

# **DIRECTIONS FOR CONTRIBUTORS TO INVASIVE PLANT SCIENCE AND MANAGEMENT**

## **Content**

The Weed Science Society of America (WSSA) publishes original research and scholarship in the form of peer-reviewed articles in three international journals. *Weed Science* is focused on understanding "why" phenomena occur in agricultural crops. As such, it focuses on fundamental research directly related to all aspects of weed science in agricultural systems. *Weed Technology* focuses on understanding "how" weeds are managed. As such, it is focused on more applied aspects concerning the management of weeds in agricultural systems. *Invasive Plant Science and Management* is a broad-based journal that focuses not only on fundamental and applied research on invasive plant biology, ecology, management, and restoration of invaded non-crop areas, but also on the many other aspects relevant to invasive species, including educational activities, policy issues, and case study reports.

Topics include the biology and ecology of invasive plants in rangeland, prairie, pasture, wildland, forestry, riparian, wetland, aquatic, recreational, rights-of-ways, and other non-crop (parks, preserves, natural areas) settings; genetics of invasive plants; social, ecological, and economic impacts of invasive plants and their management; design, efficacy, and integration of control tools; land restoration and rehabilitation; effects of management on soil, air, water, and wildlife; scholarship in education, extension, and outreach methods and resources; technology and product reports; mapping and remote sensing, inventory and monitoring; technology transfer tools; case study reports; and regulatory issues. Symposia papers and reviews are accepted. Consult the editor for additional information.

Research manuscripts will be peer-reviewed and must contain original material constituting logical units of subject matter. Research must contribute to the advancement of knowledge. Acceptance is made with the understanding that the substance of the manuscript has not been and will not be published elsewhere other than as an abstract or as a preliminary report to agencies, land managers, or cooperators. Most experiments, particularly those involving invasive plant control, should be repeated in time or space and must provide confirming results. Progress reports, nonreplicated experiments, and simple observational information are not acceptable. Visual estimates of percentage invasive plant control and of non-target plant injury are acceptable in efficacy studies and in support of objective measurements of response.

Case studies will also be peer-reviewed and should contain original material not published elsewhere other than as an abstract or as a preliminary report to agencies, land managers, or cooperators. Case studies should include well-developed discussions that provide instructive information on invasive plant management or restoration of infested plant communities. Such articles should focus on a specific study, and should include an abstract, introduction with a brief overview of the problem or hypothesis tested and its relevance, a description of the site, materials and methods, results, discussion of the

practical applications for land managers, and literature cited. Although it is not expected that case studies will be repeated in time or space, data collected should be robust enough for statistical evaluation.

## **Types of Articles**

### ***Refereed Articles***

- a. ***Research and Education.*** Original articles concerning research, teaching, extension, industry, consulting, regulation, and equipment are encouraged. Research articles and nontraditional reports such as surveys and new educational programs from extension and teaching are also welcomed. Research papers should include a short interpretive summary (see below).
- b. ***Case Studies.*** Case studies are original articles on topics that describe and document highly focused invasive plant management, restoration or rapid response projects. These typically encompass completed projects, or progress of long-term projects, and include critical components such as program organizational structures, technologies, technology-transfer, evaluation criteria, quality assurance/quality control and implementation of adaptive management. Case studies are expected to contain critical evaluations of the project and recommendations for improvements, particularly in the context of similar or related invasive plants and habitats.
- c. ***Invited Reviews.*** *Invasive Plant Science and Management* also welcomes concise review articles that provide current information and appeal to a broad audience. Authors should contact the editor to discuss the proposed article. Once received by the journal Editor, the article will be peer-reviewed and edited as a regular submission.
- d. ***Symposium Papers.*** Proceedings of invasive weed symposia may be published in *Invasive Plant Science and Management*. Chairs of symposia must obtain approval for publication of symposia no later than the midsummer WSSA Executive Committee meeting, and an associate editor will be assigned to work with the authors on paper submittal. Symposia authors must submit their manuscripts promptly for review and must cooperate so papers are published by a predetermined date, normally within one year of the symposia.
- e. ***Notes and Commentary.*** These submissions will include new research methods or equipment, and some surveys. Critical research that cannot be repeated may also appear as a Note. Commentaries generally cover topical issues related to invasive plant science and management and are understood to represent the opinion(s) of author(s), but also must include appropriate citations and references to published sources. Submissions are expected to stimulate constructive discussions, responses by other authors, and thoughtful examinations of the topic addressed.

f. ***Invasion Alert*** consists of brief communications that document new invasive plant introductions, significant range extensions (e.g., new habitats or regions of the country or world), or new relevant taxonomic information. New invasions and range extensions should consist of a significant population or plants with potentially high impact, and not a single plant or very small low impact population. Papers can be either short research papers or non-experimental notes. Both formats should contain an abstract and supporting citations. Notes and papers should also contain a short introduction to species including conditions associated with presence and impacts, likelihood of persistence and/or spread (if known), previous distribution in native and non-native range, and relevant taxonomic information. Indicate on the left hand upper corner of the paper the region of the United States (West, North Central, South or Northeast) or country (other than the US) where the invasive was found or the study was conducted. Good color photos or line drawings of the invasive plant should accompany both notes and papers.

