes on the title indicating the paper is part of a thesis submitted by one of the authors, that the paper was presented at a symposium (see section on symposia papers), etc.

(b) General disclaimer. If the use of trade or brand names is necessary in the text, the use of a disclaimer may be advisable. For example, “The use of trade names, proprietary produce or vendor does not imply endorsement by the authors, nor criticism of similar products not mentioned.”

(c) Current address of author(s) if it is not the one listed in the by-line or address for reprint requests.

(d) Indication that an author is deceased.

All footnotes on the title page are indicated by superscript arabic number. For table footnotes see the section on Tables (below).

12. Tables

Tables are used to present numerical data in a self-explanatory manner. They should be intelligible without consulting the text and should not

duplicate data already given in the text or illustrations. Tables should be typed double-spaced, each table on a separate sheet. Use the Microsoft Word Table function to create tables. Each data point in a table should be in a separate cell. Do not format tables using tabs, spaces and hard returns. In these cases, tables will be re-keyed by typesetters leading to the possible introduction of errors. Place tables immediately after the list of figure legends or references if there are no figures. Paginate the tables in series with the text. Number tables using Arabic numbers and cite all tables in the text. Align horizontally parallel entries by their bottom lines. Do not use vertical rules in tables. Avoid the use of horizontal rules within the body of the table; if necessary, separate data sets by spaces.

Heading

Describe the topic and general trends of the table. Capitalize in sentence format and end without a period. Do not indent second and subsequent lines. Do not include units of measurement in the heading; place them following column or stub headings within the table.

Column Headings

Capitalize only the first word, proper nouns and capitalized abbreviations. Subheadings should be joined by a rule. Give units in parentheses on the last line of the column head. When several column headings share the same units of measurement, place the unit below the headings, centred, with rules on each side to indicate the headings to which they refer.

Body

Headings used within the body to separate subject classes should be centred and *italicized*. Use sentence capitalization. Centre entries under column heads. Centre data within columns on decimal points, dashes, \pm signs etc. If data have been excluded from the table, use an “en” dash. Do not use ditto marks to repeat data in columns.

Footnotes

Use bold lower-case superscript letters in reverse starting with ^z (^z, ^y, ^x, ^w, etc.) to designate footnotes. Set each footnote on a separate line, flush with the left-hand margin of the table. Include footnotes on all tables to which they refer, do not say “see footnote Table 1”. Place footnote symbols at the first occurrence in the table, working left to right, top to bottom. Explain in footnotes any unconventional abbreviations

used in the table. The asterisk (*) is used only to designate Statistical significance, e.g., *, **, *** Significant at $P < 0.05$, $P < 0.01$ and $P < 0.001$, respectively.

Statistics

If needed, to indicate statistical significance, use either lower case letters (*a,b,c*, etc.) (italic, not superscript) or a single asterisk for the 5% level; upper case letters (*A,B,C*) or a double asterisk for the 1% level and a triple asterisk for the 0.1% level. Do not leave a space between the entry and letter. Mean comparison tests should be supported by significant *F* value in ANOVA designs.

13. Text Headings

Generally four levels of text heading are used:

1. **BOLD CAPITALS CENTRED**

2. **Bold Upper and Lower Case, Flush Left**

3. *Italic Upper and Lower Case, Flush Left*

4. CAPITALS AND SMALL CAPITALS. Run in to first line of text (when typing, end the heading with a period followed by a space).

14. Illustrations

Illustrations should be planned to fit one-column (8.5 cm × 22.4 cm; 3.5 inches × 8.75 inches) or two-column (17.6 cm × 22.4 cm; 7 inches × 8.75 inches). Each figure should be numbered consecutively in Arabic numerals and must be referred to in the text. Abbreviations and units of measurement must correspond to those used in the text and journal style (use SI units; use L not l for litre; use kg ha⁻¹, not kg/ha, etc.).

Line drawings

Lines must be sufficiently thick (minimum 0.5 points) to reproduce clearly; lettering, including super- and subscripts, and symbols must be in proportion to the illustration and large enough to allow for reduction without loss of clarity. Use the same font for all figures. Use clear, bold patterns and avoid the use of fine grey scale patterns. Labelling on graphs should be parallel to the graph's axes.

