WEED SCIENCE – INSTRUCTIONS FOR AUTHORS

Journal Scope

Weed Science is an online journal publishing fundamental research and scholarship as peer-reviewed articles on all aspects of weed science, with a focus on understanding "why" phenomena occur. Topics include the biology and ecology of weeds in agricultural, forestry, aquatic, turf, recreational, rights-of-ways, and other settings; genetics of weeds and herbicide resistance; chemistry, biochemistry, physiology, and molecular action of herbicides and plant growth regulators used to manage undesirable vegetation; ecology of cropping and non-cropping systems as it relates to weed management; biological and ecological aspects of weed control tools including biological agents, herbicide resistant crops, etc.; and effects of weed management on soil, air, and water.

Types of Articles

Manuscripts must contain original material constituting logical units of subject matter and 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 Acceptance is made with the understanding that the substance of the manuscript has not been and will not be published elsewhere other than as an abstract, a thesis or dissertation, or as a preliminary report to growers or cooperators. Experimental results should be confirmed by appropriate replication in time or space. Progress reports, non-replicated experiments, and simple observational information are not acceptable. Visual estimates of percentage weed control and of crop injury are acceptable when supported by objective measurements of response.

a. *Research Article.* Original articles reporting research in the areas of physiology, chemistry, and biochemistry; weed biology and ecology; weed management; soil, air, and water; and other topics related to weed science are encouraged. See a recent journal issue for examples.

b. *Review. Weed Science* welcomes review articles that synthesize current information and appeal to a broad audience. Authors should contact the editor to discuss the proposed review topic. Once received by the journal Editor, the article will be reviewed and edited as a regular submission.

c. *Symposium Papers.* Proceedings of WSSA and other symposia may be published in *Weed Science*, normally within one year of the symposium. Symposium organizers should contact the Editor within one month after the symposium to discuss a timeframe for manuscript submission and the expected number of papers. Symposium authors must submit manuscripts promptly for review to allow publication by a predetermined date. An Associate Editor will be assigned to work with the authors on paper submittal.

d. *Rapid Communication.* Publication of an article containing original research may under exceptional circumstances be expedited. Authors must explain in the cover letter why publication as a Rapid Communication is justified. Acceptance of a manuscript to be processed as a Rapid Communication is the decision of the Editor.

e. *My View*. Short essays not exceeding 2,000 words that address current issues of general interest in weed science are occasionally published. My View articles are not peer-reviewed, and acceptance is entirely at the discretion of the Editor.

f. *Special Issue Article.* Themed special issues of *Weed Science* are occasionally published. Special issue articles are commissioned by the Editor and are reviewed and edited in the same way as regular submissions.

Authorship
All individuals listed as author or co-authors must meet the following criteria:

1. They made substantial contributions to the conception and design of experiments, acquisition of data, and/or analysis and interpretation of the data.
2. They drafted the article and/or revised it critically for important intellectual content.
3. They approved the final version of the article to be published.

Contributions by individuals who do not meet all the above criteria for authorship should be recognized in the Acknowledgments section. The corresponding author must confirm that the author list is complete, that all co-authors have agreed to be included in the author list, and that all co-authors have read and agreed to submit the manuscript.

ORCID
Weed Science now requires that all corresponding authors identify themselves using their ORCID iD when submitting a manuscript to the journal. ORCID is a unique identifier for researchers that increases the discoverability of your publications and provides a place to store and share validated information about your research activities. If you do not already have an ORCID iD, you can register for one directly from your user account on Editorial Manager or via https://orcid.org/register. Please provide this iD when submitting a manuscript, either by linking it to your Editorial Manager account or supplying it during submission by using the "Link to ORCID record" button.

Publication Charges
Authors are asked to pay a portion of publication costs. These costs for *Weed Science* are currently $65 per final composed page plus an additional processing charge of $55 per manuscript if none of the authors are WSSA members. Exceptions can be made by the Editor ***but must be requested when the manuscript is first submitted.*** There is no additional charge for publishing color figures or images included in the manuscript.

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should not simply be accessible but should also be freely re-usable. Articles will be published under a Creative Commons Attribution license (CC-BY) by default. This means that the article is freely available to read, copy and redistribute, and can also be adapted (users can "remix, transform, and build upon" the work) for any commercial or non-commercial purpose, as long as proper attribution is given. Authors can, in the publishing agreement form, choose a different kind of Creative Commons license (including those prohibiting non-commercial and derivative use) if they prefer.

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Manuscript Submission

Manuscript submissions to *Weed Science* should be uploaded at https://www.editorialmanager.com/ws/. For information on formatting figures and other image files for submission, see https://www.cambridge.org/core/services/authors/journals/journals-artwork-guide.

