

The *Journal of Nematology* Style Guide, Fourth Edition

Foreword to the Fourth Edition

During the past 2 years many changes have been made to the *Journal of Nematology* (JON). One of the most important changes has been the implementation of internet-based manuscript submission using the Allen Press PeerTrack software. This change has necessitated this update of the Style Guide to include the new manuscript submission and review process. During this revision, much of the information intended as instruction to Editors has been removed and the guide has been focused towards authors and reviewers, with some general editorial process descriptions. An additional Guide for Editors will be generated in the near future to give more detail on editorial processes.

The transition of the JON to the new format has also included changing the business model for the Journal, which now does not charge publication fees and is freely available on the internet. All of these changes have required extensive research and many decisions by committee. It was truly a group effort and I would like to acknowledge Inga Zasada, Jim LaMondia, David Shapiro-Ilan, Richard Davis, Zafar Handoo, Erik Ragsdale, and Brent Sipes for their extensive and invaluable work during this process. I would also like to thank the current Editorial Board of the JON and Executive Board of the Society of Nematologists for their input.

Authors and readers are encouraged to send their comments about this guide and the style and format of the JON to the EiC or members of the Editorial Board. As noted by previous Editors, “*close attention by authors to the many details in this guide will result in smoother and more timely processing of manuscripts.*”

Nancy Kokalis-Burelle
Editor-in-Chief, JON
Fort Pierce, FL
June 2013

The *Journal of Nematology*

The *Journal of Nematology* (ISSN 0022-300X; JON) is the official publication of the Society of Nematologists (SON) and publishes original papers on all aspects of basic, applied, descriptive, theoretical, or experimental nematology. Other categories of papers include reviews, abstracts of papers presented at annual meetings, and special publications as appropriate. Authors are encouraged to consult the Editor-in-Chief (EiC) about submissions of special publications.

The JON is published quarterly and subscription is included as part of SON membership. Nonmembers of SON are encouraged to publish in the JON.

How do I submit a manuscript?

By submitting a manuscript to JON, the authors attest that the manuscript has not been submitted elsewhere and (if accepted) will not be published in whole or in part elsewhere without consent of the JON Editorial Board. They also attest that all work contained is original and the manuscript has been approved by all authors and implicitly or explicitly by the responsible authorities where the work was carried out.

Research results submitted for publication should be reproducible. It is expected that critical experiments have been repeated in time or space and statistically validated, as appropriate.

Routine surveys, for example of nematode distribution or of germplasm collections for susceptibility to parasitic nematodes, are not acceptable unless they explicitly test or generate hypotheses.

Manuscripts must be submitted to the JON via the PeerTrack Essentials platform powered by Editorial Manager software at <http://www.editorialmanager.com/jon/>

Journal of Nematology Editorial Board

The JON is administered by an editorial board composed of an Editor-in-Chief (EiC) and eleven or more Editors. The EiC is appointed by the SON Executive Board and serves 1 year as Senior Editor and 3 years as EiC. The EiC nominates Editors to serve 3-year terms on the Editorial Board. As chair of the Editorial Board, the EiC is responsible for editorial policy and coordination of all SON publications. The EiC serves as a member of the SON Executive Committee, reports to the Executive Board, prepares an annual report for the Society describing the Journal's status, makes recommendations for changes, and publishes minutes of the annual Editorial Board meeting. Editors are responsible for reviewing and accepting manuscripts submitted for publication and for recommending changes in editorial style and policies of the Journal.

The primary responsibility of the Editorial Board is to ensure the overall quality and intellectual content of JON. The Editorial Board strives to ensure that articles are clearly written, unambiguous, and contain sound science of high quality.

Page Charges

There are no page charges for publication in the JON.

What is the format for JON?

All manuscripts shall be in English with U.S. spelling conventions. There are no page limitations or page charges for any publications in the JON.

A typical paper is composed of: a title page; abstract and keywords page; an introduction; materials and methods; results; discussion; literature cited; and supporting tables and figures. For short papers, results and discussion may be combined. Abstracts of papers presented at the Annual Meeting of SON are published in the JON. Only those abstracts submitted through the meeting web-site will be accepted. Authors must follow the style guidelines and time deadlines established by the meeting organizers. Other formats are permissible for invited articles. Authors should discuss this with the EiC.

Page layout: All submissions should be formatted on US letter or A4 paper, with 1-inch (2.5 cm) margins. Page numbers should be placed in the upper right-hand corner of each page, along with the first author's surname and JON. Double space all manuscript contents, except the contact (corresponding) author's name, address, phone number, fax number, and email address; these should appear on the upper left-hand corner of the title page (single spaced). Pages should be line numbered throughout. Continuous line numbering is a great convenience for editors and reviewers.

Choose a font that is easily read; the font size should be 12 pt. Do not use hyphenation for spacing or layout purposes. Do not use boldface type; if needed, boldface type will be marked by the technical editor. Use italic font for Linnaean binomials or trinomials. Use italic font for mathematical variables (x , y , etc.), but not constants (a , b , etc.). Although footnotes are used in tables, they should not be used in the text sections.

In a typical manuscript, the primary (first level) headings are MATERIALS AND METHODS, RESULTS, DISCUSSION and LITERATURE CITED. Note that the introduction does not have a heading. The primary headings should be centered and be in all capitals (as indicated). Headings at the next level consist of indented, italicized lowercase words, forming a short phrase or sentence that terminates with a colon (also in italics). Avoid using long subheadings; the best ones are less than one line when printed in JON. Words normally italicized, such as species binomials, do not receive any special formatting (such as an extra underline).

Technical style: In preparing a manuscript for JON, authors should endeavor to express their ideas in clearly written English. Style conventions established by JON for Terminology, Abbreviations, and Units of Measure should be followed.

Title Page

Place corresponding (contact) authors name, mailing address, phone and fax numbers, and e-mail address in upper left corner, single spaced. Use double space for everything else in the manuscript.

The next line is the title of the manuscript (in Title Case, centered, with no period at the end). The title should use strong key words and be brief, preferably not more than 100 characters, including spaces. Use scientific names for nematode species and do not include common names. For other organisms, use either scientific or common names. When scientific names are used in the title do not include the authorities. Do not append footnotes to the title.

The next line lists the authors, centered. Authors may spell out first names or use initials only. Author affiliations are indicated by numbered footnotes and should be numbered in order of appearance in the list of authors. If all authors have the same affiliation, it is not necessary to use footnotes.

Insert a line and place the text: Received for publication.

The next line lists footnote(s) with author institutional affiliations(s) and current address (if not the same). The titles of authors are optional (e.g., Graduate Assistant, Professor). Each address should begin on a new line, indented. Non-US addresses should indicate country.

The next line, indented, lists acknowledgments (if any), including support for the project, disclaimers and thanks to individuals.

The next line, indented, lists the email address of the corresponding author.

On the next line, indented, insert the following phrase: This paper was edited by

The next line, indented, contains a condensed running head. After the words Running Head, followed by a colon, provide a condensed title, also followed by a colon. Then give the last name of the first author in italics; both last names for two authors; et al. for more than two. The title and author names are limited to no more than 60 spaces.

Abstract Page and Key Words

The abstract page includes the abstract and the list of key words and begins with the indented subheading *Abstract:* Note that the colon is also italicized, like all colons in all JON subheadings. The abstract serves as the summary, written in past tense, one paragraph of no more than 1,300 spaces, and must be on a separate page, along with the key words. It should be self-explanatory and intelligible in itself and include the rationale for the study, objectives and topics covered, a brief description of methods, results, and conclusions. Do not include authorities for Linnaean binomials or trinomials, footnotes, statistical probability levels, or literature references.

Key words: The list of key words begins with the indented subheading and includes those key words appearing in the title. Include words or short phrases that would be useful in index retrieval systems. Choose key words thoughtfully, as they are the sole basis of the JON annual subject index. List key words alphabetically. Most key words should be in the singular form. Include both the binomial and common name of nematodes and hosts, common names of pesticides, experimental techniques (e.g., electron microscopy, modeling, electrophoresis), specific subjects (e.g., soil temperature, suppression), and general subject areas.

