

INSTRUCTIONS FOR CONTRIBUTORS TO *POULTRY SCIENCE*¹

EDITORIAL POLICIES AND PROCEDURES

Poultry Science publishes the results of fundamental and applied research concerning poultry, poultry products, and avian species in general. Submitted manuscripts shall provide new facts or confirmatory data. Papers dealing with experimental design, teaching, extension endeavors, or those of historical or biographical interest may also be appropriate. A limited number of review papers will be considered for publication if they contribute significant additional knowledge, or synthesis of knowledge, to a subject area. Papers that have been, or are scheduled to be, published elsewhere in the scientific literature will not be accepted. Publication of a preliminary report, such as an abstract, does not preclude consideration of a complete report for publication as long as it has not been published in full in a proceedings or similar scientific publication; appropriate identification of previously published preliminary reports (i.e., abstracts) should be provided in a title page footnote. Translation of an article into other languages for publication requires approval by the Editor-in-Chief. Opinions or views expressed in papers published by *Poultry Science* are those of the author(s) and do not necessarily represent the opinion of the Poultry Science Association or the Editor-in-Chief. For information on the scientific content of the journal, contact the Editor-in-Chief, **Dr. Paul B. Siegel, Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306; telephone 540-231-6472; FAX 540-231-3010; e-mail: pbsiegel@vt.edu.** For other information or to submit a paper, contact Susan Pollock, Technical Editor, Headquarters Office, Poultry Science Association, Inc., 1111 North Dunlap Avenue, Savoy, IL 61874; telephone (217) 356-7641; FAX (217) 378-4083; susanp@assoqh.org.

Care and Use of Animals

Authors must make it clear that experiments were conducted in a manner that avoided unnecessary discomfort to the animals by the use of proper management and laboratory techniques. Experiments shall be conducted in accordance with the principles and specific guidelines presented in *Guidelines for the Care and Use of Agricultural Animals in Agricultural Research and Teaching* (Association Headquarters, 1111 North Dunlap Avenue, Savoy, IL 61874); and, if applicable, *Guide for the Care and Use of Laboratory Animals* (United States Department

of Human Health and Services, National Institutes of Health, Publication Number 85-23, 1985); or *Guide to the Care and Use of Experimental Animals* (Canadian Council on Animal Care, Volume 2, 1984). Methods of killing experimental animals must be described in the text. In describing surgical procedures, the type and dosage of the anesthetic agent must be specified. The Editor-in-Chief of *Poultry Science* may refuse to publish manuscripts that are not compatible with these guides. If rejected solely on that basis, however, the paper may be resubmitted for reconsideration when accompanied by a written verification that a committee on animal care in research has approved the experimental design and procedures involved.

Types of Articles

Full-Length Articles. The majority of papers published in *Poultry Science* are full-length articles. The journal emphasizes the importance of good scientific writing and clarity in presentation of the concepts, apparatus, and sufficient background information that would be required for thorough understanding by scientists in other disciplines. The results of experiments published in *Poultry Science* must be replicated, either by replicating treatments within experiments or by repeating experiments.

Research Notes. Research Notes are short notes giving the results of complete experiments but are less comprehensive than full-length articles. Preliminary or progress reports will not be accepted. The running head shall be "RESEARCH NOTE." Authors must also indicate the section under which the manuscript is to be reviewed on the title page of the manuscript and on the Manuscript Submission and Copyright Release Form. Research Notes will be published as a subsection of the scientific section in which they were reviewed. Research Notes are limited to five printed pages including tables and figures. Manuscripts should be prepared according to the guidelines for full-length articles.

Symposium Papers. The Symposium organizer or Chair must present the proposal and tentative budget to the Board of Directors at the summer meeting one full year before the symposium is to be scheduled. The Symposium Chair must then develop detailed symposium plans, including a formal outline of the talks approved and full budgetary expectations, which must be brought to the Board of Directors at the January meeting prior to the meeting at which the symposium is scheduled. The Symposium Chair must decide whether or not the symposium is to be published, and will inform the Editor-in-Chief of this decision at the January meeting.

¹This version should be read carefully for new information. 2003 version.

If the decision is not to publish the symposium, the individual authors retain the right to submit their papers for consideration for the journal as ordinary manuscripts. If publication is decided upon, all manuscript style and form guidelines of the journal shall be followed. **Manuscripts must be prepared electronically, including figures and tables, and then uploaded onto the Poultry Science Manuscript Central site within 2 weeks after the annual meeting.** The Symposium Chair reviews the papers and, if necessary, returns them to the authors for revision. The Symposium Chair then forwards the revised manuscript to the Editor-in-Chief for final review. All manuscripts must be in the hands of the Editor-in-Chief by December 31 of the year in which the symposium was presented. Manuscripts not meeting this deadline will not be included in the published symposium proceedings. Symposium papers must be prepared in accordance with the guidelines for full-length articles. They are exempt from processing fees and pages charges, up to 10 journal pages in length. Reprints and costs of pages over 10 pages are the responsibility of the author.

Invited Papers. Invited papers, such as the World Poultry Science Association lecture, should be submitted to the Program Chairperson, who will then send it to the Editor-in-Chief. All manuscript style and form guidelines of the journal shall be followed. Invited papers are exempt from processing fees and page charges but not reprint charges.

Book Reviews. *Poultry Science* publishes reviews of books considered to be of interest to the readers. Reviews are ordinarily solicited by the Editor-in-Chief. Unsolicited reviews must be sent directly to the Editor-in-Chief for approval. Book reviews shall be prepared in accordance to the style and form requirements of the journal, and they are subject to editorial revision. No processing fee or page charges will be required.