- Research papers (text) on new invasions should not be over six pages long double spaced and should contain an abstract, materials and methods, as well as a results and discussion section.
- For publication of a note (and if relevant to the research papers), all reported invasive plants must have a cited voucher specimen that is properly identified (including who made the determination and the date) and stored in a public herbarium at a university or governmental agency. The herbarium sheet number, including all information on the label, must be included in the note along with herbarium designation or *Index Herbariorum* acronym(s) as designated by Holmgren and Holmgren (1998). For example: Voucher specimens: **U.S.A. MISSISSIPPI. Issaquena Co.:** Ca. 5 air mi NE of Mayersville at jct. of Grace Road and Steele Bayou, 30 Oct 2006, *Bryson 21940* (DOV, SWSL, VSC).

All ***Invasion Alert*** papers will be peer-reviewed. To expedite the dissemination of this information, reviewed ***Invasion Alert*** notes and papers will be published immediately online and in the next issue following their acceptance. In addition, they will be included on open access to facilitate wider distribution.

g. ***The Forum. Invasive Plant Science and Management*** will now publish short papers in a new section referred to as “The Forum.” This section will include short letters, opinions, book reviews, and responses or rebuttals to published papers in *IPSM* or other journals. Topics should be of broad interest or concern to the readership of the journal. Papers submitted in The Forum section will be reviewed and edited to conform to style by the Editor and an Associate Editor, if appropriate, but submissions are not considered peer-reviewed papers. The Editor reserves the right to reject any submissions deemed unsuitable for publication. Forum papers cannot contain new data previously unpublished in a peer-reviewed journal. Maximum length of The Forum papers is 1000 words, with no more than seven references. A table or figure may be appropriate, depending on the subject, but is typically discouraged.

## Submitting the Manuscript

Please use PeerTrack to access manuscript submissions (<http://www.editorialmanager.com/ipasm/>). The figures must be submitted as a separate file(s) from the text/tables. It is acceptable to submit low-resolution figures in a single file for the original submission. High-resolution figures in separate files must be uploaded at the first revision stage. The following text file formats are acceptable for text: Microsoft Word, Corel Word Perfect, Rich Text Format (RTF), and Text. Electronic versions of graphics are accepted in the following formats: TIFF, EPS, PDF, JPEG, Word, PowerPoint, and Postscript. If accessing the PeerTrack site is impractical or impossible, please send one copy of the manuscript and all figures on a disk to the Managing Editor, Tracy Candelaria, 810 East 10<sup>th</sup> Street, Lawrence, KS 66044-8897 or email to [tcandelaria@acgpublishing.com](mailto:tcandelaria@acgpublishing.com).

Authors are asked to pay a portion of publication costs. These costs are currently \$60 per page plus an additional processing charge of \$50 per manuscript if none of the authors are WSSA members. Exceptions must be made to the Editor directly and are only granted under special circumstances.

**Open Access.** Charges to make articles open access are \$2,000 for authors who are members of the Weed Science Society of America and \$2,500 for non-members. Invasion Alert articles and solicited reviews will be open access without a charge to the authors. Journal articles are posted at WSSA Online Journals ([www.wssajournals.org/](http://www.wssajournals.org/)) and BioOne ([www.bioone.org](http://www.bioone.org)). Authors who opt for open access do not have to pay regular page charges.

**Manuscript Review.** Manuscripts will be reviewed for content and presentation by two or more anonymous Reviewers and an Associate Editor. Communications concerning changes are with the Associate Editor. Final acceptance or rejection is the prerogative of the Editor.

## Preparing the Manuscript

**Style.** In addition to these Directions for Contributors, refer to recent issues of *Weed Science* and *Weed Technology* as guides to proper style. All three journals follow *Scientific Style and Format: The CSE (Council of Science Editors, Inc.) Manual for Authors, Editors, and Publishers*, Cambridge University Press, Cambridge, MA (formerly CBE, the Council of Biology Editors), 7th ed., 2006. A database of WSSA approved common and Latin names of common plant species can be found at <http://wssa.net/Weeds/ID/WeedNames/namesearch.php>. A list of common and chemical names of herbicides approved by the WSSA is available at <http://www.wssa.net/Weeds/Tools/Herbicides/HerbicideNames.htm>.

**Language & Copyediting Services.** Manuscripts submitted to scholarly journals are sometimes rejected not on the basis of their science, but because of poor readability. This

is especially true of manuscripts submitted by nonnative speakers of English. The Weed Science Society of America does not provide language and copy editing services to authors prior to manuscript acceptance. However, there exist a number of language and copyediting services that may be of assistance to you. We have listed some of them below. Weed Science Society of America does not endorse any individual or agency. Professional qualifications and compensation must be discussed with the editing service that you contact.