One or more of these terms should be included in the key words list:

behavior	interaction
biochemistry	management
biological control	method
cell biology	molecular biology
cytology	morphology
detection	physiology
diagnosis	plant disease loss
ecology	regulatory
entomopathogenic nematode	resistance
etiology	systematics
genetics	taxonomy
genomics	technique
host-parasitic relationship	ultrastructure

INTRODUCTION (OMIT HEADING FOR THIS SECTION)

The intent of the Introduction is to place the research described in the manuscript into a broader context and, with the obvious exception of a review article, is not intended to be a comprehensive review of the field. Authors should expect the readership to have a general understanding of nematology and nematological terms, but should explain specialist terms or concepts. Authors should cite prior research from their own and other scientists (see Literature Cited) to support their main contentions. Avoid statements and words such as “important,” “interesting,” and “novel” that make value judgments on the work. Brevity is encouraged. The Introduction should end with a statement of the overall and specific objectives of the research, and should not recapitulate the results.

The Introduction begins on a separate page and does not have a heading. The first line of each paragraph is indented. Subheadings would rarely be used in a typical research paper, but may be appropriate in a review or other type of article.

MATERIALS AND METHODS

The Materials and Methods section should provide sufficient detail to permit a skilled and knowledgeable researcher to repeat the work. Standard techniques can

simply be cited, even if small modifications have been made. Authors are strongly encouraged to cite the primary sources of methods, especially those published in JON. Style conventions established by JON for terminology, abbreviations, and units of measure should be followed. Authors are encouraged to consult the technical style glossary.

The Materials and Methods section begins directly after the Introduction (i.e., no page break), under the heading Materials and Methods, in capitals, centered on the page. The first line of each paragraph is indented and will frequently begin with a subheading.

RESULTS

The main purpose of the Results section, written in the past tense (except for taxonomic papers), is to provide narrative support for the Figures and Tables in which the actual results of the experiments are reported. Results not displayed in a figure or table are presented in narrative style. Literature citations are rare in the Results section, and neither materials and methods nor discussion should be included. The combination of Results and Discussion is permitted and is encouraged for short articles.

Results begins directly after Materials and Methods (i.e., no page break), under the heading RESULTS, in capitals, centered on the page. The first line of each paragraph is indented, and will frequently begin with a subheading.

DISCUSSION

The Discussion should provide the authors interpretation of the data, in context with the state of the art of the field presented in the Introduction, and also in light of the objectives listed in the Introduction. Authors should arrive at some conclusions and not merely repeat what was stated in the Results; the Discussion should ordinarily not refer to figures or tables, except perhaps to present a model or hypothesis. The points emphasized in the Discussion should be in accord with the title of the article. Authors are encouraged to be brief, to not over-interpret their findings, and to make clear when views expressed are opinion or conjecture.

The Discussion begins directly after Results (i.e., no page break), under the heading DISCUSSION, in capitals, centered on the page. The first line of each paragraph is indented and would typically not include subheadings.

LITERATURE CITED

Authors have an ethical responsibility to fairly and correctly attribute previous work by citation. In most cases, it is preferable to cite the primary literature

instead of a review. Authors should make every effort to cite only articles that are readily available and are particularly encouraged to cite work published in the JON.

References in Text: In the body of the manuscript, publications are cited using the name-year system, e.g., (Bird, 1996). In some instances, such as at the start of a sentence, or if the intent is to particularly stress the cited author's contribution, only the date is in parentheses: e.g., "Bird (1996) showed that" However, authors are encouraged to limit their use of this form of citation. To cite a publication with two authors, list both: e.g., (Bird and Kaloshian, 2003); with three or more authors use et al.: e.g., (Bird et al., 2003). Note the comma used after the author name(s) and the comma and period after et al. When multiple citations are listed in parentheses, they are listed in chronological order from oldest to most recent and separated by semicolons, for example, (Zuckerman, 1980; Bird, 1996). If two or more cited papers are from the same year, list the papers from that year alphabetically: e.g., (Bird, 2003; Bird and Kaloshian, 2003; Bird and Opperman, 2003; Bird et al., 2003). For two or more articles by the same author(s) in the same year use letters: e.g., (Houser, 1992a, 1992b). The same applies if two multiple-author citations are from the same year: e.g., (Bird et al., 2003a, 2003b). Note that in these cases, the years are separated by a comma rather than a semicolon. Some manuscripts are published by consortia and do not list individual authors. In those cases, the name of the consortium should be considered to be the author's name, e.g., (*C. elegans* Sequencing Consortium, 1998). On the rare occasions where the author of a legitimate published work is truly undisclosed, use "Anonymous" as the author's name.

Thus, a complex example that incorporates the aforementioned rules might be: (Zuckerman, 1980; Houser, 1992a, 1992b; Bird, 1996, *C. elegans* Sequencing Consortium, 1998; Bird, 2003; Bird and Kaloshian, 2003; Bird and Opperman, 2003; Bird et al., 2003a, 2003b).

Manuscripts that are in preparation or have been submitted for publication but not yet accepted should not be cited as references, either in the text or in Literature Cited. If authors wish to mention such information, it can be listed parenthetically in the text as unpublished data (abbreviated as "unpubl. data"). Making reference to unpublished material from sources other than the authors requires documented permission from the source, which must accompany the manuscript; an e-mail from the source of the information would normally suffice. Such personal communications should be listed parenthetically in the text with the initials, last name and affiliation of the communicator, e.g., (D. M. Bird, NCSU, pers. comm.).

LITERATURE CITED

The major subheading is capitalized and centered, and begins on a separate page. List references alphabetically

by authors' surnames. Alphabetical order is determined by the first author's surname (family name) and then, if necessary, by surnames of succeeding coauthors. When the author names are completely identical in two or more references, these references are sequenced by publication date (earliest to latest) and, if necessary, by the page numbers of articles published in the same journal. In rare instances where different authors share the same surname, it may be necessary to also consider the alphabetical order of the author initials. When citing multiple articles by the same author, list articles with one author before those with several authors. When author(s) are the same for articles published in the same year, use letters: e.g., 1987a, 1987b.

Each reference cited in the text (including figure legends, etc.) must be in the Literature Cited; the converse also must apply. Each citation should be checked against the original publication. Authors must pay precise attention to spelling, spacing, capitalization, indentation, and format in their literature citations. The first line of each citation is indented.

Citing a journal article:

Lohar, D. P., Schaff, J. E., Laskey, J. G., Kieber, J. J., Bilyeu, K. D., and Bird, D. McK. 2004. Cytokinins play opposite roles in lateral root formation, and nematode and rhizobial symbioses. *The Plant Journal* 38: 203-214.

In this example, note the following points:

- 1) All authors are listed (never use et al.) in the order in which they appeared in the original publication, with the surname, followed by all initials. Note the comma after the surname, periods and comma after initials, and space between initials.
- 2) The year given is the year of publication listed by the journal. In some cases this may differ from the year in which the article was actually published. In case of an article in press, give the best estimate of the year that the journal will list publication. Authors should be prepared to supply the JON editorial board with documented proof that a manuscript claimed as "in press" truly has been accepted.
- 3) The title should be given in sentence case. If the title contains a colon, the word after the colon should begin with a capital letter, even if not done so in the original reference. Do not use a capital letter after a dash.
- 4) Journal names must be spelled out in full. There is no period after the name of the journal.
- 5) The volume number is followed by a colon and then the inclusive page numbers. Note the lack of spacing. Generally the issue number within a volume is not given, but in rare cases in which all issues of a journal begin with page 1, it may be required: e.g., *Journal Name* 34(4):78-93. For "in press" articles, include as much information as is known (such as the volume

number). Page numbers can be added at the proof stage as they become known.

Citing a book:

Thorne, G. 1961. *Principals of nematology*. New York: McGraw Hill.