Review Papers. Review papers are accepted only if they provide new knowledge or a high-caliber synthesis of important knowledge. Reviews are not exempt from processing fees and pages charges. All *Poultry Science* guidelines for style and form apply.

Letters to the Editor. The purpose of letters will be to discuss, critique, or expand on scientific points made in articles recently published in *Poultry Science*. Introduction of unpublished data will not be allowed, nor will material based on conjecture or speculation. Letters must be received within 6 months of an article's publication. Letters will be limited to 400 words and 5 references (approximately three double-spaced, typed pages including references). Letters shall have a title. Author name(s) and affiliation(s) shall be placed between the end of the text and list of references. Letters (an original plus two copies) will be sent directly to the Editor-in-Chief for consideration. The author(s) of the original paper(s) will be provided a copy of the letter and offered the opportunity to write a reply (an original plus two copies) within 30 d. Replies will have the same page restrictions and format as letters, and the titles shall end

with "—Reply." Letters and replies will be published together. Acceptability of letters will be decided by the Editor-in-Chief. Letters and replies shall follow appropriate *Poultry Science* format and may be edited by the Editor-in-Chief and Technical Editor. If multiple letters on the same topic are received, a representative letter concerning a specific article will be published. All letters may not be published. Letters and replies will be published as space permits. Page charges are not necessary at this time.

News and Notes. News items regarding individuals, organizations, meetings, and materials concerned with the poultry industry should be submitted to the *PSA Newsletter*, which is published quarterly. Notices of experimental stock, eggs, or other research material that may be available from universities, colleges, or other institutions are also published in the newsletter. Interested persons should contact the **newsletter coordinator** (psa@assochq.org).

SUBMISSION OF ELECTRONIC MANUSCRIPTS

Authors should submit their papers electronically at <http://poultryscience.manuscriptcentral.com>. See that web site or the Appendix to these Instructions for details on using the system. Authors who are unable to submit electronically should mail one copy of the manuscript and a disk with all manuscript materials (title page, text, figures, and tables; saved as a Microsoft Word file) to Susan Pollock, Managing Editor, Poultry Science Association, 1111 N. Dunlap Ave., Savoy, IL 61874. Staff at PSA headquarters will post manuscripts by proxy, but authors should be aware that delays might occur in the review process.

There is a \$25 nonrefundable manuscript processing fee for each manuscript submitted. A check or official purchase order, or credit card information should be forwarded to the PSA office at the time of submission. Please include corresponding author name and address and manuscript number with payment. In cases in which only the authors' personal funds are available for payment and in which such payments would be a hardship, authors may request in writing a waiver from the Editor-in-Chief.

Copyright Agreement

Authors shall complete the Manuscript Submission and Copyright Release form for each new manuscript submission; faxed copies are acceptable. The form is published in *Poultry Science* as space permits and is available online (<http://www.poultryscience.org/ps/>). The copyright agreement is included in the Manuscript Submission and Copyright Release Form and must be completed by all authors before publication can proceed. The corresponding author is responsible for obtaining the signatures of coauthors. Persons unable to sign copy-

right agreements, such as federal employees, must indicate the reason for exemption on the form.

The Poultry Science Association grants to the author the right of republication in any book of which he or she is the author or editor, subject only to giving proper credit to the original journal publication of the article by the Association. The Poultry Science Association, Inc. retains the copyright to all materials accepted for publication in the journal. Please address requests for permission to reproduce published material to the Editor-in-Chief. All tables must be original material. If an author wishes to present data previously published in tabular form, copyright permission to reproduce the table must be obtained by the author and forwarded to the PSA editorial office, even when the format of the table submitted with the manuscript is different than the table already published.

If an author desires to reprint a figure published elsewhere, copyright permission to use the figure must be obtained by the author and forwarded to the PSA editorial office.

Pre-Edit

The Technical Editor pre-edits all submissions for style and form requirements as well as clarity of writing and grammatical correctness. Special attention is paid to figures and tables. Manuscripts may be returned to authors for corrections prior to review. A pre-edited copy is sent to the appropriate Section Editor, who incorporates these changes in his or her suggestions for revision.

REVIEW

After a manuscript is submitted electronically, the editorial office informs the appropriate Section Editor, who assigns two reviewers, at least one of whom is an Associate Editor. Each reviewer has 3 wk to review the manuscript, after which his or her comments are forwarded to the Section Editor. The Section Editor may recommend rejection or acceptance at this point, after which the manuscript, reviewer comments, and the pre-edited copy are sent to the Editor-in-Chief for a final decision. More commonly, the manuscript will be sent back to the corresponding author for revision according to the guidelines of the reviewers. Authors have 60 d to complete the revision, which shall be returned to the Section Editor. Failure to return the manuscript within 60 d will cause the paper to be purged from the files. Purged manuscripts may be reconsidered, but they will have to be processed as new manuscripts. Section Editors handle all correspondence with authors during the review process. Approval by two members of the Editorial Board is necessary for acceptance. The Editor-in-Chief will notify the author of the final decision to accept or reject. Revised versions of previously rejected manuscripts are treated as new submissions. Therefore, authors must complete a new Manuscript Submission and Copyright Release

Form and must pay the \$25 processing fee at the time the revision is submitted.

PRODUCTION OF PROOFS

Accepted manuscripts are forwarded by the Editor-in-Chief to the Technical Editor for preparation for typesetting. At this point the Technical Editor may contact the authors for missing information or figure revisions. The manuscript is then typeset, figures reproduced, and author proofs prepared.