Photographs

Photographs should be high quality, continuous tone with good tonal contrast. Use uppercase letters to mark subdivisions. Electron micrographs must include a scale bar on the illustration.

Colour illustrations

Authors must pay the full cost of colour print reproduction, but there is no cost for colour reproduction on the web. Contact the journal office (journals@aic.ca) for advice on how best to submit colour illustrations and costs.

Electronic graphic files

Digital art is rendered in pixels (dots) per inch. The size at which digital art can be reproduced is limited by its resolution, measured in pixels per inch (ppi). Continuous tone images (photographs) should be a minimum of 300 ppi; line drawings should be 1200 ppi.

To check the resolution of a digital file on a PC: right click on the file, then select "Properties" / "Summary" / "Advanced". The width and height of the file will be shown in pixels and the horizontal and vertical resolution in dpi. Dividing the width and height in pixels by the horizontal and vertical resolution in dpi will give the maximum reproduction size of the file in inches.

JPEG images deteriorate each time they are opened and resaved. Rename JPEG files using the menu option rather than opening and resaving the file. If possible EPS or pdf files are a better alternative to JPEG files.

When submitting images ensure the file name includes the manuscript number and figure number (e.g., CJSS2012-001_Fig1.pdf). We do not accept Powerpoint or Sigmaplot files; however, these files can be copied, saved and submitted as Word files.

Specific Style Guide

1. Units of Measure

SI System

The SI system of units (*Système international d'unités*) is used in the AIC journals. The SI is based on seven base and two supplementary units (Table 1).

Table 1. SI base and supplementary units

Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A

Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol
Plane angle	radian	rad
Solid angle	steradian	sr

One principal advantage of the SI is that all other units in the system can be derived from the base units by simple multiplication and division. Examples of derived units are the unit of area (m^2), the unit of volume (m^3), the unit of velocity (m s^{-1}), etc. Some derived units have been assigned special names (Table 2).

In addition, certain non-SI units are so widely used in everyday life that they have been retained for general use with the SI; a few others have been accepted for use with the SI “for a limited time” (Table 3).

Usage

On many occasions, the SI base and derived units are inconveniently large or small. Hence, prefixes are used to form multiples or submultiples of the units (Table 4). Prefixes are written immediately before the symbol of the units to which they apply with no intervening space or punctuation. They should never be used alone (e.g., μ for micron is unacceptable; rather μm), nor should compound prefixes ever be used (e.g., $\text{m}\mu\text{m}$ for millimicrometre; instead use nm , nanometre).

It is preferable to use prefixes in multiples of 10^3 and therefore to avoid deci, centi, deca, and hecto whenever possible. Notable exceptions are the centimetre (cm) and the hectare (ha). Units, however, should be chosen with prefixes so that the numerical component falls between 0.1 and 1000.

When a unit is in a fractional form, the prefix should be applied to the numerator only. (Because it is the only base unit defined with a prefix, the kilogram is of course an exception.)

Style and Format

Use the symbol for a standard unit of measurement only if it is preceded by a number. Spell out a unit’s name if it follows a spelled out number (for example, opening a sentence). Do not begin a sentence with a symbol or abbreviation.

Numbers and units that form compound adjectives should be hyphenated, e.g.,

1000-kernel weight, 2-mo-old calf, 15-mm opening, 15-cm-deep layer.

The denominators of units derived by division should be written with negative indices. Do not use a solidus (/) unless the units are written in full, e.g.,

kg ha⁻¹ yr⁻¹, W m⁻² but metre/second.

A space (not a dot) is left between the elements of a unit and between the numerical value and the first letter of the unit's symbol, except for the symbols of degree, minute, and second, e.g., 91 m (not 91m, which could mean 91 metres or 9 lumens), N m (newton-metre, not m N for metre-newton, which if the space were omitted is the symbol for millinewton), but 45°30", 25°C. When numerical values are less than one, a zero must be written before the decimal marker, e.g., 0.3. In a series of measurements, place the unit at the end, e.g., 3–10°C; 1, 4, and 8 µg L⁻¹. Units whose name is derived from a proper name are not capitalized when written out in full, but the first letter of the unit's symbol is, e.g., K (kelvin), Pa (pascal), but °C (degree Celsius).