In this example, note the following points:

- 1) The format for author (or editor) name(s), date, and title are the same for journal articles (above).
- 2) List the place of publication, then the publisher. Do not use "Inc." or "Ltd." for a publisher, and for publishers with multiple locations, list only one city.
- 3) The number of total pages is not listed.

Citing a book chapter:

Herman, R. K., and Horvitz, H. R. 1980. Genetic analysis of *Caenorhabditis elegans*. Pp. 227-261 in B. M. Zuckerman, ed. *Nematodes as biological models*, vol. 2. New York: Academic Press.

In this example, note the following points:

- 1) The page range of the chapter is included, after the term "Pp." and is followed by the word "*in*" in italics.
- 2) The initials of the editor(s) come before the surname(s); note the spaces between initials.
- 3) Information about the volume (abbreviated "vol.") or edition ("ed.") number comes after the name of the book.

Citing electronic sources: In most instances, journals that are published only as electronic journals will have a bona fide citation and can be cited like a normal publication. Articles that do not have a true citation probably should not be cited. The Editor handling the manuscript (or EiC) can make format recommendations for cases that do not readily fit standardized JON rules. The following citation is to an electronic-only journal:

Scholl, E. H., Thorne, J. L., McCarter, J. P., and Bird, D. McK. 2003. Horizontally transferred genes in plant-parasitic nematodes: A high-throughput genomic approach. *Genome Biology* 4:R39.1-R39.12.

Similarly, many electronic resources, such as an online database, have been published in journals, and thus can be cited in the standard manner. For example, the widely used BLAST tools can be cited as:

Altschul, S. F., Gish, W., Miller, W., Myers, E. W., and Lipman, D. J. 1990. Basic local alignment search tool. *Journal of Molecular Biology* 215:403-410.

Another example of an on-line publication is WormBook, which is edited by a community rather than a single person and has no city for the publisher. A WormBook citation may be formatted as:

Eisenmann, D. M. 2005. Wnt signaling. (June 25, 2005). The *C. elegans* Research Community, ed. WormBook. doi/10.1895/wormbook.1.7.1, <http://www.wormbook.org>.

Information about the web sites actually queried (including the URL and date), or versions of computer programs or databases used, should rightfully be included in the Materials and Methods section.

Citing other sources: Authors should cite only those articles that are readily available, and should minimize the citation of theses, bulletins, company brochures and the like. Here are some examples of formatting for those types of articles:

Anonymous. 1945. Article title. Washington, DC: EPA Publications.

Jones, B. T. 1980. Article title. In P. L. Bond, ed. Title of larger work. Serial Publication 23:23-34.

Jones, B. T. 1987. Dissertation title. M.S./Ph.D. dissertation (or thesis), University Name, Place.

McDowell, R. I., Jr., Dewey III, F. R., and Resh, Jr., H.-T. 1985. Title. Publication and no., Name of Experiment Station, University (if needed), Place.

Teller, A. P., and Green, B. S. Title. Journal Name 28:561 (Abstr.).

TABLES

Like graphs, tables report data from multiple measurements and are most appropriate when the authors wish to show actual numerical values, to report data with no trends, or to present data with certain statistical comparisons. In most instances, short tables (i.e., those with a small number of cells) are to be avoided; those data are better reported as narrative in the Results. Each table should be self-explanatory without reference to the text.

Tables are numbered consecutively with an Arabic numeral based on the order that they are first mentioned in the text. The word Table is always spelled out in full. The rules for mentioning Tables in the text are the same as those for mentioning figures. For example: Table 1; (Tables 1,2), (Tables 1-4). However, unlike figures, tables should not be grouped together to make composites. Tables would typically not be mentioned in the Discussion.

The actual tables are presented immediately after the Literature Cited section, beginning on a new page, under the heading TABLES (in capital letters and centered on the page). Each table is on a separate page, but not a separate file (i.e., the tables are part of the text file for the manuscript).

Each table begins with a descriptive title. This is written in paragraph style, with the first line indented, and may be one or more sentences. Avoid inclusion of material in the table title or in column captions that would be more appropriate in footnotes. Linnaean binomials should be spelled out in full at first mention in the table title, or spelled out in a footnote if it must be abbreviated in the actual table.

A printed Journal page is 174 mm x 240 mm, arranged as two 85-mm-wide columns. Although tables should be designed with these dimensions in mind, the actual tables will be type set by the Journals printer so it is not necessary to scale them exactly. What is important, however, is that the numbers and symbols in the columns be clearly and unambiguously assigned to that column. For this reason, authors are strongly encouraged to use the table-making feature of your word processor, rather than inserting spaces or tabs. Do not insert any vertical lines.

It is important to distinguish the major parts of the table. Insert a single line to separate: 1) the table from the legend; 2) the table subheadings from each other; 3) subheadings from the body of the table; 4) and the body of the table from the footnotes.

Footnotes are used when their information will not fit into the logical structure of the table and the essential information is not readily available in the accompanying text. Superscript lowercase letters, e.g., ^{a,b,c}, are preferred signs directing readers to the footnotes of a table. The assignment of footnote letters to column headings is hierarchical from upper left to lower right. The first line of each footnote is indented, and each footnote ends with a period. The symbols *, **, and *** are reserved for statistical probability levels (do not use them as footnote symbols).

Authors should be thoughtful in the use of numerical values and units and should follow the Units of Measure and the Technical Style Glossary guides. Use exponents as appropriate, and round numbers to sensible values rather than expressing non-significant digits.

FIGURES

Good figures (graphs, line drawings, photographs, etc.) often are essential to create informative manuscripts, and properly designed figures are typically more useful to the reader than any other part of a paper. Poorly constructed figures, or those that convey little information, detract from the article's effectiveness. Authors are required to use good ethical judgment in the preparation of figures, particularly digital figures. Images must not be cropped or otherwise manipulated to obscure, move, or introduce any element germane to interpretation of the data. Although certain manipulations are acceptable, such as adjusting the brightness or color balance of an entire image, nothing should be done to any part of an illustration that does not affect all other parts equally. Exceptions to this policy (such as introducing false color to highlight a feature) are permitted only if the full consequences of that manipulation are explicitly described.

Authors concerned about detail being lost within a specific part of a figure should alert the editors and printer to this fact.

Figures are numbered consecutively with an Arabic numeral based on the order that they are first mentioned

in the text. The word Figure is spelled out in full at the start of a sentence or when used outside parentheses in any sentence. Use the abbreviation Fig. or Figs. followed by the number inside parentheses in the body of the text. For example: (Figs. 1,2), (Figs. 1-4). Where several subfigures are grouped together to make a composite figure, the subfigures are labeled with the figure number followed by a capital Roman letter (e.g., Fig. 1A). Each of the subfigures should be mentioned in the text before the next numbered figure is introduced. For example, it would be incorrect to mention Figure 3 before mentioning Figure 2D. There is no spacing between the letters of subfigures. For example: (Fig. 1A,B), (Fig. 1A-C), (Figs.1A,B; 2A). Figure (and Table) numbers should not be mentioned in the Discussion.

Figure legends: Each figure has a correspondingly numbered figure legend. Figure legends, with their figures, should stand alone, i.e., not require a reading of the manuscript to comprehend the figure. These are listed consecutively beginning on a new page entitled LEGENDS FOR FIGURES. The abbreviation Fig. followed by the number begins the actual legend (e.g., Fig. 1). Use a paragraph style for all figure legends in the same plate; indent the first line. All abbreviations and symbols within a figure should be explained within the legend. Linnaean binomials should be spelled out the first mention in figure legends.

Figure submission: Figures should be prepared as digital files and submitted with the text. Figures may be submitted in various formats, providing that: 1) the format is sufficiently common that the reviewers will be able to open the file. MS Word or PowerPoint files are generally acceptable, but if in doubt, Portable Document Format (.pdf) should be used; 2) the quality of the figures submitted for review purposes must be sufficiently high as to permit suitable review. Authors should also be mindful of file size. Exceptionally large files (>5 Mb) may have to be compressed for review in consideration of editors and reviewers ability to manage your manuscript files. File names should include the manuscript number, first author name, and the figure number. The resolution of these figures should be at least 900 dpi for line art; half tone images (photographs) should be at least 300 dpi.