Proofs

Author proofs of all manuscripts will be provided to the corresponding author. Author proofs should be read carefully and checked against the typed manuscript, because **the responsibility for proofreading is with the author(s)**. Corrections may be returned by fax, mail, or e-mail. For faxed or mailed corrections, changes to the proof should be made neatly and clearly in the margins of the proof. If extensive editing is required, corrections should be provided on a separate sheet of paper with a symbol indicating location on the proof. Changes sent by e-mail to the technical editor must indicate page, column, and line numbers for each correction to be made on the proof. Author alterations from copy exceeding 10% of the cost of composition will be charged to the author.

Editor queries should be answered on the galley proofs; failure to do so may delay publication.

Proof corrections should be made and returned to the technical editor within 48 h.

Page Charges

Authors will be charged \$100 (members) or \$120 (non-members) per printed page or fraction thereof to partially cover the costs of publication of *Poultry Science*. Cost of reproduction of color figures must be borne by the authors and must be approved in writing by authors prior to publication.

Authors who must use personal funds to pay for page charges and for whom such charges would entail hardship can request of the Editor-in-Chief that these charges be waived. Such requests must be made in writing at the time the manuscript is submitted and should be accompanied by a statement from a financial officer or other official from the institution with which the author is affiliated indicating the reasons why page charges cannot be paid. Waivers are limited to one per institution per year. Authors who request waiver of submission fee and page charges may not order reprints.

Reprints

A form for ordering reprints is forwarded to the corresponding author with the author proof. The form must be completed and returned to the Headquarters Office

with a purchase order. Reprints will not be available unless so ordered. Reprints will be shipped approximately 1 mo after publication of the issue. Invoices for reprints will be sent to the author or institution shown on the purchase order. There is a charge for all reprints.

POULTRY SCIENCE STYLE AND FORM

Papers must be written in English. The text and all supporting materials must use American spelling and usage as given in *The American Heritage Dictionary*, *Webster's Third International Dictionary*, or the *Oxford American English Dictionary*. Authors should follow the style and form recommended in *Scientific Style and Format. The CBE Manual for Authors, Editors, and Publishers*. 6th Ed. Council of Biology Editors Style Manual Committee. Cambridge University Press, Cambridge, UK.

Headings

Major Headings. Major headings are centered (except ABSTRACT), all capitals, boldface, and consist of ABSTRACT, INTRODUCTION, MATERIALS AND METHODS, RESULTS, DISCUSSION (or RESULTS AND DISCUSSION), ACKNOWLEDGMENTS (optional), APPENDIX (optional), and REFERENCES.

First Subheadings. First subheadings are placed on a separate line, begin at the left margin, the first letter of all important words is capitalized, and the headings are boldface and italic. Text that follows a first subheading should be in a new paragraph.

Second Subheadings. Second subheadings begin the first line of a paragraph. They are indented, boldface, italic, and followed by a period. The first letter of each important word should be capitalized. The text follows immediately after the final period.

Title Page

Authors should create a full title page as a one-page document, in a file separate from the rest of the paper. This file shall be uploaded and marked "not for review."

The full title page will contain the following information. Authors must provide a running head (short title) of not more than 55 letters. The running head is centered, is in all capital letters, and shall appear on the top of the title page. No abbreviations should be used.

The title of the paper must be in boldface with the first letter of each word capitalized except for short articles and prepositions. The title must contain no abbreviations, and numbers must be given in words rather than in numerals (e.g., One-Day-Old Broilers).

Names of authors have initial capital letters and a space between initials (e.g., T. E. Smith). Affiliations will be footnoted using the following symbols: *, †, ‡, §, ||, #, and be placed below the author names. Do not give authors' titles, positions, or degrees. Footnotes may be used to provide supplementary information such as present address, acknowledgment of grants, and experi-

ment station or journal series number. The corresponding author should be indicated with a numbered footnote of the format: To whom correspondence should be addressed: followed by an e-mail address.

The title page shall include the name and full address of the corresponding author. Telephone, FAX, and e-mail numbers must also be provided. The title page must indicate the appropriate scientific section for the paper (e.g., Breeding and Genetics; Education and Production; Environment, Health, and Behavior; Immunology and Molecular Biology; Metabolism and Nutrition; Physiology and Reproduction; or Processing and Products).

The first page of each manuscript should be an abbreviated title page (paper title and running head). No authors or affiliations should be indicated. An abbreviation key, if appropriate, should also be included on this page.

Abbreviation Key

An abbreviation key must be provided for all author-derived abbreviations. This key should appear in alphabetical order at the bottom of the title page and should be in the format: **Abbreviation Key:** CORT = corticosterone; MDR = minimum daily requirement. Do not include abbreviations 1) that are listed on the inside cover of the Journal; 2) for chemical compounds or amino acids; 3) for standard units, such as Pascals, amperes, kilograms, etc. Refer to the Miscellaneous Usage Notes for more information on abbreviations.

Abstract

The Abstract disseminates scientific information through abstracting journals and through convenience for the readers. The Abstract, consisting of not more than 250 words, appears at the beginning of the manuscript with the word ABSTRACT without a following period. It must summarize the major objectives, methods, results, conclusions, and practical applications of the research. The Abstract must consist of complete sentences and use of abbreviations should be limited. References to other work and footnotes are not permitted. The Abstract and Key Words must be on a separate sheet of paper.

Key Words

The Abstract shall be followed by a maximum of five key words or phrases to be used for subject indexing. These should include important words from the title and the running head. Authors should consult a current "Subject Index" in *Poultry Science* for additional key words. Key words should be formatted as follows: (*Key words: . . .*).