Special Uses

The adoption of the SI has created difficulties, and some confusion, in reporting concentration, and light.

(i) The amount of substance concentration, or, simply, concentration, can be expressed, for example, as concentration in HCl = 0.1 mol L⁻¹ or 0.1 M HCl.

The base unit mole (mol) replaces such terms as gram-molecule and gram-equivalent. The concept of equivalence and the corresponding amount of substance concentration that it defines, i.e., normality (N), should therefore no longer be used. Concentration in mol L⁻¹ can also be reported as molarity (M) of a solution, as in the above example.

Concentration can also be expressed on a mass or volume basis. This could be the case, for example, for nutrient concentrations in plants, soils, and fertilizers, or for soil and plant water contents, e.g.,

mmol kg⁻¹, mg kg⁻¹, g m⁻³ or g kg⁻¹

The use of percent (%) must be avoided whenever SI base or derived units can be used instead. Nevertheless, percent is acceptable for such quantities as coefficient of variation, plant or animal population estimates, increases or decreases in yield, fertilizer grades, relative humidity, soil texture, base saturation, land area estimates.

As with percentage, parts per million or billion (ppm or ppb) can be equally ambiguous, and are therefore unacceptable. Use instead units such as $\mu\text{L L}^{-1}$, mg L^{-1} , or mg kg^{-1} .

(ii) The purpose for which a study is undertaken determines the units that should be used for light intensity. In studies based on radiant energy received from a light source, the accepted SI units are the joule per square metre (J m^{-2}) for total radiant energy received or the watt per square metre (W m^{-2}), which expresses energy received per unit area or irradiance. Plants respond to photosynthetically active radiation (PAR) in the waveband 400 to 700 nm. The proper quantity to measure in this case is the flux density of quanta received per unit area, which is expressed in micromoles per square metre per second ($\mu\text{mol m}^{-2} \text{s}^{-1}$). This latter unit replaces the non-SI Einstein (E), which is equivalent to 1 mole quanta. When other wavelengths are considered, the waveband should be specified.

In animal physiology studies, light measurements can be reported in lux (lx). This measurement refers to the intensity of light, or illuminations, as perceived by the human eye (and also by the animal, presumably). Thus the lux is an inappropriate unit for use in the plant sciences.

2. Abbreviations

Generally, abbreviations in upper case do not have periods and are not letter-spaced, e.g., DM, RH. Abbreviations in lower case usually have periods, but no letter spacing: e.g., a.i. (active ingredient), i.d. (inside diameter).

A list of abbreviations used must be supplied, which will be printed on the first page of the paper. Abbreviations widely used throughout science, such as DNA, can be used in the title, abstract and text without definition. Other abbreviations must not be used in titles, but may be used in the text if they are parenthetically defined at first use. An abbreviation should not be used unless the abbreviated term is used at least three times in the manuscript. Plural abbreviations do not require a

final “s”. Refer to *Scientific Style and Format* (6th edition) for additional standard abbreviations.

Abbreviations of Words Used in Citations

(Note: AIC Journal style is to include the period following the abbreviated journal title. This is contrary to *Scientific Style and Format*, which recommends omission of the period.)

Abstract, Abstr.
Agriculture, Agric.
American, Am.
Annals, Ann.
Annual, Annu.
Association, Assoc.
British, Br.
Bulletin, Bull.
Canadian, Can.
Circular, Circ.
Edition, Editor(s), ed, eds.
Experiment, exp.
Extension, Ext.
Horticulture, Hortic.
International, Int.
Miscellaneous, Mis.
Monograph, Monogr.
National, Natl.
Proceedings, Proc.
Publication, Publ.
Report, Rep.
Research, Res.
Station, Sta.
Supplement, Suppl.
Technical, Tech.
University, Univ.