Weed Science now publishes Accepted Manuscripts (AM) online immediately following acceptance, allowing authors to make their work available to read and cite much more quickly. When submitting manuscripts (particularly upon revision), include the manuscript, tables, and figures all merged into a single Word file (do not include any Supplementary files). In the event of acceptance, this file will be posted as an Accepted Manuscript to Cambridge Core prior to FirstView publication. Please make sure the manuscript is formatted exactly as it should appear in the AM version. The Accepted Manuscript will eventually be replaced with the final copy-edited and typeset Version of Record. Authors wishing to opt out of Accepted Manuscript publication must contact the Editorial Office (wssa@cambridge.org) before acceptance or no later than 24 hours after acceptance.

Manuscript Review

All manuscripts submitted to *Weed Science* are screened for plagiarized content using iThenticate software and are reviewed for suitability by the journal Editor before being assigned to an Associate Editor. The Associate Editor coordinates review of the manuscript for content and presentation by two or more anonymous reviewers and communicates with the corresponding author concerning manuscript revisions. Final acceptance or rejection is the prerogative of the Editor.

Manuscript Style

For a detailed guide, see *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers* 8th Edition, *Council of Science Editors (2014)* http://www.scientificstyleandformat.org/.

See also published articles in recent issues of *Weed Science* as guides to proper style.

Manuscript Format

Double-space everything, including pages with tables, figure legends, footnotes, and references. Include line numbers in your manuscript: lines should be numbered consecutively throughout the entire document. Indent paragraphs.

Scientific Names

Give scientific names in full (without authority) in the paper title, in the headings of sections and tables, in figure captions, and at the beginning of sentences. Refer to https://plants.usda.gov/ for approved scientific names for weeds. Use italic font for genera and species names. Provide complete scientific names (with authority abbreviated as is customary, e.g., common lambsquarters, *Chenopodium album* L.) of plants, animals, and microorganisms when first mentioned in the abstract. If the author wishes to provide synonyms for common names and Latin binomials, these can be placed in the keyword section. See http://theplantlist.org/ for an authoritative list of synonyms.

At the first mention in the text of a plant or animal, give its common name (if any) followed by the approved scientific name with the authority abbreviated enclosed in parentheses, or in brackets when parentheses occur within the binomial [e.g., johnsongrass [*Sorghum halepense* (L.) Pers.]. Thereafter use the abbreviated scientific name throughout the text (e.g., *C. album*), except for crops, where the common name (e.g., wheat) may be used. For the scientific and common names of crops, refer to *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.

Manuscript Order

Manuscripts should be in the following order: **Short title** for running header, **Title** (no separate title page), **Author(s), Abstract**, **Key Words, Introduction** (begin on a new page), **Materials and Methods, Results and Discussion**, **Acknowledgments, References** (begin on a new page), **Tables** (begin each on a new page), **Figure Legends** (begin on a new page), and **Figures**.

Title

The title page includes a ***short title*** for the running header that is not to exceed 30 characters and spaces. The full title should be no more than 200 characters and spaces, centered, in bold, sentence case, and should include words useful in online searches. Give scientific names in full (without authority) in the title, with genera and species names italicized. 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) and include a numbered superscript for each author. In the footnote, give the affiliation(s) of the authors and full institutional job titles at the time the study was conducted, followed by the institutional address(es). Spell out names of institutions in full. Inclusion of current addresses (if different) is optional, and they should be listed at the end. Addresses of U.S. authors should include the two-letter postal abbreviation for the state and the ZIP code. E-mail and full mailing address of the corresponding author should be included. We require all corresponding authors to identify themselves using ORCID when submitting a manuscript to the journal. Please visit this page for more information and to register. ORCID identifiers are encouraged for all coauthors, and should be included parenthetically after the job title.

Example of an author listing and address footnote:
Vipan Kumar [1], Joel Felix[2], Don Morishita[3] and Prashant Jha[4]
[1]Postdoctoral Research Associate, Montana State University, Southern Agricultural Research Center, Huntley, MT, USA; [2]Associate Professor, Oregon State University, Malheur Agricultural Experiment Station, Ontario, OR, USA; [3]Professor, University of Idaho, Kimberly Research and Extension Center, Kimberly, ID, USA; and [4]Associate Professor (ORCID 0000-000x-xxxx-xxxx), Montana State University, Southern Agricultural Research Center, Huntley, MT, USA. Author for correspondence: Prashant Jha, Associate Professor, Montana State University, Southern Agricultural Research Center, 748 Railroad Highway, Huntley, MT, 59037. (E-mail: pjha@montana.edu)