<http://www.journalexperts.com> (10% discount with the referral code “WSSA”)

<http://www.internationalscienceediting.com>

<http://www.asiascienceediting.com>

<http://www.prof-editing.com>

<http://www.councilscienceeditors.org/jobbank/services.cfm>

<http://www.alphascienceeditors.com>

<http://www.editage.com>

**Typing Instructions.** Include line numbers in your manuscript. Lines should be numbered consecutively throughout the entire document. Double-space everything, including pages with tables, figure legends, footnotes, and literature citations. Do not indent subheadings or subsubheadings. Indent paragraphs.

**Order.** Manuscripts should be in the following order: Short title for running footer, Title (no separate title page), Author(s), Abstract (untitled), Nomenclature, Key Words, Interpretive Summary (see below), Introduction (untitled, begin on a new page), Materials and Methods, Results and Discussion, Acknowledgments, Literature Cited (begin on a new page), Tables (begin on a new page), and Figures Legends (begin on a new page). Figures should each be a separate file, and not included with the text. All original research articles should include an Interpretive Summary. This is a brief (one page, double spaced) description of the importance of the work to the field practitioner).

**Headings.** Place each main section heading centered on its own line in bold and capitalize all major words. Main section headings will generally be: Materials and Methods, Results and Discussion, Acknowledgments, Literature Cited, and Interpretive Summary (for original research articles). Omit a summary or conclusion section after the Results and Discussion section. The introductory section is not titled. Center each main section heading four lines below the previous section; use boldface type and capitalize the first letter of major words. Begin subsection headings at the left-hand margin. Capitalize the first word and each major word following, type in boldface, and end with a period. Begin the first sentence on the same line. If sub-subsection headings are used, begin at the left-hand margin, capitalize the first word and all major words, italicize, and end with a period. Begin the first sentence on the same line. Use fourth-level headings (level following sub-subheadings) sparingly. If used, paragraph indent, capitalize only the first word (and proper nouns that are normally capitalized), italicize, and end with a period. Begin the first sentence on the same line. Avoid use of nonspecific headings such as General, Field, Greenhouse.

## Format

**Title.** The title page includes a short title for the running footer that is not to exceed 30 characters and spaces. The title, centered and typed in bold with all major words capitalized, should be no more than 80 characters and spaces and should include words useful in computer searches. Use the WSSA-approved common name for weeds followed by the scientific name (without authority) in parentheses. If there is no WSSA-approved common name, use only the scientific name. Use only the common name of crops. Use only common name or code numbers of herbicides.

**Authors.** Provide the full name of each author (first, middle initial [optional], and last). Place the names of the authors—with first initials only capitalized and with “and” before the last author—centered two lines below the title, and indicate a footnote with an asterisk. Use of one given name and initial for each author is encouraged. In the footnote, give the institution or institutions where the study was conducted, followed by the institutional address. Spell out names of institutions in full. Addresses of U.S. authors should include the two-letter postal abbreviation for the state and the ZIP code. E-mail address of the corresponding author should be included. Also include the full job titles of the authors at the institution or agency. Current addresses should be listed at the end. An example of an author address footnote follows:

\* First, third, and fourth authors: Graduate Student, Assistant Professor, and Professor, Department of Plant Sciences, University of California, Davis, CA 95616; Second author: Professor, Department of Natural Resources, Cornell University, P.O. Box 11111, Ithaca, NY 14853. Current address of third author: Associate Professor, Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695. Corresponding author’s E-mail: [correspondingauthor@wssa.com](mailto:correspondingauthor@wssa.com).

**Abstract.** Place the abstract on the same page as the title and authors. Do not include the word “Abstract.” The text of the abstract should not exceed 3% of the length of the manuscript, including tables but not including the Literature Cited. It must be written as a single paragraph and must contain an objective and informative digest of the significant content of the paper, not simply a description of the contents. Representative quantitative data from the results often make the abstract more informative. Use only common names in the body of the abstract for herbicides, plants, animals, and microorganisms. Omit tables, graphs, long lists of names, references to literature, or footnotes. At the first mention of the herbicide rate, express the rate either on the acid equivalent (ae) basis or active ingredient (ai) basis. Omit trade names for herbicides, other pesticides, and surfactants or other adjuvants in the abstract.

**Nomenclature.** Immediately after the abstract, type “Nomenclature” followed by a colon and use boldface type. Then repeat each common name appearing in the title and abstract. Only include weeds and crops in the Nomenclature that are mentioned in the Abstract. For herbicides, use WSSA-approved common names or other designations. Give full chemical names for herbicides, other pesticides, or safeners that have no WSSA-

approved common names. For plants use the common name followed by the Latin binomial and classifier; Bayer codes may be included for weeds, but are not required. For other organisms, use the common name followed by the binomial and the authority. The preferred order is herbicides and weeds, alphabetized within each group. Example: **Nomenclature:** Glyphosate; 2,4-D; black mustard, *Brassica nigra* (L.) Koch BRSNI; downy brome, *Bromus tectorum* L. BROTE; yellow starthistle, *Centaurea solstitialis* L. CENSO. Note the use of commas and semicolons. A database of WSSA approved common and Latin names of common plant species, including Bayer codes, can be found at <http://wssa.net/Weeds/ID/WeedNames/namesearch.php>. A list of common and chemical names of herbicides approved by the WSSA is available at <http://www.wssa.net/Weeds/Tools/Herbicides/HerbicideNames.htm>.