Abbreviations of Frequently Cited Periodicals (Refer to Biosis List of Serials with Title Abbreviations: <http://www.biosis.org.uk>)

Acta Agric. Scand.
Acta Endocrinol.
Acta Hortic.

Adv. Carbohydr. Chem.
Adv. Genet.
Adv. Protein Chem.
Agric. Eng.
Agron. J.
Am. J. Anat.
Am. J. Bot.
Am. J. Clin. Nutr.
Am. J. Clin. Pathol.
Am. J. Hum. Genet.
Am. J. Obstet. Gynecol.
Am. J. Pathol.
Am. J. Physiol.
Am. J. Soil Sci.
Am. J. Vet. Res.
Analyst
Anal. Biochem.
Anal. Chem.
Anat. Rec.
Anim. Behav.
Anim. Breed. Abstr.
Anim. Feed Sci. Technol.
Anim. Prod.
Ann. Bot. (Lond.)
Ann. Eugen.
Ann. Hum. Genet.
Ann. Math. Statist.
Ann. Zootech. (Paris)
Annu. Rev. Biochem.
Annu. Rev. Pharmacol. Toxicol.
Annu. Rev. Physiol.
Antibiot. Chemother.
Appl. Environ. Microbiol. (name since 1976)
Appl. Microbiol. (name since 1976)
Arch. Biochem.
Arch. Biochem. Biophys.
Arch. Tierz.
Aust. J. Agric. Res.
Austr. J. Biol. Sci.
Austr. J. Exp. Agric. Anim. Sci.
Austr. Vet. J.

Bacteriol. Rev.
Biochemistry
Biochem. Biophys. Acta
Biochem. Biophys. Res. Commun.
Biochem. J.
Biogeochemistry
Biol. Chem.
Biol. Fertil. Soils
Biol. Reprod.
Biol. Rev.
Biometrics
Bioscience
Blood
Br. J. Nutr.
Br. Poult. Sci.
Br. Vet. J.

Can. J. Anim. Sci.
Can. J. Biochem. Physiol.
Can. J. Bot.
Can. J. Genet. Cytol.
Can. J. Microbiol.
Can. J. Plant Sci.
Can. J. Res.
Can. J. Soil Sci.
Can. J. Zool.
Can. Med. Assoc. J.
Can. Vet. J.
Cereal Chem.
Chem. Ind.
Clays Clay Miner.
Clin. Toxicol.
Clim. Change.
Commun. Soil Sci. Plant Anal.
Cornell Vet.
Crop Sci.

Ecol. Monogr.
Ecology
Econ. Bot.

Endocrinology
Environ. Sci. Technol.
Equine Vet. J.
Eur. Assoc. Anim. Prod.
Eur. J. Biochem.
Eur. J. Soil Sci.
Eurasian Soil Sci.
Exp. Agric.

Farm Res.
FEBS Lett.
Fed. Proc.
Fert. Steril.
Food Chem.
Food Cosmet. Toxicol.
Food Technol.

Gastroenterology
Genetics
Grass Forage Sci.
Growth
Gut

Heredity
Horm. Behav.
HortScience
Hortic. Sci.

Indian J. Vet. Sci. Anim. Husb.

J. Agric. Food Chem.
J. Agric. Res.
J. Agric. Sci. (Camb.) if published in England. Include
country of publ. for other countries
(e.g., Neth. J. Agric. Sci.)
J. Am. Chem. Soc.
J. Am. Med. Assoc.
J. Am. Oil Chem. Soc.
J. Am. Soc. Hortic. Sci.
J. Am. Statist. Assoc.
J. Am. Vet. Med. Assoc.