Size: Figures should be designed with the printed Journal page dimensions of 174 mm x 240 mm, arranged as two 85-mm-wide columns in mind. Ideally, authors should exactly scale their figures to either one-column or full-page width. If the figures submitted do not conform to these dimensions, authors should indicate on the figure whether full-page width or one-column width is desired. Figures should not be submitted smaller than the final size desired. Because it is preferred that the figure legend be printed on the same page as the figure, authors should strive to make the height less than 240 mm.

Whenever it makes logical sense to group them, illustrations, graphs, and photographs should be combined and assembled into composite figures. Each subfigure, labeled A, B, C, etc., may be arranged across the page, down a column, or assembled into a composite plate. Because separation of subfigures by wide gutters attracts the readers eye to the empty space between the subfigures instead of the illustration, it is important that subfigures should be assembled as close to each other as possible without having them mistaken for a single figure.

Labeling: Lettering on illustrations should be of high contrast and at least 1 mm high at final print size. The location and color (black or white) of the letters should ensure that they can easily be read. The chosen font (ideally a sans-serif type such as Helvetica) and size (no smaller than 12 point) should be the same for all letters within a figure (except for italicized scientific names) and for all figures within the same manuscript. Large letters and bold type can overwhelm the data contained within a figure and are discouraged. Authors should pay attention to the effect that digitally resizing subfigures might have on the lettering. Subfigures should be labeled with uppercase A, B, etc., ideally in the upper left corner of the subfigure. Labels should be within the logical border of the figure so as not to introduce excessive white space.

Composite plates: Halftone images, such as photographs (digital or otherwise) should be combined and assembled into composite plates where possible. The size of each of the subfigures may be different from each other, but each subfigure must be square or rectangular. Each of the subfigures should be immediately adjacent to each other, without any white space; the printer will insert a 1-mm hairline between each. The final composite plate should conform to JON column- or page-width size.

Magnification: Size bars should be added to figures to indicate magnification when they are appropriate. Because figure size may change during reproduction, numerical values of reproduction (e.g., x100) may change during reproduction and therefore must not be used in figures or in figure legends.

Graphs: Graphs are used to present relational data characterized by a pronounced trend; tables are often more appropriate to report accurate numbers, report data with no trends, or present data with certain statistical comparisons. If practical, all graphs within the same manuscript should have the same size, format, scaling, and type style. Ideal graphs are slightly wider than they are high, but this rule should not be followed if lack of clarity results.

Labels in graphs should clearly state what was measured and in what units; the units should be in parentheses at the end of the label. Labels should be parallel to the axis, not perpendicular or askew.

All four sides of a graph should form a square. Do not use X- or Y-axis grid lines for line or bar graphs. All

segments of all lines (including axes and tick marks) should be distinct, and error bars should be easily readable. Tick marks along the axes should be used and should describe real intervals instead of being merely decorative. Identify some (but not all) of the tick marks. The axes should not extend beyond the range of data points and should not be thicker than the data lines, which are the focal points of the graph and are ideally twice as wide as the axis lines. The finest lines in a graph should be the error bars. Excessively heavy lines and letters will become exaggerated in thickness when reduced and should be avoided. All lines must be uniformly black.

Graphs within the same figure should be labeled A, B, etc. Linnaean binomials must be italicized. All letters and symbols should be distinct when the graph is printed at final size. Any symbol used within a graph to mark a data point should be one that is commonly typeset. Solid and hollow circles, triangles, and squares are best. In addition, use different styles of lines as well as different symbols for identifying different groupings of data. If space permits, lines may be defined within the graph instead of the figure legend, but the graph should maintain an uncluttered appearance.

Shading in bar graphs is desirable and can be best achieved by setting different levels of gray scale. If other patterns are needed, they should consist of solid black or line patterns rather than stippled dots. Three-dimensional graphs are acceptable only if the Z-axis contains information.

HOW WILL MY MANUSCRIPT BE PROCESSED?

All manuscripts are received by the EiC who assigns each to one of the Editors. The assigned Editor is charged with overseeing the review process, communicating to the author(s) the reviewers comments, deciding what revisions (if any) must be made to the manuscript, and deciding if the manuscript is acceptable for publication in the JON. See General Editing Procedures below for complete details.

REVIEW OF MANUSCRIPTS

All manuscripts submitted to the JON are reviewed by at least two peer reviewers and an Editor. Authors are encouraged to submit a list of up to six potential peer reviewers to assist the Editors. Suggested reviewers should not have a conflict of interest (such as being a recent or current collaborator, advisor/advisee, or member of the same institution) with any of the authors. They also may request that certain individuals not review a manuscript. This review process assures readers of the highest professional quality of articles published and ensures that all articles satisfy the following questions:

- 1) Is the information new and significant? Is the work original?
- 2) Were the experiments well planned? Were adequate experimental techniques used?
- 3) Were the experiments repeated in time or space and is there demonstration of reproducibility?
- 4) Is the discussion relevant, and are the conclusions justified by the data?
- 5) Is the writing clear, concise, and appropriately organized? Are there sections that should be expanded, condensed, or deleted?
- 6) Are all the tables and figures of high quality and properly labeled? Do they materially aid the text? They should not be too complex, repetitive of the text, or contain extraneous material.
- 7) Is the form and style of the manuscript proper for the Journal? In particular, are the literature citations presented correctly and all cited in the text?

Emphasis of reviewers should be on assessing the scientific merit of the work. You should document and substantiate substantive criticisms. Keep in mind that a manuscript is a privileged document. Protect it from exploitation, and endeavor to retain your anonymity. In particular, do not discuss the manuscript with colleagues or the author(s), as your opinions may differ from those of the other reviewer(s) and the Editor, and the author(s) may be misled by your discussions.

Reviewers are given 2 to 3 weeks to review manuscripts before electronically submitting their reviews and recommendations. The assigned Editor may also suggest revisions to the manuscript to the author. Authors have 2 months to make revisions and return manuscripts to the assigned Editor. A manuscript returned after 2 months may be considered as a new submission.

Revised manuscripts are accepted for publication by the assigned Editor who notifies the EiC that revisions are complete, and the manuscript is ready for publication. The EiC then coordinates preparation of page proofs with authors, the technical editor, and the printer.

PAGE PROOFS

Proofs (including figure proofs) are sent to the corresponding author along with the Copyright Form (.pdf). It is the responsibility of authors to carefully read the proofs and to return them promptly to the Technical Editor (within 48 hours of receipt). Authors should answer all questions from the printer and technical editor, which will be found on the proof cover sheet or marked in the margins of the proofs.

GENERAL EDITING PROCEDURES

Receipt and Transmission to Editors: The Editor-in-Chief (EiC) receives all manuscripts, and chooses an Editor

based on the general topic. The chosen Editor will select two external reviewers. If extensive corrections are required (e.g., to bring the manuscript into JON style), manuscripts may be returned to the author for revision prior to being sent out for review.

Receipt by Editors: Upon receipt of a manuscript from the EiC, the Editor should read the manuscript sufficiently thoroughly to select two suitable reviewers. In most instances, this read is expected to be fairly quick, as at this point Editors are not attempting to judge the work presented in the manuscript. If an Editor feels that a manuscript is far outside their area of expertise, they should contact the EiC. Initial delays in processing manuscripts come from difficulties in identifying willing reviewers. The identity of reviewers must remain confidential unless the reviewer chooses to reveal their identity to the authors. Editors should ensure that any files uploaded by reviewers do not contain any personal identification unless the reviewer chooses to reveal their identity.