Introduction

The Introduction, while brief, should provide the reader with information necessary for understanding

research presented in the paper. Previous work on the topic should be summarized, and the objectives of the current research must be clearly stated.

Materials and Methods

All sources of products, equipment, and chemicals used in the experiments must be specified in footnotes, using numerical references, i.e., ²ABC Corp., Provo, UT. Model and catalog numbers should be included. Footnotes shall include the full corporate name (including division, branch, or other subordinate part of the corporation, if applicable), city, and state (country if outside the United States), or web address. Footnotes should be placed at the bottom of the same page and be numbered consecutively from the title page through the body of the manuscript. Street addresses need not be given unless the reader would not be able to determine the full address for mailing purposes easily by consulting standard references.

Age, sex, breed, and strain or genetic stock of animals used in the experiments shall be specified. Animal care guidelines should be referenced if appropriate.

Papers must contain analyzed values for those dietary ingredients that are crucial to the experiment. In other papers, authors should state whether experimental diets meet or exceed the National Research Council (1994) requirements as appropriate. If not, crude protein and metabolizable energy levels should be stated. For layer diets, calcium and phosphorus contents should also be specified.

When describing the composition of diets and vitamin premixes, the concentration of vitamins A and E should be expressed as IU/kg on the basis of the following equivalents:

Vitamin A

- 1 IU = 0.3 μ g all-trans retinol
- 1 IU = 0.344 μ g retinyl acetate
- 1 IU = 0.552 μ g retinyl palmitate
- 1 IU = 0.60 μ g β -carotene

Vitamin E

- 1 IU = 1 mg dl- α -tocopheryl acetate
- 1 IU = 0.91 mg dl- α -tocopherol
- 1 IU = 0.67 mg d- α -tocopherol

In the instance of vitamin D₃, cholecalciferol is the acceptable term on the basis that 1 IU vitamin D₃ = 0.025 μ g cholecalciferol.

The sources of vitamins A and E must be specified in parentheses immediately following the stated concentrations.

Statistical Analysis. Adequate and appropriate statistical methods shall be used for both numerical and categorical data. The Materials and Methods section shall include sample sizes with a discussion of the methods of statistical analysis including sufficient detail so that the analysis could be repeated by others. Specify the factors tested in the analysis or the statistical model employed. In model statements, upper case letters should be used for fixed effects and lower case letters

for random effects. If the same probability level is used throughout a manuscript, the author may make a general statement specifying the probability level. If more than one probability level is used, statements as to the significance of data should be followed by the level of probability in parentheses ($P \leq 0.05$). Nonsignificant differences ($P \geq 0.05$) should not be discussed as if they are real differences by using such terms as "numerical differences," "trends," etc. Nonsignificant probability levels can be discussed if properly qualified so that the reader is not misled. The authors must provide the appropriate citation in the text and entry in the References section for all statistical methods and procedures used for analysis of the data. Sample means shall be accompanied by number of observations and an estimate of variation or experimental error (e.g., standard error).

Results and Discussion

Results and Discussion sections may be combined, or they may appear in separate sections. If separate, the Results section shall contain only the results and summary of the author's experiments; there should be no literature comparisons. Those comparisons should appear in the Discussion section.

Acknowledgments

An Acknowledgments section, if desired, shall follow the Discussion section. Acknowledgments of individuals must include affiliations but not titles, such as Dr., Mr., or Ms. Affiliations shall include institution, city, and state. Review copies shall have authors' institutions omitted.

Appendix

A technical Appendix, if desired, shall follow the Discussion section or Acknowledgments, if present. The Appendix may contain supplementary material, explanations, and elaborations that are not essential to other major sections but are helpful to the reader. Novel computer programs or mathematical computations would be appropriate. The Appendix will not be a repository for raw data.

References

Text Citations. In the body of the manuscript, refer to authors as follows: Smith and Jones (1992) or Smith and Jones (1990, 1992). If the sentence structure requires that the authors' names be included in parentheses, the proper format is (Smith and Jones, 1982; Jones, 1988a,b). Where there are more than two authors of one article, the first author's name is followed by the abbreviation et al. More than one article listed in the same sentence of text must be in chronological order first, and alphabetical order for two publications in the same year. Work that has not been accepted for publication shall be listed in

the text as: "J. E. Jones (1981, institution, city, and state, personal communication)." The author's own unpublished work should be listed in the text as "(J. Smith, unpublished data)." Personal communications and unpublished data must not be included in the References section.

References Section. To be listed in the References section, papers must be published or accepted for publication. Manuscripts submitted for publication can be cited as "personal communication" or "unpublished data" in the text. In the References section, references shall first be listed alphabetically by author(s)' last name(s), and then chronologically. The year of publication follows the authors' names. As with text citations, two or more publications by the same author or set of authors in the same year shall be differentiated by adding lower case letters after the date. The dates for papers that would be abbreviated in the text as et al., even though the second and subsequent authors differ, shall also be differentiated by letters. All authors' names must appear in the Reference section. Journals shall be abbreviated according to the conventional abbreviations given in *Serial Sources for the BIOSIS Data Base* (BioSciences Information Service, 2100 Arch St., Philadelphia, PA 19103-1399). One-word titles must be spelled out. Inclusive page numbers must be provided. Sample references are given below. Consult recent issues of *Poultry Science* for examples not included below.

Article or abstract:

Bagley, L. G., and V. L. Christensen. 1991. Hatchability and physiology of turkey embryos incubated at sea level with increased eggshell permeability. *Poult. Sci.* 70:1412-1418.