J. Anim. Sci.
J. Appl. Ecol.
J. Appl. Meteorol.
J. Appl. Physics
J. Appl. Physiol.
J. Assoc. Off. Anal. Chem.
J. Bacteriol.
J. Biol. Chem.
J. Br. Grassl. Soc.
J. Can. Inst. Food Technol.
J. Cell Physiol.
J. Chromatogr.
J. Clin. Endocrinol. Metab.
J. Clin. Invest.
J. Clin. Pathol.
J. Dairy Res.
J. Dairy Sci.
J. Ecol.
J. Econ. Entomol.
J. Endocrinol.
J. Environ. Pathol. Toxicol.
J. Environ. Qual.
J. Equine Med. Surg.
J. Exp. Biol.
J. Exp. Bot.
J. Exp. Med.
J. Food Sci.
J. Gen. Microbiol.
J. Gen. Physiol.
J. Geophys. Res.
J. Gerontol.
J. Hered.
J. Immunol.
J. Infect. Dis.
J. Lab. Clin. Med.
J. Lipid Res.
J. Morphol.
J. Nutr.
J. Pathol.
J. Pathol. Bacteriol.
J. Pharmacol. Exp. Ther.

J. Physiol.
J. Prod. Agric.
J. Range Manage
J. Reprod. Fertil.
J. Sci. Food Agric.
J. Soil Sci.
J. Soil Water Cons.
J. Toxicol. Environ. Health
J. Vet. Res.
J. Vet. Sci. Anim. Ind.

Lab. Anim.
Lipids
Livest. Prod. Sci.

Meat Sci.
Metabolism

Nat. Can. (Que.)
Nature (Lond.)
Neuroendocrinology
NZ J. Agric. Res.
NZ Vet. J.
Nucleonics
Nutr. Abstr. Rev.
Nutr. Metab.
Nutr. Rep. Int.

Obstet. Gynecol.

Pharmacol. Rev.
Physiol. Rev.
Plant Dis.
Plant Physiol.
Physiol Plant.
Phytochemistry
Phytopathology
Plant Soil
Poult. Sci.
Proc. Br. Nutr. Soc.
Proc. Meat Ind. Res. Conf.

Proc. Nutr. Soc.
Proc. Recip. Meat Conf.
Proc. R. Soc. (Lond.)
Proc. Soc. Exp. Biol. Med.
Prog. Lipid Res.

Rec. Prog. Horm. Res.
Residue Rev.

Science
Sci. Agric.
Sci. Hortic
Soil Biol. Biochem.
Soil Sci.
Soil Sci. Soc. Am. J.
Soil Sci. Soc. Am. Proc.
Soil Tillage Res.
Soil Use Manage.
Steroids
Swed. J. Agric. Res.

Theor. Appl. Genet.
Theriogenology
Toxicol. Appl. Pharmacol.

Vet. Rec.
Vet. Res.

Water Resour. Res.
Weed Sci.
Weed Technol.
World's Poult. Sci. J.

Z. Tierz. Zuchtungsbiol.
Zentralbl. Veterinarmed Reihe A (B)

International Feed Names and International Feed Numbers (IFN)

Each feedstuff referred to in the manuscript may be identified by the International Feed Number (IFN) and a simplified name of the feed. The IFN, when used, should be listed only once in the manuscript, preferably in tables if tables listing feeds are included. If no table of feed

ingredients is included then the IFN should be given in parentheses following the feed name in the Materials and Methods section. The use of the IFN makes the full description of the International Feed names redundant and space consuming. Thus, simplified names for the full description of the International Feed Names should be used in the text and tables as indicated in the examples for the following feeds: Clover, red, hay sun-cured, early bloom (IFN 1-02-400) Soybean, seeds, meal solvent extracted (IFN-5-04-604) In the text they should be written as ... red clover hay (IFN 1-01-400), barley (IFN 4-00-549) and soybean meal (IFN 5-04-604) were fed. In tables they should appear as shown below:

Ingredient (%)

Barley (IFN 4-00-549) (78.6)

Soybean meal (IFN 5-04-604) (18.0).

The international Feed Names and IFN are listed in Utah Agricultural Experiment Station Bulletin 501 (1981). Copies of the bulletin may be obtained from: The Utah Agricultural Experiment Station, Bulletin Room, Utah State University, UMC 50, Logan, UT 84322. Many different names are used in describing feedstuffs, but to establish a common basis for comparing nutritive values it is essential that the exact IFN given for the specific International Feed Name in this bulletin be used. If a feed ingredient is not exactly described in Bulletin 501, write to: Director, International Feedstuffs Institute, Utah State University, UMC 46, Logan, UT 84322, and an International Feed Name and IFN will be provided.