If after three weeks the Editor has not received a review, prompt the reviewer to submit their reviews. If the reviewer does not respond to this prompt, then the manuscript should be immediately forwarded to a new reviewer chosen by the Editor. If a reviewer has taken an inordinately long time (more than six weeks), then the Editor can serve as the second reviewer, but this procedure should be kept to a minimum. A complete list of reviewers and a log of the performance and timeliness of the selected reviewers is maintained in the PeerTrack system. Editors should not overburden particular reviewers, especially those who are exceptionally efficient.

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Although the identity of the Editor is known to the authors, confidentiality of peer reviewers is an established tradition in the JON review process and under no circumstances are the names of reviewers to be given to authors or other reviewers. Do not inadvertently reveal identities in e-mail address or 'cc' lines, for example. Because most manuscripts will be handled as electronic files, reviewers often will use the 'Track Changes' feature of MS Word to "mark" the manuscript. Reviewer instructions request that reviewers ensure that this feature is configured so as not to reveal their identities; any revisions that do show identity should not be returned to the author(s).

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INSTRUCTIONS FOR TAXONOMIC DESCRIPTIONS

GENERAL PRINCIPLES

International code: Manuscripts proposing new species must conform to requirements of the International Code of Zoological Nomenclature (<http://www.nhm.ac.uk/hosted-sites/iczn/code/>).

If in the future JON becomes solely an open-access online publication, and to ensure conformity with the regulation of the International Commission on Zoological Nomenclature, the following requirement will be required for electronic publication of taxonomic descriptions:

- 1) The work must be registered in ZooBank (<http://zoobank.org/>) before it is published. The work itself must state the date of publication and contain evidence that registration has occurred. The ZooBank registration must state both the name of the electronic archive intended to preserve the work and the ISSN or ISBN associated with the work.
- 2) The original publication must be archived somewhere other than the publisher's website.

Taxonomic authority: With the first usage of the name of each taxonomic category, cite the taxonomic authority and year of authorship for that name. Examples are as follows: *Meloidogyne incognita* Kofoed and White, 1919; *Globodera pallida* Stone, 1973. In the case of changed combinations, the original author should

also be given, e.g., *Pristionchus maupasi* (Potts, 1910) Paramonov, 1952. References for authorities should be included in the Literature Cited. The first usage of a newly proposed species name should be acknowledged as in the following example: *Meloidogyne incognita* n. sp. Additional newly proposed taxonomic categories should be similarly acknowledged as in the following example: Heteroderidae n. fam.

General organization for taxonomic descriptions: The overall organization of the article is recommended as follows:

ABSTRACT KEY WORDS

INTRODUCTION (omit heading for this section)

- **Content:** Provide the taxonomic context and literature background relevant to the new species. It is advisable to include some statement justifying the decision to designate a new species.
- **Etymology:** It is recommended that at the point of initial reference to a new species name (often the Introduction), the etymology of the name be given. Typically this can be done parenthetically or as a footnote. Alternatively, the etymology can be given as a footnote in the Description: because the etymology is most suitably included in this section, avoiding use of the binomial until this part of the manuscript would facilitate proper introduction of the new name.

MATERIALS AND METHODS

- **Conditions and practices for making measurements:** To the extent required for repeatability, an explanation must be given of the conditions under which the measurements were taken (specimens live, heat relaxed, fixative). Where researchers might differ in their methods for taking a measurement (e.g., pharynx length or spicule length), it is helpful to specify the approach used in this particular publication.

DESCRIPTION

- **Kinds of individuals represented:** A holotype must be designated. Designation of an allotype (the opposite sex of the holotype) is no longer regulated by the ICZN and is therefore meaningless and should not be used; the specimen is just a paratype of the opposite sex of the holotype. After the single holotype has been labeled, any remaining specimens of the type series should be labelled as paratypes. With rare exceptions, descriptions must include females/hermaphrodites and, where available, males. Including juveniles, dauers, eggs, and additional stages is generally optional but may be required if they are pertinent to

diagnostics (e.g., cysts, eggs, or infective stages of some parasites).

- What to present about each kind: For each kind of individual, morphometrics are to be followed by a narrative description. Morphometrics are best presented in a table. Where it is necessary to use abbreviations in the table, define these abbreviations; this could be done in footnotes. What specific morphometrics and details of the description must be included will vary with the taxon and what is pertinent to diagnostics within that group. Contrary to previous JON requirements, it is preferred that the narrative be in a concise but not telegraphic style. Appropriate supporting figures should be referenced within the narrative.
- Numbers of specimens: With few exceptions (rare parasites or material from habitats of limited access), species descriptions should be based on a minimum of 10 females/hermaphrodites. Where available, males and any additional kind of individuals represented (see above) should be described from at least 10 individuals.
- Analysis of variance: The above should be presented with range, mean, and a statistical measurement of variability.
- Subheadings to use under “Description”:
 - Females or hermaphrodites (required)
 - Males (required if present)
 - Juveniles, eggs, additional stages (generally optional)
 - Molecular data (optional) – if included, data should at least be comparable to those of other species in the taxonomic group, if such data are available, so that species diagnoses can be supported by genetic or phylogenetic information.
 - Type locality and habitat (required) – generally the type locality needs to be presented in such a way that the precise location can be identified and revisited for future study. In this regard GPS coordinates are preferable but optional. In the case of parasites, the host and host tissue must be identified if possible.
 - Type designation and deposition (required) – it is required that type specimens be deposited in one or more curated, broadly accessible taxonomic collections. The number of specimens deposited at each site should be indicated, and it is helpful to include the accession numbers for the material.
 - Biology and ecology (optional) – a description of distribution, ecological associations or behaviors such as dormancy stages, feeding, or mating is helpful and particularly so where these features are particular to certain species. In the case of parasites, it is desirable to include information on host-parasite relationships. Where possible, mating tests with putatively closely related species

can also strengthen hypotheses of species identities, although such tests are optional and, by nature, subjective.

- Differential diagnosis (required) – a description of how the new species is distinguished from other species must be presented. For conciseness, often the narrative can be supplemented by a table showing comparisons.

DISCUSSION

- Typically the discussion places the significance of the findings in a broader context. Generally it is appropriate to suggest hypotheses of relationships/phylogenetics.

LITERATURE CITED

FIGURES

- Illustrations of morphology (required): drawings should convey all the diagnostic features of the species in the context of the entire organism.
- Light micrographs (optional): light micrographs of key features are highly recommended as a supplement to illustrations. Through-focus video light microscopy can also provide a useful supplement to illustrations and can be referenced online.
- Scanning electron micrographs (SEM) and other imaging tools (optional): SEM and other imaging tools that contribute to species descriptions are encouraged.

TERMINOLOGY

Biological nomenclature: The genus and species of each organism must be identified by its Linnaean binomial, which should be *italicized* and fully spelled out for each first use in text, figure captions and table titles. As applicable, additional information may be included to identify authority, cultivar or varietal names, breed, race, or accession number. If the word “cultivar” (or “cv.”) precedes the actual cultivar name (e.g., soybean cv. Kirby, or the soybean cultivars were Forrest, Picket, and Hartwig), the cultivar name is not bounded by quotation marks. Use single quotation marks if the cultivar name immediately follows the botanical name (e.g., *Arachis hypogaea* ‘Florunner’). Complete authorities and dates are required in taxonomic and systematic papers, but they would be included at the editor’s discretion in other manuscripts. When new names of nematodes are introduced, the recommendations of the *International Code of Zoological Nomenclature* (2000) should be strictly applied, especially regarding type designation and statements indicating where such type material is deposited. Although JON is available in print and is therefore deposited in libraries, it is recommended that new Linnaean binomials be registered in ZooBank (<http://zoobank.org>), as required by the International

Commission on Zoological Nomenclature for digital taxonomic publications.

If common names are used for nematodes, they should conform to the names listed below for common names for plant-parasitic nematodes. Common crop names should not end in the letter “s” (e.g., “oat” not “oats”), although the plural form is appropriate for seed of each crop (e.g., soybeans, peanuts). If commonly accepted model organisms are mentioned (e.g., *Arabidopsis*, *C. elegans*, *Medicago*, etc.), it is correct not to italicize these names, as they are not intended to be Linnaean binomials. However, as with all organisms mentioned in JON, the Linnaean binomial must be spelled out at the first use (e.g., *Arabidopsis thaliana*, *Medicago truncatula*).