Bagley, L. G., V. L. Christensen, and R. P. Gildersleeve. 1990. Hematological indices of turkey embryos incubated at high altitude as affected by oxygen and shell permeability. *Poult. Sci.* 69:2035-2039.

Peak, S. D., and J. Brake. 2000. The influence of feeding program on broiler breeder male mortality. *Poult. Sci.* 79(Suppl. 1):2. (Abstr.)

Book:

National Research Council. 1994. Nutrient Requirements of Poultry. 9th rev. ed. National Academy Press, Washington, DC.

Paper in book:

Metcalf, J., M. K. Stock, and R. L. Ingermann. 1984. The effects of oxygen on growth and development of the chick embryo. Pages 205-219 in *Respiration and Metabolism of Embryonic Vertebrates*. R. S. Seymour, ed. Dr. W. Junk, Dordrecht, The Netherlands.

Conference proceedings:

Rongey, E. H. 1965. A simple objective test for sausage emulsion quality. Pages 99-106 in *Proceedings of the Meat Industry Research Conference*. American Meat Institute Foundation, Chicago, IL.

URL:

Schaeffer, L. R. 1997. Subject: Random regressions. <http://chuckagsci.colostate.edu/wais/logs/agdg869258263.html>. Accessed Nov. 1997.

Tables

Each table must be typed on a separate sheet of paper. The table shall begin with "TABLE 1." followed by the title of the table in boldface type. The first letter of the first word in the table title shall be capitalized. No period follows the title. Units of measure for each variable must be indicated. Papers with several tables must use consistent format. All columns must have appropriate headings. Use of horizontal and vertical lines to separate sections within the body of the table is not permitted. A horizontal line is used to separate the title and column titles from the body of the table or to include several columns under a single heading.

Each table must stand alone. Therefore, abbreviations not found on the inside front cover of the journal must be defined in each table. Abbreviations must match those used in the text. Footnotes to tables shall be marked by superscript numbers.

Superscript letters shall be used for the separation of means in the body of the table and explanatory footnotes must be provided [i.e., "Means within a row lacking a common superscript differ ($P < 0.05$)."]; other significant P -values may be specified. Comparison of means within rows and columns should be indicated by different series of superscripts (e.g., a,b, . . . in rows; x-z . . . in columns). The first alphabetical letter in the series (e.g., a or A) shall be used to indicate the largest mean. Lowercase superscripts indicate $P \leq 0.05$. Uppercase letters indicate $P \leq 0.01$ or less.

Probability values may be indicated as follows: * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$, and † $P \leq 0.10$. Consult a recent issue of *Poultry Science* for examples of tables.

Figures

Details for preparing figures are available online at <http://www.fass.org/authinst.htm>. This web site should be consulted regularly for updated information.

The use of figures should be minimized. Do not repeat material already mentioned in the Materials and Methods section or in the tables. Verify, however, that each figure is independently comprehensible without reference to the text, other figures, or other tables. Figure style and format should be consistent across figures. Figures will use the same format as required for tables to indicate statistical differences.

To ensure good print quality in the journal, figures to be printed in black and white or gray scale should not be prepared in color.

Figures or groups of figures must be no larger than 18.6 × 24.4 cm and should be created as near as possible to the size they will appear in the journal (8.5, 15, or 18.6 cm). The front, lower right corner of each figure should be labeled with author name, figure number, and a few words of the article title to which it belongs. For revised manuscripts, label figures with figure number and manuscript number only.

On line graphs, symbols must not contain other symbols within them (e.g., a circle within a triangle) to indicate data points, because those symbols will fill in after reduction. When possible, symbols should be defined in the caption; when the legend is part of the figure, it should appear within the axes but outside the data field. Lettering on the y-axis should be printed vertically along the axis. All lines within the figure should be at least 1 point wide when printed.

Not all dot or line patterns or gray shading will produce evenly and, thus, should be avoided. Three-dimensional figures, although attractive, often obscure the data presentation and should generally be avoided; however if three-dimensional bars are necessary, indicate in the caption which portion of the bar is to be used for making comparisons.

For plates, individual photographs are preferred. If submitted as a composite, plates should be carefully mounted on a white background. Margins between each photograph should be minimal and must be even. Labels should be on the photographs, not outside them, when possible.

Before submission, authors should print out each figure, and ensure that the lettering, line widths, shading, etc. are of high quality (clear) and readable.

Captions and Legends. Captions should be typed double-spaced on a separate page preceding the figures. Identify curves with the following symbols: □, ■, ○, ●, ▲, ▼, △, ▽, ★, ☆, ◇, ◆. Symbols other than those listed cannot be reproduced in the caption and, thus, must appear as part of the figure.

For each figure, captions should define all abbreviations used in the figure. Abbreviations in figures should be consistent with text usage. Figure format and style should be consistent across figures.

Light and Electron Micrographs. Authors should submit high-quality files for reviewers (300 dpi). Micrographs must be submitted as near to the final publication size as possible. A bar on the figure should indicate scale.

Color Illustrations. The cost to publish each color figure is \$995; a surcharge for color reprints ordered will be assessed. Authors must agree in writing to bear the costs of color production after acceptance and prior to publication of the paper. The form "Changes for Printing in Color" is available on the journal web site.