**Key words.** Immediately after the nomenclature, type the phrase “Key words” at the left margin. Use boldface type, followed by a colon. List words, word pairs, or phrases (usually not more than five words) not included in the title or nomenclature that further describe the content of the manuscript. List only specific words or phrases that will be useful in indexes and in computerized literature searches. Capitalize only the first letter of the first word of this list, except for proper names. Place a comma after each word or phrase and a period after the last word.

**Management Implications.** Following the abstract, include a one page (double spaced) description of the importance of this work to the field practitioner. This section should not be a rewording of the abstract. Rather, it should be a clearly written interpretation of how the work can be used currently or in the future for better prevention or management of invasive plants. This section will be included in a boxed addendum in either the first or second page of the published paper. The Management Implications section is only required for original research articles and not for review articles or case studies.

### **Introduction, Materials and Methods, Results and Discussion, and**

**Acknowledgments.** These sections follow the Key words section in that order. Each first-level section head is centered on the fourth line below the preceding section. Text begins two lines below each heading. Begin the introduction on a new page. There is no heading for the introduction. In the Materials and Methods section, the sources of the material should be shown in parentheses following the first mention. Provide a brief description of the item, model number (if applicable), and the source. The company’s address (full mailing address or just city and state/country) may also be included although it is not required. Following is an example: “During a single year, large plots were treated with glyphosate (Roundup WeatherMax®, 540 g ai L<sup>-1</sup>, Monsanto Canada, 900 One Research Road, Winnipeg, Manitoba, Canada, R3T 6E3).”

Submissions including five or more herbicides should be listed in a Table providing the following details: herbicide common and trade names, herbicide formulation (if necessary), herbicide rate(s) in active ingredient or acid equivalent, name of respective herbicide manufacturer, and herbicide manufacturer city, state, and website (no mailing address or zip code). Long herbicide treatment lists in the text will also be discouraged; herbicide treatments and rates will be easily discerned in the Table. Use

one sentence in the Materials and Methods and/or other appropriate locations within the manuscript to refer readers to the Table. Likewise, when it is necessary to describe more than one experiment with five or more herbicides, the information can be listed in the same Table or in an additional Table.

The use of separate Results and Discussion sections and a separate concluding section are generally discouraged, but authors may wish to conclude the Results and Discussion section with an untitled summary. Type second-level heads flush left and boldface, with the first letter of each word capitalized, and end with a period. Third-level heads are flush left and italic, with the first letter of each word capitalized, and end with a period. Fourth-level heads are paragraph indented, italicized, with only the first letter capitalized, and end with a period. The text following second-, third-, and fourth-level heads should immediately follow the head on the same line.

**Literature Cited.** Beginning on a separate page, type “Literature Cited” in bold, centered. Begin the first entry two lines below the heading. The first line of each entry should be flush left; subsequent lines should be paragraph indented. Double space the entire section (with no extra spaces between entries). List citations alphabetically by author. Each citation should include the names of all authors, year of publication, complete title, publication, volume number, and inclusive pages, in that sequence. Journal names should be abbreviated as shown in the most recent issue of *BIOSIS Serial Sources*, published by Biological Abstracts, Inc., and recent issues of *Weed Technology* and *Weed Science*. Please be sure to use the correct abbreviations. You can check them online at <http://library.caltech.edu/reference/abbreviations/>. when two or more authors are listed, initials should follow the last name for the first author, but the initials should precede the last name of other authors. When three or more authors are listed, place a comma after the next-to-last name as well as after earlier names in the sequence. Space between two initials but run together three or more. For references to a specific portion of a book or similar publication, cite those pages rather than the total pages of the book. (Example: Baver, L. D. and W. H. Gardner. 1972. Flow in stratified soil systems. Pages 343–345 in L. D. Baver, ed. *Soil Physics*. New York: Academic.) Unpublished texts are not permitted in the Literature Cited section. Please cite submitted or unpublished articles parenthetically in the text as personal communications: (K. M. Novosel, personal communication). Theses and dissertations may appear in Literature Cited. Do not cite or footnote abstracts more than 3 years old unless the information contained is of vital importance and has not been reported elsewhere. Authors should consult *Scientific Style and Format: The CSE (Council of Science Editors, Inc.) Manual for Authors, Editors, and Publishers*, Cambridge University Press, Cambridge, MA (formerly CBE, the Council of Biology Editors), 7th ed., 2006.

**Citation examples:**

***Journal:***

Merriam, R.W. 2003. The abundance, distribution and edge associations of six non-indigenous, harmful plants across North Carolina. *J. Torrey Bot. Soc.* 130:283-291.

- Tichich, R.P., J.D. Doll, and P.S. McManus. 2006. *Pseudomonas syringae* pv. *tagetis* (PST) population dynamics both on and in Canada thistle (*Cirsium arvense*) leaves as affected by rain events. *Weed Sci.* 54:934-940.
- Wardell, D. A. and D. Parkinson. 1990. Influence of the herbicide glyphosate on soil microbial community structure. *Plant Soil* 187–204.