Abstract

Place the abstract on the same page as the title and authors. The text of the abstract should not exceed 300 words. It must be written as a single paragraph and should provide an objective and informative digest of the significant content of the paper, not simply a description of the contents. Use complete scientific names with abbreviated authority in the body of the abstract for plants, animals, and microorganisms. Do not include tables, graphs, long lists of names, references to literature, or footnotes. At the first mention of a herbicide rate, express the rate either on the acid equivalent (ae) basis or active ingredient (ai) basis. Use common names and omit trade names for herbicides, other pesticides, and surfactants or other adjuvants in the abstract. A list of ISO-approved common and chemical names of herbicides is available at the Compendium of Common Pesticide Names: (http://www.alanwood.net/pesticides/index.html). A database of approved Latin names of common weed species can be found at https://plants.usda.gov/.

Key words

Immediately after the abstract, list words, word pairs, or phrases (usually not more than five words) ***not included in the title*** that further describe the content of the manuscript. List only specific words or phrases that will be useful in indexes and literature database searches. Synonyms for common names and Latin binomials are optional. If provided, they should be placed in the keyword section. See http:theplantlist.org for an authoritative list of synonyms.

Introduction

Begin the introduction on a new page.

Materials and Methods

Sources of materials should be shown in parentheses following the first mention. Provide a brief description of the item, model number (if applicable), and the source, including the company's address (full mailing address, or city and state/country).For example: "During a single year, large plots were treated with glyphosate (Roundup WeatherMax®, 540 g ai L^{-1}, Monsanto Canada, 900 One Research Road, Winnipeg, Manitoba, Canada, R3T 6E3)." Commercially available software packages (e.g. SAS/STAT) should be cited in this way and not in the References. Freely available software described in the peer-reviewed literature (e.g. R) should be referenced by citing the relevant article in the text and in the References section.

Long herbicide treatment lists in the text are discouraged. In cases where five or more herbicides are mentioned, they 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 web site.

Authors are encouraged to include latitude and longitude coordinates for field locations. After each location name they should specify the coordinates in parenthesis e.g. “Vegetable Crop Research Farm in Champaign, Illinois (40.08°N, 88.26°W)”.

Results and Discussion
These are combined as one section. There is no separate Conclusion section, but authors may choose to end the Results and Discussion with an untitled summary.

Acknowledgments
WSSA requires that authors disclose sources of all funding received to support the research described in the manuscript. Funding sources should be appropriately described and recognized in the Acknowledgments section, accompanied by declaration of any potential conflicts of interest (see below). Where no specific funding has been provided for research, please provide the following statement: "This research received no specific grant from any funding agency, commercial or not-for-profit sectors." Acknowledgment of individuals who contributed to the research, but who do not meet the criteria for authorship listed above in the Authorship section, is at the discretion of the authors. Consult a recent issue of *Weed Science* for examples.

Conflicts of Interest
A conflict of interest (COI) may include, but is not limited to, any financial, professional, contractual or personal relationship or situation that could be perceived to influence an author’s objectivity in presenting the work. Conflicts of interest must be disclosed if relevant to the content of the manuscript. A COI declaration does not invalidate the research presented or preclude publication of the manuscript, but is required to allow reviewers and readers to assess research in the context in which it was conducted. Determination and disclosure of all COIs involving co-authors is the responsibility of the corresponding author. If no conflicts of interest are noted, then the following statement should be included: “No conflicts of interest have been declared.”

References
Begin on a separate page. 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 ISI guidelines, accessible at https://woodward.library.ubc.ca/research-help/journal-abbreviations/. Initials should follow the last name of each author, with no comma after the last name and no periods or spaces between initials. For references to a specific portion of a book or similar publication, cite those pages rather than the total pages of the book. See example below.

Unpublished texts are not permitted in the References section. Please cite submitted or unpublished articles parenthetically in the text as personal communications e.g. (KM Novosel, personal communication). Theses and dissertations may appear in References. Do not cite or footnote abstracts more than three years old unless the information contained is of vital importance and has not been reported elsewhere.

Citation examples:

Journal:
Pline WA, Wilcut JW, Duke SO, Edmisten KL, Wells RFP (2007) Tolerance and accumulation of shikimic acid in response to glyphosate applications in glyphosate-resistant and nonglyphosate-resistant cotton (*Gossypium hirsutum* L.). J Agric Food Chem 50:506–512

Wardell DA, Parkinson D (1990) Influence of the herbicide glyphosate on soil microbial community structure. Plant Soil 21:187–204

Citation of material published online, including articles published online but not yet assigned to a journal issue, should include the DOI (digital object identifier). Citations from online journals should also include volume and page numbers if available. Example: Clouse JW, Adhikary D, Page JT, Ramaraj T, Deyholos MK, Udall JA, Fairbanks DJJellen EN and Maughan PJ (2016) The amaranth genome: genome, transcriptome, and physical map assembly. Plant Genome 9, 10.3835/plantgenome2015.07.0062.