Miscellaneous Usage Notes

Abbreviations. Abbreviations shall not be used in the title, key words, or to begin sentences, except when they are widely known throughout science (e.g., DNA, RNA, etc.) or are terms better known by abbreviation (IgG, CD, etc.). A helpful criterion for use of abbreviation is whether it has been accepted into thesauri and indexes widely used for searching major bibliographic databases in the scientific field. Abbreviations may be used in heads within the paper, if they have been first defined within the text. The inside front cover of every issue of the journal lists abbreviations that should be used with-

out definition and are also listed at the end of this section. They are subject to revision at any time, so authors should always consult the most recent issue of the journal for relevant information. Abbreviations are allowed when they help the flow of the manuscript; however, excessive use of abbreviations can confuse the reader. The suitability of abbreviations is evaluated by the Technical Editor during pre-editing and editing and by the reviewers and editors during the review process. As a rule, author-contrived abbreviations should be in all capital letters. Terms used less than three times must be spelled out in full rather than abbreviated. All terms are to be spelled out in full with the abbreviation following in parentheses the first time they are mentioned. Abbreviations shall be used consistently thereafter, rather than the full term.

The abstract, text, each table, and each figure must be understood independently of each other. Therefore, abbreviations shall be defined within each of these units of the manuscript.

Plural abbreviations do not require "s." Chemical symbols and three-letter abbreviations for amino acids do not need definition. Units of measure, except those shown below, should be abbreviated as listed in the *CRC Handbook for Chemistry and Physics* (CRC Press, 2000 Corporate Blvd., Boca Raton, FL 33431) and do not need to be defined.

The following abbreviations may be used without definition in *Poultry Science*.

A	adenine
AME	apparent metabolizable energy
AME _n	nitrogen-corrected apparent metabolizable energy
ANOVA	analysis of variance
B cell	bursal-derived, bursal-equivalent derived cell
bp	base pairs
BSA	bovine serum albumin
BW	body weight
C	cytosine
cDNA	complementary DNA
cfu	colony-forming units
CP	crude protein
cpm	counts per minute
CV	coefficient of variation
d	day
df	degrees of freedom
DM	dry matter
DNA	deoxyribonucleic acid
EDTA	ethylenediaminetetraacetate
ELISA	enzyme-linked immunosorbent antibody assay
g	gram
<i>g</i>	gravity
G	guanine
GAT	glutamic acid-alanine-tyrosine
h	hour
HPLC	high-performance (high-pressure) liquid chromatography
ICU	international chick units
Ig	immunoglobulin
i.m.	intramuscular
i.p.	intrapertoneal
IU	international units
i.v.	intravenous
kb	kilobase pairs
kDa	kilodalton
L	liter
L:D	hours light:hours darkness in a photoperiod
m	meter
μ	micro

M	molar
MAS	marker-assisted selection
ME	metabolizable energy
ME _n	nitrogen-corrected metabolizable energy
MHC	major histocompatibility complex
mRNA	messenger ribonucleic acid
min	minute
mo	month
MS	mean square
N	normal
n	number of observations
NRC	National Research Council
NS	not significant
PAGE	polyacrylamide gel electrophoresis
PBS	phosphate-buffered saline
PCR	polymerase chain reaction
ppm	parts per million
pfu	plaque-forming units
QTL	quantitative trait loci
r	correlation coefficient
r ²	coefficient of determination, simple
R ²	coefficient of determination, multiple
RFLP	restriction fragment length polymorphism
RH	relative humidity
RIA	radioimmunoassay
RNA	ribonucleic acid
rpm	revolutions per minute
s	second
s.c.	subcutaneous
SD	standard deviation
SDS	sodium dodecyl sulfate
SE	<i>Salmonella enteritidis</i>
SE	standard error
SEM	standard error of the mean
SRBC	sheep red blood cells
T	thymine
TBA	thiobarbituric acid
T cell	thymic-derived cell
TME	true metabolizable energy
TME _n	nitrogen-corrected true metabolizable energy
Tris	tris(hydroxymethyl)aminomethane
TSAA	total sulfur amino acids
U	uridine
USDA	United States Department of Agriculture
vol/vol	volume to volume
vs	versus
wt/vol	weight to volume
wt/wt	weight to weight
wk	week
\bar{x}	mean
yr	year

International Words and Phrases. Non-English words in common usage (defined in recent editions of standard dictionaries) will not appear in italics (e.g., *in vitro*, *in vivo*, *in situ*, *a priori*, *vs.* etc.). However, genus and species of plants, animals, or bacteria and viruses should be italicized. Authors must indicate accent marks and other diacriticals on international names and institutions. German nouns shall begin with capital letters.

Capitalization. Breed and variety names are to be capitalized (Single Comb White Leghorns).

Measures and Mathematics. Numbers less than one shall be written with preceding zeros (e.g., 0.75). Numbers shall be written out in words when less than 10 and when they are not measurements (e.g., three hens, 30 hens; but 3 cm). Measures must be in the metric system; however, U.S. equivalents may be given in parentheses. *Poultry Science* requires that measures of energy be given in calories rather than joules, but the equivalent in joules may be shown in parentheses or in a footnote to tables. Units of measure not preceded by numbers must be

written out rather than abbreviated (e.g., lysine content was measured in milligrams per kilogram of diet) unless used parenthetically. Measures of variation must be defined in the Abstract and in the body of the paper at first use. Units of measure for feed conversion or feed efficiency shall be provided (i.e., g:g).