**Book:**

- Coombs, E.M., J.K. Clark, G.L. Piper, and A.F. Cofrancesco, Jr., eds. 2004. *Biological Control of Invasive Plants in the United States*. Corvallis: Oregon State University Press. 467 p.
- Vencill, W. K., ed. 2002. *Herbicide Handbook*. 8th ed. Champaign, IL: Weed Science Society of America. Pp. 224-226.
- Wiese, A. F. and D. J. Kyle. 1985. *Weed Control in Limited Tillage Systems*. 2nd ed. Champaign, IL: Weed Science Society of America. Pp. 78–96.

**Article in book:**

- Baver, L. D. and W. H. Gardner. 1972. Flow in stratified soil systems. Pages 343-345 in L. D. Baver, ed. *Soil Physics*. New York: Academic Press.
- Lym, R.G. and C.A. Duncan. 2005. Canada thistle, *Cirsium arvense* (L.) Scop. Pages 69–83 in C.E. Duncan and J.K. Clard, eds. *Invasive Plants of Range and Wildlands and Their Environmental, Economic, and Societal Impacts*. Lawrence, KS: Weed Science Society of America.

**Proceedings:**

- Dicus, C.A. and M.P. Anderson, M.P. 2004. Benefits versus fire risk of native and invasive vegetation in the wildland-urban interface. Pages 64–70 in *Proceedings of the California Invasive Plant Council*. Berkeley, CA: California Invasive Plant Council (Cal-IPC).

**Report or governmental publication:**

- Taylor, A. G. 1992. Pre-compliance Date Testing for Pesticides in Illinois' Surface Water Supplies. Springfield, IL: State of Illinois Environmental Protection Agency Rep. 026. 6 p.
- [USDA] U.S. Department of Agriculture. 1994. *Kentucky Agricultural Statistics 1993–1994*. Washington, DC: U.S. Department of Agriculture, p. 101.
- Anonymous. 1995. *1994–1995 Nebraska Agricultural Statistics*. Nebraska Agricultural Statistics Service. 164 p.

**Thesis or dissertation:**

- Enloe, S.F. 2002. *The Ecology and Management of Yellow Starthistle in Annual and Perennial Grassland Communities*. Ph.D dissertation. Davis, CA: University of California. 108 p.

**Patent:**

- Harred, J. F., inventor; Dow Chemical Company, assignee. 1972 Apr 4. Epoxidation process. U.S. patent 3,654,317.

**Package labels and inserts:**

Anonymous. 2005. Milestone™ VM. Herbicide product label. Dow AgroSciences LLC. LOES No. 010-02121. Indianapolis, IN . 8 p.

**Website:**

Agriculture and Agri-Food Canada. 1999. Market and Industry Services Branch, Horticulture and Special Crops Division.

[http://www.Agr.ca/misb/spcrops/bean\\_e.html](http://www.Agr.ca/misb/spcrops/bean_e.html). Accessed: January 29, 2006.

Anonymous. 2006. The Nature Conservancy. The Global Invasive Species Initiative. Available at <http://tncweeds.ucdavis.edu/esadocs.html>. Accessed August 23, 2006.

**Software:**

Schneider, S., D. Roessli, and L. Excoffier. 2000. Arlequin, Version 2000: A Software for Population Genetics Data Analysis. [anthropologie.unige.ch/arlequin/](http://anthropologie.unige.ch/arlequin/).

SPSS. 1999. SPS for Windows. Release 10.0.1 Chicago, IL: SPSS.

**In-Text Citations.** Literature citations in the text should use the author and year system. Literature citations should be enclosed in parentheses. Authors are directed to consult the *CSE Manual*. A brief summary of the citation method is shown below. Entries are in alphabetical, then chronological order.

One author:	Jones (1995) or (Jones 1995)
Two authors:	James and Smith (1994) or (James and Smith 1994)
Three or more authors:	Jones et al. (1994) or (Jones et al. 1994)
Two or more citations:	James and Smith (1994), Jones (1995)
	or
	(James and Smith 1994; Jones 1995)
Multiple citations	
by one author :	Jones (1989, 1994a, 1994b)
	or
	(Jones 1989, 1994a, 1994b)
Multiple citations	
by different authors:	(James and Smith 1989; Jones et al. 1993)

No comma is required to separate name and year, but multiple citations by the same author should be separated by commas, as shown above. Multiple citations by different authors are separated by a semicolon. When referring to the authors of a paper with more than two authors, use the first author's name, followed by et al. Unpublished data and personal communications are cited parenthetically in the text using this form: (J.T.C. Renner, unpublished data) and (K. M. Novosel, personal communication). All citations must be listed in Literature Cited (except unpublished data and personal communications), and all listed references must be cited.

**Tables.** Type each table on a separate page following the Literature Cited. Tables should be numbered with Arabic numerals in the sequence of first reference in the text. Begin at the left margin with the word “Table” and its associated number followed by a period. Begin the title on the same line. Do not indent after the first line. Double space everything. Do not give the scientific name of a weed or crop if it has already been given in the text. Redefine all abbreviations used in the table, even if the definition has already been given in the text. If horizontal lines in a table need to span more than one cell, it is advisable to merge the cells to prevent line breaks from being introduced during typesetting.