COMMON NAMES FOR NEMATODES

JON requires that the full Linnaean binomial be given for all nematode species mentioned. But, as long as it is explained, the use of common names, or even an abbreviation, is also permitted. For example: *Meloidogyne* spp. (root-knot nematode: RKN). However, authors should be judicious in using common names and only do so when it improves clarity to the wider readership. There are several points to consider in electing to use a common name:

- 1) Is the common name likely to be recognized across or beyond the narrow discipline of the paper? For example, home gardeners are likely to have heard of root-knot nematodes, and soybean farmers will know about soybean cyst nematode. A similar case might be made for dog heart-worm (*Dirofilaria immitis*) or Guinea worm (*Dracunculus medinensis*). But the same could probably not be said of *Romanomermis culicivorax* and so, although likely known to many JON readers, assigning a common name to this species would be discouraged.
- 2) Does using the common name convey some information that might not be readily apparent from the binomial? For example, calling *Globodera* spp. “potato cyst nematode” might help the flow of the writing if one were talking about host preference.
- 3) Is the common name ambiguous? Some names are applied to multiple genera (e.g., *Cactodera*, *Globodera* and *Heterodera* have all been called “cyst nematodes,” and *Criconea* and *Mesocriconea* both have been called “ring nematode”). In some instances, an author may intend the redundant term to be inclusive of the different species, but not in other cases.
- 4) What is the precedent in using the common name? Although some generic common names have little meaning or have only restricted application to a

genus, long-standing use has legitimized them (e.g., stunt nematode for *Tylenchorhynchus* spp.)

The coining of common names is permissible. Priority in providing a common name for a new species rests with the describer. Suggested sources for the common name include: geographic location for a species thought to have a restricted range (e.g., Columbia root-knot nematode for *M. chitwoodi*); host plant (e.g., citrus nematode for *T. semipenetrans*); morphological character (e.g., awl nematode for *Dolichodorus* spp.); specific symptom; or translation of the specific epithet. However, as many nematodes are polyphagous, geographically widespread, or have no symptomatic effects on plants, a rigid system is impossible to institute.

Listed below are “officially” designated common names for plant parasitic nematodes.

Genetic nomenclature: Authors naming strains, genes, alleles, loci identified as DNA polymorphisms, and molecular clones should follow the guidelines specified in vol. 26, pp. 138-143 of JON.

Nematological phrases and terminology: A number of terms are used synonymously in the broader nematology literature, most notably juvenile and larva, hypodermis and epidermis, and pharynx and esophagus; an etymological and historical discussion of the use of these terms has been presented by Bird and Bird (1991). JON authors are free to choose which of these terms is most appropriate in their manuscript, providing they are consistent. The name of plant diseases caused by nematodes should not include the word disease (e.g., “red ring of palm” is preferred to “red ring disease;” “pinewilt” is preferred to “pinewilt disease”).

ABBREVIATIONS

Abbreviations should be used to improve the flow and clarity of the manuscript and those listed in the table below can be used in JON with no explanation. Units of measure should be used without explanation, but ensure that the correct abbreviation is used. Common Latin abbreviations (such as i.e., e.g., etc.) also may be used; NB, these are not italicized. The coining of abbreviations by authors is permissible, but it is preferred that authors keep this to a minimum. Coined abbreviations should be used more than twice in the manuscript. Spell out in full the word to be abbreviated at the first use and place the abbreviation in parentheses immediately afterwards. Use the abbreviation after that except at the beginning of a sentence, where the complete phrase must be written out. Do not add an “s” to make abbreviations plural; abbreviations are both singular and plural as written.

Common names for plant-parasitic nematodes

Where two names are listed, the first name should be afforded priority.

Anguina spp.: seed and leaf gall nematodes, seed-gall nematodes

A. agrostis (Steinbuch) Filipjev: bentgrass nematode

A. tritici (Steinbuch) Filipjev: wheat cockle nematode, wheat gall nematode

Aphelenchoides spp.: bud and leaf nematodes, foliar nematodes

A. arachidis Bos: testa nematode

A. besseyi Christie: rice white tip nematode, strawberry bud nematode, summer crimp, summer dwarf nematode

A. fragariae (Ritzema Bos) Christie: spring crimp nematode, spring dwarf nematode, strawberry bud nematode

A. ritzemabosi (Schwartz) Steiner and Buhrer: chrysanthemum nematode

Belonolaimus spp.: sting nematodes

B. longicaudatus Rau: sting nematode

Bursaphelenchus cocophilus (Cobb) Goodey: coconut palm nematode, red-ring nematode

Bursaphelenchus xylophilus (Steiner and Buhrer) Nickle: pinewood nematode

Cacopaurus pestis Thorne: walnut nematode

Cactodera spp.: cyst nematodes

C. cacti (Filipjev and Schuurmans-Stekhoven) Krall and Krall: cactus cyst nematode

C. weissii (Steiner) Krall and Krall: knotweed cyst nematodes, smartweed cyst nematode

Criconea spp.: ring nematodes

Ditylenchus spp.: stem and bulb nematodes

D. destructor Thorne: potato knot nematode

D. dipsaci (Kuhn) Filipjev: stem and bulb nematode, alfalfa stem nematode

D. africanus Wendt, Swart, Vrain and Webster: peanut pod nematode

Dolichodorus spp.: awl nematodes

D. heterocephalus Cobb: awl nematode

Globodera spp.: round-cyst nematodes

G. pallida (Stone) Behrens: white potato cyst nematode

G. rostochiensis (Wollenweber) Behrens: golden nematode, golden potato cyst nematode

G. tabacum (Lownsbery and Lownsbery) Behrens: tobacco cyst nematode

G. virginiae (Miller and Gray) Behrens: horsenettle cyst nematode

Gracilacus spp.: pin nematodes

Helicotylenchus spp.: spiral nematodes

H. dihystra (Cobb) Sher: spiral nematode

H. multicinctus (Cobb) Golden: banana spiral nematode, Cobb's spiral nematode

Hemicriconemoides spp.: false-sheath nematodes

Hemicycliophora spp.: sheath nematodes

H. arenaria Raski: sheath nematode

Heterodera spp.: cyst nematodes

H. avenae Wollenweber: cereal cyst nematode, oat cyst nematode

H. betulae Hirschmann and Riggs: birch cyst nematode

H. carotae Jones: carrot cyst nematode

H. cruciferae Jones: cabbage cyst nematode

H. cyperi Golden, Rau and Cobb: nutgrass cyst nematode

H. fici Kirjanova: fig cyst nematode

H. glycines Ichinohe: soybean cyst nematode

H. goettingiana Liebscher: pea cyst nematode

H. humuli Filipjev: hop cyst nematode

H. lespedezae Golden and Cobb: lespedeza cyst nematode

H. schachtii Schmidt: sugarbeet cyst nematode

H. trifolii Goffart: clover cyst nematode

H. zae Koshy, Swarup and Sethi: corn cyst nematode

Hirschmanniella oryzae (van Breda de Haan) Luc and Goodey: rice root nematode

Hoplolaimus spp.: lance nematodes

H. galeatus (Cobb) Filipjev and Schuurmans Stekhoven: lance nematode

H. columbus Sher: Columbia lance nematode

Longidorus spp.: needle nematodes

Meloidodera spp.: cystoid nematodes

M. charis Hopper: mesquite cystoid nematode

M. floridensis Chitwood, Hannon, and Esser: pine cyst nematode

Meloidogyne spp.: root-knot nematodes

M. arenaria (Neal) Chitwood: peanut root-knot nematodes

(Continued)

Continued.

Where two names are listed, the first name should be afforded priority.