Nucleotide Sequences. Nucleotide sequence data must relate to poultry or poultry pathogens and must complement biological data published in the same or a companion paper. If sequences are excessively long, it is suggested that the most relevant sections of the data be published in *Poultry Science* and the remaining sequences be submitted to one of the sequence databases. Acceptance for publication is contingent on the submission of sequence data to one of the databases. The following statement should appear as a footnote to the title on the title page of the manuscript. "The nucleotide sequence data reported in this paper have been submitted to GenBank Submission (Mail Stop K710, Los Alamos National Laboratories, Los Alamos, NM 87545) nucleotide sequence database and have been assigned the Accession Number XNNNNN."

Publication of the description of molecular clones is assumed by the editors to place them in the public sector. Therefore, they shall be made available to other scientists for research purposes.

Nucleotide sequences must be submitted as camera-ready figures no larger than 21.6 × 27.9 cm in standard (portrait) orientation. Abbreviations should follow *Poultry Science* guidelines.

Miscellaneous Usage Notes. Note that "and/or" is not permitted; choose the more appropriate meaning or use "x or y or both."

Use the slant line only when it means "per" with numbered units of measure or "divided by" in equations. Use only one slant line in a given expression: e.g., g/d per chick. The slant line may not be used to indicate ratios, mixtures.

Footnote numbers should follow punctuation (e.g., Jones,¹ or ...end of sentence.²)

Use "to" instead of a hyphen to indicate range.

Insert spaces around all signs (except slant lines) of operation (=, −, +, ×, >, or <, etc.) when these signs occur between two items.

Items in a series should be separated by commas: e.g., a, b, and c.

Restrict the use of "while" and "since" to meanings related to time. Appropriate substitutes include "and," "but," or "whereas" for "while" and "because" or "although" for "since."

Initial zeros should be used with numbers less than 1 (e.g., 0.01). Commas should be used in numbers greater than 1,000.

APPENDIX: WEB-BASED SUBMISSION AND REVIEW VIA MANUSCRIPT CENTRAL

One of the goals of *Poultry Science* in recent years has been to speed up the review and publishing processes

so that authors and readers can benefit from the results of research as soon as possible. The PSA journals now use a web-based system for submission and review of manuscripts, Manuscript Central, a product of ScholarOne, Inc., Charlottesville, Virginia (<http://poultryscience.manuscriptcentral.com>). Below are steps that should be followed for submitting, revising, and reviewing papers.

Before starting the submission process, authors should prepare the following files and data to be uploaded or copied and pasted into text boxes:

- Separate Title Page containing title, running head, author names and affiliations, corresponding author name, address, and e-mail.
- Text (main document) of your article; tables should be included in this file, after the references section. Papers submitted to *Poultry Science* should use an abbreviated title page (no authors or affiliations) as the first page of the text document.
- Any figures to be included with your manuscript.
- Author names, affiliations, and e-mail addresses (if you want them to be copied on the status of the manuscript)
- Manuscript title and key words
- Abstract (Summary for JAPR)
- Cover letter

Authors will also use this site to upload revisions of their papers and to check the progress of the review process. Reviewers will use this e-mail-driven system to receive assignments to evaluate papers. Papers will be posted to the Manuscript Central web site, where the .pdf can be read online or downloaded and printed out. When ready to make comments on a manuscript, reviewers may type comments to the editor and to the author into a word processing document so that the text will be ready to copy and paste into text boxes on the Manuscript Central site. To score a paper, reviewers will access the online score sheet and comment boxes. If interrupted during this process, the score sheet can be saved and completed later.

Using the System

As you use the system the first few times, be sure to read all instructions completely. If you have problems, you will find a "Find Help Now" button on the upper right-hand corner of almost every page. A variety of help options are available: FAQs, e-mail addresses for submitting questions, and a phone number (434-817-2040 ext. 167; international callers should dial 001-434-817-2040) to request help. You may also contact PSA headquarters in Savoy if you have questions. Please contact Crystal Rothganger at crystalr@assoqhq.org for guidance on preparing the manuscript.

Please use the navigation buttons within the system for moving forward and back. Do not use your browser's back button.

AUTHORS

Preparing the Manuscript File. The manuscript should be prepared before the submission process begins. **Key the manuscript with double spaces between lines for 8.5- × 11-inch paper.** Be sure that line numbering is turned on (**numbers should be continuous throughout the text; do not restart with 1 on each page**) and that pages are numbered consecutively so that reviewers can refer to page and line numbers in their reviews. **Save your manuscript as a Microsoft Word file (.doc).** Other allowable formats for the text are .rtf (rich text format) and .ps (postscript file).

It is strongly suggested that authors use 11- or 12-point Times New Roman font to prepare manuscripts and that all special characters (Greek, other alphabets) be inserted using the symbols palette available with this font. Mathematic formulas can be inserted with Equation Editor. Errors in uploading your files onto the system may occur if special or uncommon fonts are used to type the manuscript. For papers submitted to *Poultry Science*, author names and affiliations should not appear on the title page, as the copy that you upload is the review copy. A separate document containing a full title page (running title, full title, author names, author affiliations, corresponding author name and address, including e-mail address) should be created and uploaded. The separate title page should be marked "not for review" when uploaded.

When papers are uploaded onto the server, the system will convert them to the .pdf file format for review, so authors should be familiar with the limits of that format to convert some fonts, special characters, and equations. Consult the Help areas of Manuscript Central or your local tech department if you have problems.

Tables should be inserted at the end of the paper, after the references. Broadside tables to be viewed in landscape format may be saved in an MS Word file to be uploaded separately from the main text. Figures (with captions) should be uploaded as separate files. The best format for saving figure files is Tagged Image File Format (.tif) for graphs, line images, and photographs. Avoid using PowerPoint and Excel formats. In most cases 150 to 300 dpi images should be sufficient resolution for review. Figures should be high enough resolution to be legible when printed. **Figures prepared in MSWord should be saved as .doc files and not converted to other formats.**

The use of color in figures should be avoided unless the figure is to be published in color. Grayscale or black-and-white patterning should be used instead of color when appropriate.