**Legends for Figures.** Type the list of legends on a separate page. Begin the legend at the left margin, type the word “Figure” and its number, and place a period after it. Begin the first sentence on the same line. Do not indent after the first line. Double space everything. Do not give the scientific name of a weed or crop if it has already been given in the text. Do not redefine all abbreviations used in the figure if the definition has already been given in the text. If an explanation of symbols is required, include the key in the figure. Authors may be charged a fee if artwork has to be generated to match a symbol used in the figure.

**Figures.** Number figures consecutively with Arabic numerals in the sequence of first reference in the text. Upload each figure as a separate file. The following figure formats are acceptable: TIFF, EPS, PDF, JPEG, Word, PowerPoint, and Postscript. Figures should be at least 300 dpi in quality for printing.

### Detailed Instructions

**Abbreviations.** Acceptable abbreviations for frequently used terms or phrases that need not be defined follow:

A	absorbance
ac	acre
ae	acid equivalent
ai	active ingredient
ANOVA	analysis of variance
Bq	Bequerel
C	Celsius
cec	cation exchange capacity
cm	centimeter
d	day
diam	diameter
dicot	dicotyledon
g	gram
<i>g (Italics)</i>	acceleration due to gravity
gal	gallon(s)
h	hour
ha	hectare

ht	height
kg	kilogram
km	kilometer
kPa	kilopascal
L	liter
lb	pound(s)
LD <sub>50</sub>	dose lethal to 50% of test organisms
LSD	least significant difference
m	meter
M	molar
min	minute
ml	milliliter
mm	millimeter
mM	millimolar
mmol	millimole
mo	month
mol	mole
monocot	monocotyledon
mph	miles per hour
N	normal
nm	nanometer
NS	not significant
oz	ounce(s)
Pa	pascal
ppmv	parts per million by volume
ppmw	parts per million by weight
pt	pint(s)
qt	quart(s)
rpm	revolutions per minute
s	second
SD	standard deviation
SE	standard error
μl	microliter
μM	micromolar
μmol	micromole
UV	ultraviolet
vol	volume
wk	week
wt	weight
yr	year

Other abbreviations should be introduced in parentheses immediately after the first use of the term: e.g., days after treatment (DAT), thin-layer chromatography (TLC). Avoid excessive use of acronyms.

**Adjuvant Names.** Where possible, use WSSA-approved terminology as given in the WSSA monograph, *Adjuvants for Herbicides*, or in *Weed Science* 33 (Supp. 1):22-23 1985. Otherwise, use the most complete chemical description of the adjuvant.

**Enzymes.** Use the nomenclature and numbering system recommended by the Committee on Nomenclature and Classification of Enzymes of the International Union of Biochemistry (see *Enzyme Nomenclature*, 1986, Academic, New York).

**Equations.** Center display equations on a separate line, number sequentially starting with 1, and place the number in square brackets at the right-hand margin. Example:

$$Y = mx + b \quad [1]$$

Equations must be included in figures with predicted curves or put in the figure legend. Refer to equations in the text, tables, or figures by number: Equation 1 or (Equation 1).

**Figures.** Experimental data may be presented in graphic or tabular form, but the same data will not be published in both forms. Data points should be included with plotted curves. Equations must be given with predicted curves or in figure legends. Figure size should not exceed 20 by 28 cm. Color figures can be used if the authors bear reproduction costs. Legends for the axes of graphs must follow the 'Parameter (unit)' format; e.g., Time (h). Note the use of capital and lower case letters (capitalize only the first word of each axis label). Figures will be published at the maximum width of one journal column (8.8 cm), unless authorized otherwise by the Editor. Figure preparation should allow for reduction to this size without loss of clarity or legibility. The final size of all letters or symbols should be 1.0 to 2.5 mm tall and all lines should be 0.1 to 0.6 mm thick. Photomicrographs should be supplied in the correct size for printing with scale bars placed directly on the prints. Keys to symbols should be included in the figure itself. Authors may be charged if artwork must be generated to reproduce a graphic in the figure captions.

**Herbicide and other Pesticide Names.** At the first mention in text of a herbicide or other pesticide, give its approved common name or other designation. A list of common and chemical names of herbicides approved by the WSSA is available at <http://www.wssa.net/Weeds/Tools/Herbicides/HerbicideNames.htm>. Full chemical names are not required for herbicides and safeners that have WSSA-accepted common names. However, the full chemical name is required for any herbicide, other pesticide, growth regulator, or safener that does not have a WSSA approved common name. A chemical referred to by a code designation must be followed by its full chemical name enclosed by parentheses, brackets, or braces, unless already included in "Nomenclature." Use only the common name or other designation thereafter. Do not repeat in the text chemical names that have been given in "Nomenclature". The company code name should be used *in lieu* of a common name when the latter has not been approved by the WSSA Terminology Committee. If the particular commercial formulation of a herbicide used affects results, identify the formulation parenthetically within the text (refer to directions under Sources of Materials).