- M. camelliae* Golden: camellia root-knot nematode
M. carolinesis Eisenback: blueberry root-knot nematode
M. chitwoodi Golden, O'Bannon, Santo, and Finley: Columbia root-knot nematode
M. enterolobii Uang and Eisenback: pacara earpod tree root-knot nematode
M. exigua Goeldi: coffee root-knot nematode
M. graminis (Sledge and Golden) Whitehead: grass root-knot nematode
M. hispanica Hirschmann: Seville root-knot nematode
M. hapla Chitwood: northern root-knot nematode
M. incognita (Kofoid and White) Chitwood: southern root-knot nematode
M. javanica (Treub) Chitwood: Javanese root-knot nematode
M. konaensis Eisenback, Bernard, and Schmitt: Kona coffee root-knot nematode
M. lusitanica Abrantes and Santos: olive root-knot nematode
M. megatyla Baldwin and Sasser: pine root-knot nematode
M. naasi Franklin: barely root-knot nematode
M. nataliei Golden, Ross, and Bird: Michigan grape root-knot nematode
M. paranaensis Carneiro, Carneiro, Abrantes, and Almeida: Paraná coffee root-knot nematode
M. partityla Kleynhams: pecan root-knot nematode
M. pini Eisenback, Yang and Hartman: sand pine root-knot nematode
M. platani Hirschmann: sycamore root-knot nematode
M. querciana Golden: oak root-knot nematode
M. suginamensis Toida and Yaegashi: Suginami root-knot nematode
M. thamesi Chitwood: Thames's root-knot nematode
Merlinius spp.: stunt nematodes
Mesocriconema spp.: ring nematodes
M. ornatum (Raski) Loof and De Grisse: peanut ring nematode
M. xenoplax (Raski) Loof and De Grisse: peach ring nematode

Nacobbus spp.: false root-knot nematodes
N. aberrans (Thorne) Thorne and Allen: false root-knot nematode

Orrina phyllobia (Thorne) Brzeski: nightshade gall nematode

Paratrichodorus spp.: stubby-root nematode
P. minor (Colbran) Siddiqi: stubby-root nematode
Paralongidorus spp.: needle nematodes
Paratylenchus spp.: pin nematodes
Pratylenchoides spp.: false-burrowing nematodes
Pratylenchus spp.: lesion nematodes
P. alleni Ferris: Allen's lesion nematode
P. brachyurus (Godfrey) Filipjev and Schuurmans Stekhoven: lesion nematode
P. coffeae (Zimmermann) Filipjev and Schuurmans Stekhoven: coffee lesion nematode
P. penetrans (Cobb) Filipjev and Schuurmans Stekhoven: lesion nematode, meadow nematode
P. scribneri Steiner: Scribner's lesion nematode
P. thornei Sher and Allen: Thorne's lesion nematode
P. vulnus Allen and Jensen: boxwood lesion nematode, walnut lesion nematode
P. zaeae Graham: corn lesion nematode
Punctodera punctata (Thorne) Mulvey and Stone: grass cyst nematode

Radopholus spp.: burrowing nematodes
R. similis Cobb: banana burrowing nematode, burrowing nematode
Rotylenchulus spp.: reniform nematodes
R. reniformis Linford and Oliveira: reniform nematode
R. parvus (Williams) Sher: reniform nematode
Rotylenchus spp.: spiral nematodes
R. buxophilus Golden: boxwood spiral nematode

Scutellonema spp.: spiral nematodes
S. bradys (Steiner and Lehigh) Andrassy: yam spiral nematode
Subanguina radicicola (Greeff) Paramonov: grass root-gall nematode

Trichodorus spp.: stubby-root nematodes
Tylenchorhynchus spp.: stunt nematodes
T. claytoni Steiner: tobacco stunt nematode
Tylenchulus semipenetrans Cobb: citrus nematode

Xiphinema spp.: dagger nematodes
X. americanum Cobb: American dagger nematode
X. chambersi Thorne: Chambers's dagger nematode
-

Common abbreviations

a.i.	active ingredient(s)
abstr.	abstract
bp	base pair(s)
cDNA	complimentary DNA
CFU	colony forming unit(s)
cv.	cultivar
d	day(s)
diam.	diameter
DNA	deoxyribonucleic acid
ed.	edition
EDTA	ethylenediaminetetraacetic acid
Eq.	equation
EST	expressed sequence tag(s)
Fig.	figure
g	gravity
ha	hectare(s)
hr	hour(s)
i.d.	inside diameter
IJ	infective juvenile(s)
J	juvenile(s)
J1, J2 etc	first stage juvenile(s), second stage juvenile(s), etc.
kb	kilobase pair(s)
L	Larva(e)
L1, L2, etc.	first stage larva(e), second stage larva(e), etc.
min	minute(s)
mon	month(s)
nt	nucleotide(s)
o.d.	outside diameter
PAGE	polyacrylamide gel electrophoresis
PCR	polymerase chain reaction
Pf	final nematode population density
Pi	initial/preplant nematode population density
Pm	midseason nematode population density
publ.	publication
Rf	reproduction factor
RFLP	restriction fragment length polymorphism
RNA	ribonucleic acid
rRNA	ribosomal RNA
RT-PCR	reverse transcription PCR
sec	second(s)
SSR	simple sequence repeat(s)
UV	ultraviolet
wk	week(s)
yr	year(s)

multiplication in units of measure. For example, light intensity could be expressed $\mu\text{E}\cdot\text{s}^{-1}\cdot\text{m}^{-2}$. In other cases, using the common derived SI units will be clearer. For example, use joule (J) instead of $\text{kg}\cdot\text{m}^2\cdot\text{s}^{-2}$.

Write out units that are not preceded by a number (e.g., the number of cysts per cubic centimeter of soil increased with time). There are no plural forms for unit abbreviations, e.g., ml (not mls). Spell out numbers at beginning of sentence (e.g., four milliliters) and if a number is not specified, use “several” milliliters (i.e., spelled out, not abbreviated). Twenty-five milliliters was (not “were”) added to the solution (because all 25 ml are dumped in at once; the volume is considered as an entire unit of measurement).

Include a space between the numeral and the unit of measurement (e.g., 1.2 g, 3 ml, 1.2 g/liter). There are several exceptions (e.g., g, °C – degrees Celsius, 16S).

Common unit abbreviations

bp	base pair	cm	centimeter
d	day	g	gravity (note <i>italic</i>)
ha	hectare	g	gram
hr	hour	kb	kilobase
kg	kilogram	km	kilometer
liter	always spell out in full	ml	milliliter
m	meter	min	minute
mon	month	sec	second
wk	week	yr	year

$\log x$, $\log (x + 1)$, $\log_{10} x$ (note spacing). In text....“were transformed by $x^1 = \log_{10} (x + 1)$ before analysis,” “...were transformed by $\arcsin (\sqrt{x})$ before analysis” (not...“were log-transformed ($\log_{10} [x + 1]$) or $\arcsin$ transformed”).

$[^3\text{H}]$ leucine (no hyphen or space), sodium $[1\text{-}^{14}\text{C}]$ acetate.

1.3×10^{-4} (note spacing)

Decimal Fractions and Multiples

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

UNITS OF MEASURE

Use the metric system with decimal fractions and multipliers. Basic SI units (meter, kilogram, etc) may be used, but use liter for volume and degrees Celsius (°C) for temperature. Specialized units, such as S – Svedberg unit (for sedimentation coefficient) or E – Einstein (as a unit of light irradiance) should be used where appropriate.

To express multiple units, different styles are permitted so as to maximize clarity in each instance. To indicate division between two units, a solidus (“/”) should normally be used. Examples include $\mu\text{g}/\text{ml}$ and m/s^2 . Where multiple units are used, it will sometimes be appropriate to use “bullets” to indicate

Basic SI units

Physical Quantity	Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

Common derived units

Physical Quantity	Unit	Symbol
Frequency	hertz	Hz
Energy	joule	J
Force	newton	N
Pressure	pascal	Pa
Power	watt	W
Electric charge	coulomb	C
Electric potential difference	volt	V
Electric resistance	ohm	Ω
Electric conductance	siemens	S
Electric capacitance	farad	F
Magnetic flux	weber	Wb
Inductance	henry	H
Magnetic flux density (induction)	tesla	T

TECHNICAL STYLE GLOSSARY

Apostrophes: used to show possession, not to show plural form of abbreviations.

