

# Seed Technology

*An International Journal Serving Seed Scientists and Technologists*

Volume 20

1998

Number 1

*Invited Reviews*

## **Testing Tree Seeds for Vigor**

F. T. Bonner  
USDA Forest Service (Retired)

## **Initiatives to Improve the International Seed Health System**

Denis C. McGee, Professor  
Seed Science Center, Iowa State University

ISSN: 1096-0724

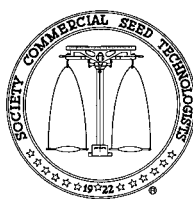
Published Jointly by the Association of Official Seed Analysts  
and the Society of Commercial Seed Technologists



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Serving Seed Scientists and Technologists*

Volume 20, Number 1 • 1998



**Published jointly by:**

ASSOCIATION OF OFFICIAL SEED ANALYSTS  
SOCIETY OF COMMERCIAL SEED TECHNOLOGISTS

**Editor:**

Dennis M. TeKrony  
Department of Agronomy  
University of Kentucky  
Lexington, Kentucky 40546-0091  
USA

**Associate Editors:**

Joe Burris, Iowa State University  
Wayne Guerke, Georgia Department of Agriculture  
Miller McDonald, Jr., Ohio State University  
Nancy Vivrette, Ransom Seed Laboratory, CA

ISSN: 1096-0724

Printed in the USA by Allen Press, Lawrence, KS

# Seed Technology

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**AIMS AND SCOPE** – *Seed Technology* is an international journal containing scientific and technological papers in all areas of seed science and technology. The emphasis is on applied and basic research in seed physiology, pathology and biology that may relate to seed development, maturation, germination, dormancy and deterioration. Studies on seed production, sampling, testing, conditioning, distribution and storage are also included. Short communications from seed analysts and technologists are encouraged and will be published as Seed Tech Notes. These notes include new techniques, standardization of laboratory tests and documentation of anatomical and pathological observations of seed and seedling development. The journal also includes timely review articles in all areas of seed technology that may relate directly to the seed industry.

**TYPES OF PAPERS** – Original research papers, review articles and Seed Tech Notes are reviewed for publication. Manuscripts should be typed, double spaced and three copies sent to the Editor. After acceptance, a disk copy of the original hard copy is also required. Potential authors should note that there are no page charges, however reprints can be ordered at a minimal fee. The journal is co-sponsored by the two predominant organizations in North America with a direct interest in seed technology: the Association of Official Seed Analysts and the Society of Commercial Seed Technologists.

**SUBSCRIPTIONS & SUBMISSIONS** – *Seed Technology* is published one to three times annually, at the price of \$50.00 (North America) and \$60.00 (outside North America including postage). Subscriptions should be sent direct or through a bookseller to: Association of Official Seed Analysts, 201 North 8th Street, Suite 400, P.O. Box 81152, Lincoln, NE 68501-1152, USA. Refer to last pages of this volume for **Instructions to Authors** for manuscript and Seed Tech Note submissions.

## EDITORIAL

*I'M PLEASED THAT THIS SECOND ISSUE (Volume 20, No. 1) of the new international journal, Seed Technology is now available. It contains two invited reviews by Dr. Frank Bonner, 'Testing Tree Seeds for Vigor' and Dr. Denis McGee, 'Seed Health Initiative', who are certainly international authorities in these two important areas. I'm extremely pleased that this volume also includes five Seed Tech Notes in addition to the several full length research papers. Thus, we are getting an excellent response to these non-refereed notes, which offers a medium to relate directly to the seed analysts and seed technologists of both the AOSA and SCST. If the current rate of submissions continues for manuscripts of full papers and Seed Tech Notes, it appears that at least two volumes of the journal will be published annually. It is my intent that the journal continues to provide a medium for the publication of papers from applied and basic seed research in physiology, pathology and biology. The journal will continue to publish invited review articles from all areas of seed science and technology that relate directly to seed testing laboratories and the seed industry (topics of future reviews are listed on page 4).*

*Seed Technology must continue to reach out to seed researchers and technologists to include current information on seed science. In this regard, I'm pleased to announce that all final reports of research projects funded by the American Seed Research Foundation (ASRF) will appear in future issues of Seed Technology. This foundation funds approximately four or more research projects dealing with fundamental and applied seed studies on a three year cycle. These reports were previously published in Search, but will get much wider distribution and readership in a special section entitled 'Final Seed Research Reports' of Seed Technology. I'm also pleased to announce that the papers presented at a symposium entitled 'Vegetable and Flower Seed Quality' at the 1998 AOSA/SCST meeting in Boise, Idaho will be published in Seed Technology. This symposium was organized by Dr. Miller McDonald and will offer a wide range of topics (listed in Seed Technologist Newsletter, Volume 72, p. 24) from ten speakers. The journal will also continue to initiate a more global emphasis reaching out for papers from the strong seed technology programs of Central and South America as well as North America. We appreciate the joint sponsorship from both the Association of Official Seed Analysts and the Society of Commercial Seed Technologists, which is a major factor toward the expanded papers and readers for this journal.*

*A special "thank you" to Dr. C. Hunter Andrews, Mississippi State University, for his work as Associate Editor. Hunter has decided to enter into full time retirement.*

*On behalf of the Associate Editors and the Editorial Board I would invite you to contribute papers or notes to future volumes of Seed Technology. Potential authors should note that there are no page charges, however reprints can be ordered at a minimal fee from the publisher.*

*Dennis TeKrony*

## Invited Review Articles for Future Editions of *Seed Technology*

The following authors have agreed to write review articles for the topics listed to appear in future volumes of *Seed Technology*. Any and all ideas on additional review articles are always welcomed by the editor.