When the common name of the herbicide refers to the parent acid, the salt or ester portion of the active ingredient should be identified at first mention. Example: the methyl ester of diclofop or the isopropylamine salt of glyphosate. Use the approved common name in the remainder of the paper unless there is a need to distinguish between the active ingredient and the parent acid in the text. In such cases, a modifier can be added to the common name (e.g., 2,4-D-amine), and can be used in the text to identify the active ingredient. Recent issues of *Weed Technology* or *Weed Science* can be used to determine appropriate modifiers.

When rates of acid herbicides are expressed as weight per volume or weight per area, indicate at first mention whether weight refers to the acid equivalent (ae) or the active ingredient (ai), (kg ae ha<sup>-1</sup> or kg ai ha<sup>-1</sup>).

**Measurements and Units.** Use exponents rather than a slash (/) or dot (·) in reporting units of measure. e.g., kg ha<sup>-1</sup> and μmol m<sup>-2</sup> s<sup>-1</sup>, not kg/ha or μmol · m<sup>-2</sup> · s<sup>-1</sup>. Report all measurements in SI units or SI-derived units (see CSE Manual), followed by English units in parentheses for chemical volumes, volumes per area, speed (e.g., km hr<sup>-1</sup>), temperature, distance and area measurement, and product or active ingredient (or acid equivalent per volume). English units only need to be used once for each unit in text. For example, kg ae ha<sup>-1</sup> (lb ae ac<sup>-1</sup>) for first mention of unit; thereafter, list only kg ae ha<sup>-1</sup>. Do not use quintals or metric tons. Describe lighting conditions as irradiance (W m<sup>-2</sup>) of photosynthetically active radiation or as photosynthetic photon flux density (μmol m<sup>-2</sup>/s<sup>-1</sup>). Leave a space between units in a series. Use nanometers (nm) to designate wavelength, and give spectrophotometric readings in absorbance units (A) rather than optical density (OD). In laboratory studies, express concentration of acids and bases in normality (N) and of herbicide and salt solutions in molarity (M) rather than ppm. Express pressure in kPa (kilopascals) rather than kg cm<sup>-2</sup> or bars. Express radioactivity in Bq (Bequerels). Use kg rather than Mg (megagrams). Use L or ml rather than cc for measurements of volume. Express the makeup of solid systems as in the following: sand and peat (1:1 by wt). Words are preferred when units of measure are not involved; e.g., use buds per rhizome and tillers per plant, not buds/rhizome or tillers/plant. In field or laboratory studies, indicate whether ppm and percentages are on a w/w or v/v basis. Do not use w/v as a ratio. Use only the weight/volume units; e.g., 100 g L<sup>-1</sup> rather than 1:9 (w/v). Express the makeup of solvent systems as follows: methyl alcohol, water, and kerosene (1:2:1 by vol).

**Numbers.** Use Arabic numerals for all numbers with two or more digits and for all measurements such as time, weight, length, area, quantity, concentration, or temperature, with the following exceptions. Spell out a number if it is the first word in a sentence or if it is less than 10 and not a measurement, except in a series in which one number has two or more digits. Do not use a hyphen for the preposition 'to', or × for the preposition 'by' except in tables and figures. Write 100 by 20 rather than 100×20 and 1 to 3 rather than 1–3. Separate thousands with a comma (1,000, 10,000, 100,000).

Omit nonsignificant numbers. Herbicide dosages and injury levels usually are not known more accurately than to the nearest 10%. Yields, enzyme levels, and photosynthetic rates often are not known more accurately than to the nearest 1% (10% of

LSD or a similar statistic). Therefore, report a herbicide rate as 0.9 kg ha<sup>-1</sup> rather than 0.89 kg ha<sup>-1</sup> and a plant biomass as 590 kg ha<sup>-1</sup> rather than 593 kg ha<sup>-1</sup>.

**Plant and Animal Names.** At the first mention in the text of a plant or animal, give its common name followed by the approved scientific name enclosed in parentheses or in brackets when parentheses occur within the binomial. Give the genus, species, subspecies or variety (if applicable) and author or authors for the binomial. Underline or italicize the genus, species, and subspecies or variety (if applicable). Enclose the cultivated variety of a crop or forage plant, if known, in single quotation marks at first mention; thereafter, omit the quotation marks. Example: orchardgrass (*Dactylis glomerata* L. 'Paiute'), but later Paiute orchardgrass or just orchardgrass if only one cultivated variety is used. Repeat scientific names in the text even if they have been given in Nomenclature. Include the scientific name of the invasive plant, without authorship, in the title. For cultivar names that are registered trade names, insert the registered trademark (®) after the name. Refer to <http://www.wssa.net/weedname.html> for approved scientific names, common names, and Bayer codes of weeds. Bayer codes are optional and should be used only for plant species included in the study; do not use Bayer codes for weeds mentioned only in literature citations. After the first mention of scientific and common name, the use of either throughout the remaining text is the discretion of the author, but both should not be used again together. For papers that have an international perspective, it is best to use scientific names throughout, as common names can vary among regions of the world. Describe animals and microorganisms in the same way at first mention. For the scientific and common names of crops, refer to <http://wssa.net/Weeds/ID/WeedNames/namesearch.php> or use those listed in *Important Crops of the World and their Weeds*, 2nd Edition, 1992 (Business Group, Crop Prot. Bayer AG, Germany), or *Standardized Plant Names*, 2nd Edition, prepared for the Joint Committee on Horticultural Nomenclature and the International Code of Nomenclature for Cultivated Plants whenever a more recent, authoritative taxonomic reference is not available.