3. Time

Use the 24-h clock system: 0930, 1340, etc. Give day length in quantitative hours (e.g., 2 h 16 min). Abbreviate the terms hours (h), minute (min), second (s) and year (yr), month (mo), week (wk), when used with a number in the text but spell them out when they are used alone.

4. Dates

Use arabic numerals for all dates. Abbreviate the month when it is used with the date (day) but spell out the name of the month when it is used alone or with the year. Do not put commas between day, month and year.

Abbreviations are: Jan., Feb., Mar., Apr., Aug., Sep., Oct., Nov., Dec. Give dates in the order: year, month, day (2003 Sep. 01).

When referring to a space of years give both years in full, e.g., 1980–1983 rather than 1980–83.

When referring to a group of continuous years, add the plural “s” without an apostrophe. e.g. 1970s.

Abbreviations BC, AD, BP should be capitalized.

5. Places

Spell out the names of countries, provinces and states when they are used alone; abbreviate them when they are used with the city, in footnotes and in references. List of abbreviations:

Provinces

Alberta, AB

British Columbia, BC

Manitoba, MB

New Brunswick, NB

Newfoundland and Labrador, NL

Northwest Territories, NT

Nova Scotia, NS

Nunavut, NU

Ontario, ON

Prince Edward Island, PE

Quebec, QC

Saskatchewan, SK

Yukon Territory, YT

United States of America and Territories

Alabama, AL

Alaska, AK

Arizona, AZ

Arkansas, AR

American Samoa, AS

California, CA

Canal Zone, CZ

Colorado, CO

Connecticut, CT

Delaware, DE

District of Columbia, DC

Florida, FL

Georgia, GA

Guam, GU

Hawaii, HI
Idaho, ID
Illinois, IL
Indiana, IN
Iowa, IA
Kansas, KS
Kentucky, KY
Louisiana, LA
Maine, ME
Maryland, MD
Massachusetts, MA
Michigan, MI
Minnesota, MN
Mississippi, MS
Missouri, MO
Montana, MT
Nebraska, NE
Nevada, NV
New Hampshire, NH
New Jersey, NJ
New Mexico, NM
New York, NY
North Carolina, NC
North Dakota, ND
Ohio, OH
Oklahoma, OK
Oregon, OR
Pennsylvania, PA
Puerto Rico, PR
Rhode Island, RI
South Carolina, SC
South Dakota, SD
Tennessee, TN
Texas, TX
Utah, UT
Vermont, VT
Virginia, VA
Virgin Islands, VI
Washington, WA
West Virginia, WV
Wisconsin, WI

Wyoming, WY

Translate the names of foreign cities and countries into English in text and authors by-line. Street addresses, institutional names, etc. retain their foreign spelling.

6. Statistics

Place emphasis on the interpretation of the experimental results based on a sound statistical methodology.

Experimental designs, data, statistical model, and analyses must be clearly described, more fully in non-standard designs. Reference to a computer program used in analysis is not sufficient description of design. The experimental design should be appropriate to the objectives of the experiment and the statistical procedure(s) should be appropriate for the design. If necessary, data should be transformed to satisfy assumptions required for valid statistical analysis. In combined analyses, error variances should be homogeneous or heterogeneity should be taken into account in the analysis. Summary statistics should be accompanied by estimates of their precision. Means usually should be accompanied by either the standard error of the mean, the standard error of the difference between means, or a confidence interval. The number of replicates used or the degrees of freedom should be indicated. If emphasis is on the spread of the data values, then the standard deviation or the range may be given. If a mean (\bar{x}) and standard error of a mean ($s_{\bar{x}}$) have been calculated on transformed data, back transformed values should be presented; one procedure of doing this is to transform the range of values ($\bar{x} - s_{\bar{x}} + s_{\bar{x}}$) back onto the original