Book:
Ahrens WH, ed (1994) Herbicide Handbook. 7th ed. Champaign, IL: Weed Science Society of America. Pp 224–226

Kyle DJ, Osmond CB, Arntzen CJ, eds (1987) Photoinhibition. 4th ed. Volume 2. New York: Elsevier. 315 p

Wiese AF, Kyle, DJ (1985) Weed Control in Limited Tillage Systems. 2nd ed. Champaign, IL: Weed Science Society of America. Pp 78–96

Article in book:
Baver LD, Gardner WH (1972) Flow in stratified soil systems. Pages 343–345 *in* Baver LD, ed. Soil Physics. New York: Academic Press

Frankland B (1981) Germination in shade. Pages 187–204 *in* Smith HL, Taylor GHM, eds. Plants and the Daylight Spectrum. London: Academic Press

***Proceedings*:**
Forcella F, Buhler DD (1994) Dynamic environmental regulation of secondary dormancy in summer annual weeds. Pages 3–7 *in*Proceedings of the 1st International Symposium on Plant Dormancy. Corvallis, OR: Weed Science Society of America

Report or government publication:

Taylor AG (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] US 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:
Nieto-Hatem J (1963) Seed Dormancy in *Setaria lutescens*. Ph.D dissertation. Ames, IA: Iowa State University. 81 p

Patent:
Harred JF, inventor; Dow Chemical Company, assignee (1972) April 4. Epoxidation process. US patent 3,654,317

Package labels and inserts:
Anonymous (1996) Assure® II herbicide product label. DuPont Publication No. H-59334. Wilmington, DE: DuPont. 9 p
Website:
Agriculture and Agri-Food Canada (2014) Market and Industry Services Branch, Horticulture and Special Crops Division. http://www.Agr.ca/misb/spcrops/bean_e.html. Accessed: January 29, 2016

Anonymous (2015) Project Summary Comparative Genomics of Domestication Traits in Lettuce and Sunflower. http://veghome.ucdavis.edu/faculty/michelmore/. Accessed August 23, 2016

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 (2005) or (Jones 2005)
Two authors: James and Smith (2015) or (James and Smith 2015)
Three or more authors: Jones et al. (2016) or (Jones et al. 2016)
Two or more citations: James and Smith (2012), Jones (2013) or (James and Smith 2012; Jones 2013)
Multiple citations by one author: Jones (2001, 2012a, 2012b) or (Jones 2001, 2012a, 2012b)
Multiple citations by different authors: (James and Smith 2013; Jones et al. 2011; Smith 2014)

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: (JTC Renner, unpublished data) and (KM

Novosel, personal communication). All citations must be listed in References (except unpublished data and personal communications), and all listed references must be cited.

Tables

Type each table on a separate page following the References section. First reference to tables included primarily to present results should be in the Results and Discussion section, and tables should be numbered with Arabic numerals in the sequence of first reference in the text.

Include titles for all tables. Use the full scientific name (without authority) for weeds and other non-crop species in the table title. Redefine all abbreviations used in the table, even if the definition has already been given in the text. All text within each table should be in lower case letters except for the first word of a phrase or sentence, and proper nouns that should have initial capitals. 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:

Corn yield	
1988	1989
hg ha^{-1}	
6,400	7,800
...	...

Improper Form:

Year	
1988	1989
kg ha^{-1}	
6,400	7,800
...	...

Avoid the use of exponents in column headings. 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. Do not place the unit of measurement in parentheses. 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. For sample layouts, see published tables in a recent issue of *Weed Science*.

Figures

Figures should be appended to the end of the manuscript for inclusion in a posted Accepted Manuscript, for which total manuscript file size should not exceed 500 MB. High resolution figure files that expand the composite manuscript file beyond this limit can be uploaded separately for inclusion in the final published version of the article. 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. Legends for the axes of graphs must follow the 'Parameter (unit)' format; e.g., Time (h). Capitalize only the first word of each axis label. If an explanation of symbols is required, include the key in the figure. Scale bars included in photomicrographs should be placed directly on the image.