**Replication.** While IPSM recognizes that experimental studies in wildland, aquatic, and natural environments are unique and may require flexibility in experimental approaches, it is expected that many experiments should be repeated in time or space. This primarily includes field plot experiments, but can also include some laboratory, greenhouse and growth chamber experiments. In addition, IPSM recognizes that, due to limitation in time and funding, some high intensity manipulative experiments cannot be replicated temporally or spatially. In circumstances where limited replication is justified, IPSM will consider manuscripts on a case by case basis. We ask, however, that authors appropriately tailor their discussions and conclusions to reflect limitations of experiments conducted at single locations and/or over short periods of time. Authors need strong justification for not repeating an experiment in time or space. This can occur, for example, in cases where there is truly compelling supporting evidence from parallel experiments. In addition, repeating an experiment is not necessary if the experiment addresses a supporting study, which is not primary to the hypothesis being tested, and the lack of repetition is clearly stated with limited inferences. Experiments that are not repeated should be statistically robust with a high degree of confidence and with

outcomes that are supported by other experiments of other peer reviewed literature. This can apply to unique experimental conditions (e.g., mesocosms or ecotrons), field experiments where populations are not large enough or the habitats are not sufficiently uniform to be repeated, or studies that may not allow replication in time such as large-scale disturbances. Such studies may require sufficient replication within a single experiment or pseudoreplication, but should report any spatial or time series covariance. Authors should identify their proposed inference space for their study and exercise caution in extrapolating across spatial scales or generalizing beyond the experimental condition.

**Soil Terminology.** Include the soil series with textural classification and the subgroup name, using the terminology of the U.S. Department of Agriculture Soil Conservation Services publication, Soil Taxonomy, 1988 (U. S. Government Printing Office, Washington, D.C.). For soils outside the United States, use the local official terminology.

**Statistical Analyses.** Data should be analyzed statistically, and results of the analyses should be included in the tables or figures where the data are presented. Multiple comparison tests (LSD and Duncan's multiple range) may be used when appropriate, but not on structured data such as quantitative series of treatments (e.g., herbicide rates in stepwise increments) or factorial treatments. The least significant difference (LSD) is appropriate for paired multiple comparison procedures. In quantitative series, the correct procedure is use of regression or other curve-fitting techniques that can be included in an analysis of variance (ANOVA). An assumption with ANOVA is that variances are homogeneous, but this is unlikely for proportions, percentages, or values differing by orders of magnitude. In such cases, transformations of the raw data must be used if ANOVA is to be valid. Clearly identify all statistical procedures used, including methods of analysis, numbers of replicates and subsamples, transformations used, and statistical tests performed. Give literature citations for statistical analyses.

**Supplemental Material.** Additional material too long for publication in print can be submitted as supplementary material to be available online. This material may include (but is not limited to) data, tables, figures, appendices, video, or program code. Supplemental files can be uploaded along with the manuscript via PeerTrack and should be no larger than 5 megabytes in order to assure accessibility to readers.

**Tables.** Tables cannot be more than 120 character-spaces wide. First reference to tables included primarily to present results should be in the Results and Discussion section. All text within each table should be in lower case letters except for the first word of a phrase or sentence, proper nouns which should have initial capitals, and Bayer codes. Column headings should relate to data or information in the body of the table, not just to other information in column headings, as in this example (note separation of thousands by a comma):

Proper Form:	Improper Form:
<u>Corn yield</u>	<u>Year</u>

1988	1989	1988	1989
hg ha <sup>-1</sup>		kg ha <sup>-1</sup>	
6,400	7,800	6,400	7,800
...	...	...	...

Avoid the use of exponents in column headings. If a weed name must be abbreviated in column headings, use only the Bayer code. When reporting data for a number of years or locations, group the data in adjacent columns under each factor measured. This facilitates comparison for repeatability of responses. The unit of measurement for a column of figures should be abbreviated and placed at the top of the column below the solid horizontal line. Do not place the unit of measurement in parentheses. If horizontal lines in a table need to span more than one cell, it is advisable to merge the cells to prevent line breaks from being introduced during typesetting. Footnotes to tables should be designated with superscript lowercase letters at the highest appropriate level within the table, except probability values, which should use asterisks. Study the form of a table in a recent copy of *Weed Science* or *Weed Technology*. Leave a space between values and letters used to indicate significant differences.

**Trade Names.** Use trade names sparingly and only if necessary to describe materials or methods. If a trade name is necessary, use it with the generic name in the text and include, where appropriate, the symbol ®. The capitalized trade name along with the name and address of the manufacturer or supplier, if not widely known, should be shown in parentheses immediately following the first mention. Submissions including five or more herbicides should be listed in a Table. Refer to the complete instructions for the Materials and Methods section for details.