scale of measurement. The statistical procedure used for separation of means should be appropriate for the data being analyzed. For example, fitting response functions using regression techniques or using planned sets of contrasts among means or groups of means are appropriate where treatments are graded levels of a quantitative variable or where there are combinations of two or more factors at two or more levels, whereas multiple comparison tests are appropriate when unstructured qualitative treatments are involved. Statistical hypothesis testing is an important aspect of analyzing experimental results. The author(s) should indicate what probability level is being used for the rejection of a null hypothesis. Probability levels commonly used are $P < 0.05$ and $P < 0.01$, with $P < 0.001$ and $P < 0.1$ being used rarely. Rigid use of $P < 0.05$ or $P < 0.01$ will often form a dichotomy, which is artificial and

unnecessary; an effect with probability of $P = 0.049$ might be declared significant but a second at $P = 0.051$ might not be. When the null hypothesis is not being rejected at a prespecified level, the observed probability level should be stated, for example $P = 0.056$, 0.078 , 0.095 , etc. Also, if acceptance of the hypothesis that there is no difference is of importance, it would be of value to state the observed probability level, for example $P = 0.65$, 0.92 , etc. In presenting correlation coefficients and mean squares, $P < 0.05(*)$, $P < 0.01(**)$ and $P < 0.001(NS)$ may be used since the reader can apply or determine other probability levels if desired. When relevant, mean squares should be presented rather than significance of F tests (i.e., *, ** and NS) since the latter alone do not provide the reader with basic information. As a matter of clarity and logic, when tests of significance indicate no difference, state that there was “no (significant) difference”, rather than saying “the difference was non-significant”. The GLM procedure of SAS has been widely used for analysis of variance; however, it was designed to analyze data having fixed effects only. Models that have both fixed and random effect should be analyzed using the MIXED procedure of SAS. This is also important in analyzing datasets with repeated observations on the same experimental unit that have heterogeneous variances over time and/or unequal within subject time-dependent correlations. The Canadian Journal of Animal Science will not normally accept papers reporting the use of the GLM procedure to analyze datasets that include random effects or repeated measurements on the same experimental unit where the data show heterogeneous variances and/or unequal within subject time-dependent correlations. Avoid reporting a number of similar experiments separately; combine when possible. Omit raw data, information that can be calculated by the reader, and material irrelevant to the objectives. Results that are not significant may be included when relevant but may best be covered in the text rather than in tables or figures. Give only meaningful digits. A practical rule is to round, so that the change caused by rounding is approximately one-tenth of the standard error. Such rounding increases the variance of the reported value by less than 1%, so that less than 1% of the relevant information contained in the data is sacrificed.

7. Spelling

Use American (refer to Webster's New International Dictionary) or British (refer to the Oxford English Dictionary) spelling consistently throughout the manuscript.

8. Numbers

Follow the rules given below for writing numbers:

- Spell out numbers one through nine and use numerals for 10 and above and in instances given below.
- Use arabic numerals when they precede abbreviated units of measure: 2 g, 5 d, \$4.00, 3% and numerical designations in the text: exp. 1, group 3, etc.
- Use arabic numerals to express time and date: 2003 Sep. 01, 0800 (not 08:00 h), etc.
- In a series using some number less than 10 and some more than 10, use numerals for all: 2 Holsteins, 6 Charolais and 15 Friesians.
- When using numbers of more than four digits leave a space between each group of three going from the decimal point: 10 000, 450 000, etc.
- Numbers of two to four digits are run together: 3500, 1000, etc., except when they are used (e.g., in tables) in columns with numbers of more than four digits, when a space is inserted after the third digit from the decimal point:
23 000
450 000
1 200
- When writing a large number ending in several zeros use a word for part of the number: 1.8 million rather than 1 800 000.
- When two numbers appear adjacent to each other spell out the first: ten 2-d-old chicks, rather than 10 2-d-old chicks.
- Do not begin a sentence with a numeral. If a number is spelled out at the beginning of a sentence spell out its associated unit (Five millilitres of ... not Five mL of...)
- Follow the same rules for ordinals as for whole number: first, third, 1st, 3rd.
- When enumerating a discussion the use of secondly, thirdly, etc. is incorrect; use first, second, third, etc.
- Spell out units of measurement not associated with a number.