Commas: Serial commas should be used in lists, as in common American usage: “genetic, morphometric, and behavioral...” instead of “genetic, morphometric and behavioral...”

Dates: 1992-95, June 1995, 15 June 1995.

Degrees: Ph.D., M.A., M.S., M.Sc.

Enumeration: Within text, use (i), (ii), (iii), (iv), etc., not 1), 2), 3), etc.

Hyphens: Used with compound adjective forms, including those with numbers:

2.5-cm-diam. core

5- to 10-cm deep

2-wk-old seedlings

60-kg weight

9- x 16-cm plastic pots

250-ml bottle

5-cm-diam. pots

(use lowercase letters after hyphens).

Other hyphenated words: degree-day, light-year

Latin phrases not italicized: in vivo, in vitro, sensu, per se, in situ.

Light intensity units: $\mu\text{mol}\cdot\text{s}^{-1}\cdot\text{m}^{-2}$ or $\mu\text{E}\cdot\text{s}^{-1}\cdot\text{m}^{-2}$

Magnification: x200 (note spacing and that x precedes magnification value. Use the multiplication symbol or a sans serif (e.g., Helvetica letter x).

Miscellaneous: “As described previously” implies that the said information was described in a previous paper and must be accompanied by a literature citation.

“Which” and “that” are often used incorrectly. *That* should be used as the relative pronoun introducing a restrictive clause. *Which* should be used to introduce a nonrestrictive clause, usually preceded by a comma (e.g., this is the nematode that I found yesterday. This nematode, which I found yesterday, has not been identified.)

“Compared to” is used to show similarity (e.g., “You can compare my copy to the original”). “Compared with” is used to show difference and similarity (e.g., “His work cannot compare with mine.”)

“Was” and “were” - a total was, data were, either was.

Tris buffer

Gram stain

petri dish (lower case “p”)

gram positive

pipet

Parafilm

Molecular weight and daltons: The molecular weight of protein A is 74,000 (not 74,000 Da) or the molecular mass of protein A is 74,000 Da. The term “molecular weight” is considered a synonym for “relative molecular mass,” which is unitless. In some instances, the term amu (atomic mass unit) may be appropriate.

Nematicides: Use generic names when available; otherwise use capitalized trade names followed by their ingredient. Do not use trademark symbols. Nematicide doses should be reported as amount of active or technical material applied per unit area (for field use) or concentration for in vitro studies. The chemical formulation should be given and method of application clearly stated.

Nested parentheses: Use ([]), except for taxonomic authorities, in which case use (()).

Numbers: Spell out numbers lower than 10 except when used with units of measure; use numerals for 10 and above (e.g., two plants, 10 plants, 4 ha, 10 ha, twofold, 10-fold). An exception to this rule is a number at the beginning of a sentence, which is always spelled out. If numbers are spelled out, the unit of measure should also be spelled out (“Fifteen percent” at beginning of sentences).

Use % with numbers, “percentage” without numbers, for example: 13%, but use the word “percentage” when there is no number, e.g., a smaller percentage; 32%, 43%, and 56%. Use “between 3% and 5%,” “from 3% to 5%.” Note: A range of percentage is expressed with the symbol [%] following each value to eliminate any ambiguity as to whether the first number represents simply a number or a percentage; also note closed-up space between the number and % symbol.

Fifteen percent of the samples were contaminated (note the plural verb “were”; the subject of the sentence

is not singular “percent” but the implied “fifteen samples of 100 samples”). But, “Fifteen percent was contaminated.”

Use commas in numbers of four digits or more (1,000 and 1,000,000).

Do not use the symbol # as an abbreviation for number; abbreviate “no.” in tables or figures, or in rare instances in text.

The words “number,” “total,” as well as actual numerical quantities and fractions take either singular or plural verbs according to their meaning. For example, “The number of complaints has been increasing,” “A number of changes have been made.”

When discussing quantities in technical writing, use “more than” rather than “over.” For example, “A total of more than 16 species was isolated. . .”

When numbers are less than one, a zero should precede the decimal marker, e.g., 0.3, not .3.

When using $\pm$, do not enclose in parentheses, e.g., 34.2 ± 0.3 , not $34.2(\pm 0.3)$.

Operator signs and spacing: = word, = 2, < 12, + 1 SE, $\pm$ 400.

Solidus (slash) – The main use of the solidus “/” is as a symbol for the mathematical operation of division. Do not use as a substitute for the comma, hyphen, or full expression. Use “per” without numbers/numerals (e.g., “a few eggs per gram”) and “/” with numerals (e.g., 0.18 kg/ha).

Proprietary materials and apparatuses: Follow the proprietary name with the manufacturer’s name and address in parentheses (city and state or city and country outside the United States), e.g., QIAquick (Qiagen Inc., Valencia, CA) PCR Purification kit.

Quotation marks: Commas or periods go inside quotation marks, except for the names of cultivars, in which case any comma or period would always be outside single quotations, e.g., *Lycopersicon esculentum* ‘Rutgers’.

Ranges: Use the connecting word “to” rather than a hyphen, e.g., 21°C to 28°C. If the range is given in parenthesis or in a table, use a short dash.

Restriction endonucleases: Eco RI, Bam I, Hind III, Sau 3A (note spacing and lack of italicization).

Single words: cheesecloth, germplasm, preemergence, postemergence, preincubated, pretreated, nonspecific, nonparasitic. Use “nontreated,” “noninoculated,” and “noninfected” (note the prefix non- is not hyphenated when combined with most words).

Soil identification and types: All soils should be identified according to the U.S. soil taxonomic system the first time each soil is mentioned. Give the series name in addition to the family name. See: *National Soil Taxonomy Handbook* (U.S. Department of Agriculture, 1982-1986) and in *Keys to Soil Taxonomy* (Soil Management Support Services, 1985).

(x% sand, y% silt, z% clay; n% organic matter; pH a.b). Note semicolons. x + y + z must equal 100.

Some abbreviations commonly used in statistics and denotation of those to be typeset in italics:

$\bar{X}$	Arithmetic mean
χ^2	Chi-square
r	Correlation coefficient
R^2	Coefficient of multiple determination
r^2	Coefficient of simple determination
CV	Coefficient of variation
df	Degrees of freedom
LSD	Least significant difference
R	Multiple correlation coefficient
NS	Not significant
α	Probability of type I error
β	Probability of type II error
b	Regression coefficient
n	Sample size
SE	Standard error of mean
SD	Standard deviation of sample
t	Student’s t
s^2	Sample variance
F	Variance ratio
P	Probability

Spelling: Spelling should conform to American usage, as preferred in *Webster’s Third New International Dictionary* (Merriam-Webster). Use American English and spelling except for titles in literature citations, where the originally published spelling should be followed.

Statistics: Do not cite a reference for commonly used experimental designs, such as completely randomized, randomized block, and split-plot designs, or simple procedures such as t tests. For little-used statistical methods, designs, or analyses, cite an appropriate and accessible reference. If computer software programs are used, they should be treated as proprietary material or apparatus. Give the manufacture or developer name with location within the text body (in parentheses). This includes SAS software. Do not list SAS software in the Literature Cited section.

The achieved significance level for statistical tests (e.g., $P \leq 0.05$, $P \leq 0.001$; or $P > 0.05$, $P > 1.10$) should be given in parentheses after the comparison (generally end of clause or end of sentence): ($P \leq 0.05$) ($P > 0.05$) (*note spacing*).

The asterisk symbols *, **, and *** are used to show significance at $P \leq 0.05$, 0.01 and 0.001 probability levels, respectively.

Student’s t -test, U -test, k-ratio, F -test.

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