Number all figures, including photographs, consecutively with Arabic numerals in the sequence of first reference in the text. Figures should be cited in the text as Figure 1, Figure 2 etc. Type the list of figure legends on a separate page. Use scientific names in full (without authority) in figure legends for weeds and other non-crop organisms. Redefine abbreviations used in the figure even if the definition has already been given in the text. For details of image formatting and acceptable file types, see https://www.cambridge.org/core/services/authors/journals/journals-artwork-guide.

Supplementary Material

The reader should be able to fully understand the author's work through a reading of the article alone. However, the provision of Supplementary Material may be beneficial to readers if it supports reproducibility and transparency. Additional material too extensive for publication in a journal issue can be submitted as supplementary files to be made available online (e.g. figures, videos, 3-D structures/images, extensive datasets, etc).

Supplementary tables should be identified and referenced in the text as "Supplementary Table S1", "Supplementary Table S2" etc.; supplementary figures should be identified and referenced as "Supplementary Figure S1", "Supplementary Figure S2" etc. Any supplementary file that is not a table or figure should be referenced and identified as "Supplementary Appendix S1", "Supplementary Appendix S2" etc. All Supplementary Material should be uploaded in Editorial Manager at the time of parent article submission and clearly cited in a "Supplementary Materials" references list at the end of the body text. Supplementary Material will be made available for peer review for both relevance to the parent article and accuracy, but will be neither copyedited nor typeset.

Detailed Instructions

Abbreviations. 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. See (INSERT HYPERLINK) for approved abbreviations for frequently used terms or phrases that need not be defined.

Adjuvant Names. Consult Young B, F Whitford and J Matthews (2016) *Compendium of Herbicide Adjuvants* 13e (available at https://edustore.purdue.edu/) for correct terminology. Otherwise, use the most complete chemical description of the adjuvant.

Crop Variety Names. Enclose the cultivated variety of a crop plant, if known, in single quotation marks at first mention; thereafter, omit the quotation marks. Example: Corn (*Zea mays* L. 'Dixie 18'), but later Dixie 18 corn or just corn if only one cultivated variety is used. For cultivar names that are registered trade names, insert the registered trademark (®) after the name.

Enzymes. Use the nomenclature and numbering system recommended by the Committee on Nomenclature and Classification of Enzymes of the International Union of Biochemistry (http://www.chem.qmul.ac.uk/iubmb/enzyme/).

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:

$$Y = mx + b \quad \textbf{[1]}$$

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).

Herbicide and other Pesticide Names. At the first mention in the text of a herbicide or other pesticide, give its common name or other designation. A list of ISO-approved common and chemical names of herbicides is available at the Compendium of Common Pesticide Names (http://www.alanwood.net/pesticides/index.html). The full chemical name is required for any herbicide, other pesticide, growth regulator, or safener that does not have an ISO-approved common name. A chemical referred to by a code designation must be followed by its full chemical name enclosed by parentheses. Use only the common name or other designation thereafter. If the particular commercial formulation of a herbicide used affects results, identify the formulation in parentheses. 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 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^{-1} or kg ai ha^{-1}).

Measurements and Units. Use exponents rather than a slash (/) or dot (·) in reporting units of measure. e.g., kg ha^{-1} and µmol m^{-2} s^{-1}, not kg/ha or µmol · m^{-2} · s^{-1}. Report all measurements in SI units or SI-derived units (see *CSE Manual*). Do not use quintals or metric tons. Describe lighting conditions as irradiance (W m^{-2}) of photosynthetically active radiation or as photosynthetic photon flux density (µmol m^{-2} s^{-1}). 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^{-2} 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. 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^{-1}, 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 one to three rather than 1–3. Separate thousands with a comma (1,000; 10,000; 100,000). Omit non-significant 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^{-1} rather than 0.89 kg ha^{-1} and a grain yield as 590 kg ha^{-1} rather than 593 kg ha^{-1}.

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. Experimental results should be confirmed by appropriate replication in time or space. Progress reports, non-replicated experiments, and simple observational information are not acceptable. Data should be analyzed statistically, and results of the analyses should be included in the tables or figures where the data are presented. Authors are encouraged to refer to Onofri et al. (2010) *Current statistical issues in Weed Research.* Weed Res. 50:5–24; and to Ritz et al. (2015) *Research Methods in Weed Science: Statistics.* Weed Sci. 63sp1:166–187. All estimated values (e.g., model parameters, means, differences, etc.) should be presented together with an appropriate measure of variability in text, tables, and graphs. 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 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. For regression, the R should be used to delineate multivariate coefficient of variation, r bivariate correlation coefficients, and R^2, the coefficient of determination. 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.

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: see the Materials and Methods section for details.