8. Equations

Use the simplest form of the equation possible especially in non-displayed equations in the text, e.g., use

$(a + b)/(c + d)$ rather than $\frac{a + b}{c + d}$

Ensure that possibly ambiguous characters are clear (1, one/ell; 0, zero/oh; k/K; c/C; u/U/v/V, etc.). Single letter mathematical abbreviations are usually set in italics; abbreviations of more than one letter (max., ln, avg.), chemical symbols and numbers are not italicized. Number equations with arabic numerals in parentheses at the right margin of the text; refer to equations in the text as “Eq. 4”.

Table 2. SI derived units with special names

Quantity	Name	Symbol	Expression in terms of	Expression in terms of
Frequency	hertz	Hz	B	s^{-1}
Force	newton	N	B	$\text{m}^{-1} \text{kg s}^{-2}$
Pressure, stress	pascal	Pa	N m^{-2}	$\text{m}^{-1} \text{kg s}^{-2}$
Work, energy, quantity of heat	joule	J	N m	$\text{m}^2 \text{kg s}^{-2}$
Power, radiant flux	watt	W	J s^{-1}	$\text{m}^{-1} \text{kg s}^{-3}$
Electric charge, quantity of electricity	coulomb	C	B	S A
Electric potential	volt	V	W A^{-1}	$\text{m}^2 \text{kg s}^{-3} \text{A}^{-1}$
Electric capacitance	farad	F	C V^{-1}	$\text{m}^2 \text{kg}^{-1} \text{s}^4 \text{A}^2$
Electric resistance	ohm	Ω	V A^{-1}	$\text{m}^2 \text{kg s}^{-3} \text{A}^{-2}$
Electric conductance	siemens	S	A V^{-1}	$\text{m}^2 \text{kg}^{-1} \text{s}^3 \text{A}^2$
Magnetic flux	weber	Wb	V s	$\text{m}^2 \text{kg s}^{-2} \text{A}^{-1}$
Magnetic flux density	tesla	T	Wb m^{-2}	$\text{kg s}^{-2} \text{A}^{-2}$
Inductance	henry	H	Wb A^{-1}	$\text{m}^2 \text{kg s}^{-2} \text{A}^{-2}$
Celsius temperature	degree Celsius	$^{\circ}\text{C}$	B	K
Luminous flux	lumen	lm	B	cd sr
Illumination	lux	lx	lm m^{-2}	$\text{m}^{-2} \text{cd sr}$
Activity (radionuclide)	becquerel	Bq	B	s^{-1}
Absorbed dose (radiation)	gray	Gy	J kg^{-1}	$\text{m}^{-2} \text{s}^{-2}$
Dose equivalent	sievert	Sv	J kg^{-1}	$\text{m}^2 \text{s}^{-2}$

Table 3 Non-SI units that are retained for general use or accepted for use with the SI

Quantity	Name	Symbol	Value in SI units
Time	minute	min	60 s
	hour	h	3 600 s
	day	d	86 400 s
	month	mo	604 800 s
	year	yr	–
Angle	degree	$^{\circ}$	$\pi/180$ rad
	minute	'	$\pi/10\,180$ rad
	second	"	$\pi/648\,000$ rad
Mass	tonne	t	1000 kg or 1 Mg
Volume	litre	l	1 dm^3 or 10^{-3} m^3
Area	hectare	ha	$10\,000 \text{ m}^2$ or 10^{-2} km^2

Table 4. SI prefixes

Multiples			Submultiples		
Factor	Prefix	Symbol	Factor	Prefix	Symbol
10^{18}	exa	E	10^{-1}	deci	d
10^{15}	peta	P	10^{-2}	centi	c
10^{12}	tera	T	10^{-3}	milli	m
10^9	giga	G	10^{-6}	micro	μ
10^6	mega	M	10^{-9}	nano	n
10^3	kilo	k	10^{-12}	pico	p
10^2	hecto	h	10^{-15}	femto	f
10^1	deca	da	10^{-18}	atto	a