Submitting the Manuscript

You will first need to log into the system. Go to <http://poultryscience.manuscriptcentral.com>. If you do not know if you have an account or have forgotten your password, go to "Check for Existing Account" and your

user name and password will be e-mailed to you. If you do not have an account, go to "Create an Account" to enter your user information; fill in at least the mandatory fields.

Information Needed with the Submitted Manuscript. Before you begin to submit the manuscript, you should also have the following information prepared to key in or copy and paste into the forms found in the submission system: names of authors, affiliations of the authors, e-mail addresses of co-authors (if you want them to be copied on the status of the manuscript), manuscript title, key words, and abstract (summary for *JAPR*). The system also has a form box for entering comments to the editor that will act as your cover letter; if you want to submit a cover letter, please have that copy prepared to paste into the system.

Manuscript Submission. Log in, click on "Author Center," then on "Submit First Draft of A New Manuscript." Complete the information as requested. If you are interrupted during the submission process, it is possible to save what you have completed and finish the submission process later. Once you have uploaded a draft of your manuscript, you will be given the opportunity to view the proof. To view the proof, you must have Adobe Acrobat Reader installed on your computer (version 4 or higher); if you do not already have this free software, a link for downloading is available under the "Instructions and Forms" button on the upper right-hand corner of almost every page.

Please check the proof to ensure that the .pdf file has translated successfully and to review your final manuscript. If you find problem areas, you may upload new drafts until you are satisfied with the file. Close the proof file. As the final step, **you must submit the manuscript.** Once you have successfully uploaded a manuscript you will immediately receive a number for the manuscript, and an e-mail message will be sent to you and all co-authors verifying that your manuscript has been received and entered. **Make a note of your manuscript number;** you and all co-authors must include this number on the mandatory "Manuscript Submission and Copyright Release Form" that you fax or mail to the Managing Editor at PSA headquarters. You can keep track of the status of your paper by logging on to <http://poultryscience.manuscriptcentral.com>, where the status will be displayed in the author center, along with the name of the Section or Subject Editor overseeing the reviews.

Submitting a Revised Manuscript

Make Revisions. Make your revisions in your original word processing document and then save as a Microsoft Word file (.doc). This file should be uploaded onto the system as a file not for review. You should also generate a "compare" document by using the Tools menu of Microsoft Word. You will then upload the compare document as the revised manuscript for review. This compare

document and your revisions will be used to evaluate and make subsequent decisions on your manuscript.

Submitting your Comments to Editor and Reviewers. Enter the Author Center and click on the button "View Comments/Respond," which is to the right of the manuscript title in the "Manuscripts to be Revised" section. Copy and paste your comments to the Editor and to the Reviewers in the appropriate text boxes and click on "Submit Responses." This saves your comments. Submitting the revised manuscript is a separate step. See "Upload the Revision" below.

Upload the Revision. Log onto the Manuscript Central site and enter the Author Center. Click on your manuscript title. This will bring you to the File Upload Center. If you want to correct the title, abstract (summary for *JAPR*), or names of authors, you may do so by clicking the "Previous..." button on the File Upload Center page. These "Previous..." buttons will take you through each page in the Author Center that had been completed during the original submission. Correct any necessary information and then click on the "Save and Continue" to advance through the pages until you return to the File Upload Center.

In the File Upload Center:

- Click on "Use the File Manager," click on "Next," click on "Browse," and locate your revised manuscript on your hard drive.
- Select the file designation and indicate whether it is intended for review.
- Click on Upload File.

Proof and submit your file as you did for the original submission. When your draft has been assigned an ".R1" after the manuscript number, the upload is complete.

Submitting Accepted Papers for Production

For final submission, manuscript text, with tables and footnotes following the references, should be in a Microsoft Word file, and graphics should be submitted as separate files, not embedded into the text file. Electronic files in .tif, .jpg, or .eps (Encapsulated Postscript) format can be submitted with the final version, if possible at camera-ready size. Bitmap images (black and white; charts, graphs, and drawings) should have a resolution of 600 dpi; photographs should have a resolution of 300 dpi. If you have concerns about the print quality of electronic graphics files, you may mail hard copies of the figures to PSA headquarters. For those figures to be printed in color, hard copies should be sent to PSA headquarters with a letter stating that the author agrees to pay the surcharges for color printing. Please label such figures with manuscript number, figure number, and corresponding author name.

REVIEWERS

Reviewers will first receive an assignment, by e-mail, to review a manuscript from the Section or Subject Edi-

tor. You will be notified by e-mail that the full paper is available in your "Reviewer Center." You will be able to download the manuscript to either read on screen or print out. When you are ready to complete your evaluation of the manuscript, you will find an online form similar to the form that has been used previously. (Please do not use the forms on the PSA web pages to evaluate these papers. Only use the forms at <http://poultryscience.manuscriptcentral.com>.)

You may create your comments in your normal word processing software and paste them into the form boxes

found for the review of the article. Please add double spacing between paragraphs. You may save your score sheet and remarks and come back to them later before you submit the review. But, once you have submitted your review, you will no longer have access to that paper.

After you submit your review, the Section or Subject Editor will immediately receive e-mail with your score sheet and evaluation comments. If for some reason you are unable to review online but still wish to review a paper for PSA, PSA headquarters in Savoy can act as a proxy to post evaluations for you.