Proposed Title for Review	Author(s)
International Seed Training Programs—	
Return on Investment . . . . .	J. Curt Delouche
Seed Storage, Critical to the National Germ Plasm System. . . . .	Eric Roos
Flower Seed Industry—	
Problems and Opportunities . . . . .	Nancy Vivrette
Seed Enhancement Implications on the Seed Testing Laboratory . . . . .	Alan Taylor and Ellen Chirco
Open Field Burning—	
Grass Seed Quality in the Northwest . . . . .	Tom Chastain
Effect of Seed Drying on Corn Seed Quality . . . . .	Joe Burris
Seed Herbarium, Beltsville—	
A National Resource to Seed Analysts . .	Bob Gunn and John Wiersema
Seed Vigor—An Important Component to Seed Quality in Brazil. . . . .	Roberval Vieira UNESP, Jaboticabal, Brazil

### List of Reviewers for *Seed Technology* – Volume 19

Maintaining the editorial standards of a scientific journal is the responsibility of the editor and associate editors, however this task can only be accomplished with the advice of a large number of colleagues who agree to review manuscripts. The editorial board of *Seed Technology* want to express their appreciation to the following individuals who helped review manuscripts for Volume 19, issue 1.

Mark Bennett	Peter Dotray	R. G. Shatters
Kent Bradford	Susana Goggi	Jan Spears
Roger Boerma	Wayne Guerke	David Weaver
Joe Burris	Robert Keys	Loren Wiesner
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Larry Copeland	Richard Payne	
Tom Chastain	Paul Raymer	

# Instructions to Authors

*Seed Technology* is an international journal which publishes original papers, review articles and notes in all areas of seed science and technology. This includes information from applied and basic seed research in physiology, pathology and biology, which relates to individuals interested in seed production, sampling, testing, conditioning, distribution and storage. Papers are accepted on the understanding that they have not been published or submitted to any other scientific journal.

Manuscripts must be written in English and should be typed, double spaced with ample margins (at least 4.0 cm on each side) on one side of line-numbered, bond paper (approximately 21 x 28 cm). Four copies of all manuscripts should be sent to the Editor, Dr. Dennis M. TeKrony, Department of Agronomy, University of Kentucky, Lexington, KY, USA, 40546-0091. Three types of submissions will be considered for publication:

- a. Full-length papers. This includes information from applied and basic seed research in physiology, pathology and biology which relates to individuals interested in seed production, sampling, testing, conditioning, distribution and storage. Papers are accepted with the understanding that they have not been published or submitted to any other scientific journal.
- b. *Seed Technology Notes* are appropriate for the reporting of seed laboratory or seed production research which might not justify a full paper, but provide important information of potential practical importance. This may include new techniques or developments, standardization of old techniques or anatomical, pathological or other documentation of seed or seedling development. The requirements for such notes are described below.
- c. Review articles are welcomed by special arrangement with the Editorial Board. The content of reviews should have a strong technical and/or scientific base and may include papers presented at symposia sponsored by the Association of Official Seed Analysts or Society of Commercial Seed Technologists at annual meetings.

## INSTRUCTIONS FOR FULL LENGTH PAPERS

Manuscripts should be arranged in the following order: Title (no separate title page), Author(s), Abstract, Text, Acknowledgments, References, Tables, Captions for Figures (separate page) and Figures. The title should be concise (10 to 12 words) but informative, containing key words which describe the subject matter for use in abstracting systems. The name of the author(s) should be placed below the title with an asterisk (\*) after the name of the corresponding author. The abstract indicating the scope of the paper should be complete in itself without reference to text or figures and not more than 250 words typed immediately below the title and authors. The text of the manuscript should normally have the subject matter grouped under the following major headings: Introduction, Materials and Methods, Results, Discussion, Acknowledgments (optional) and References. Main

headings are centered on each page and capitalized in bold type. Secondary headings begin at the left margin (do not indent) with the first letter capitalized and the entire heading in bold print.

**Author-paper documentation.** Author-paper documentation is a single paragraph at the bottom of the first page. The first sentence lists the authors (without professional titles) and their complete addresses. If the author has moved, provide the current address. The second sentence lists institutional sponsors with identification of the article or research project including granting agency acknowledgment, if appropriate. Always end the author-paper documentation with two statements: “\*Corresponding author. Received \_\_\_\_\_.”

**Style Manual.** *The Style Manual for Biological Journals* prepared by the Committee on Form and Style of the Council of Biology Editors and published by the American Institute of Biological Sciences (AIBS) should be followed for writing papers submitted to *Seed Technology. The Publications Handbook and Style Manual* of the American Society of Agronomy can also be used as a guide in manuscript preparation.

**Abbreviations.** Use standard abbreviations (e.g, Fig., RH, °C) listed in the AIBS Style Manual without definition. Other abbreviations should be defined at first usage and may be used thereafter without further definition. Names of states, provinces and countries should be abbreviated following city names, using appropriate abbreviations of the postal service in that country.

**Units.** Metric units must be used for all measurements and the SI system (System International de Unites) used as far as possible.

**Numbers.** Use arabic numerals for all numbers with two or more digits and for all measurements such as time, weight, or degrees except when the number is the first word in a sentence. Spell out numbers when they are the first word in a sentence or when they are less than 10 and not measurements, except when in a series in which one figure has two or more digits. The percentage sign should be used in conjunction with a number (5 %), but percentage should be written in full when used as a noun (percentage germination). Dates should be given as 2 December, 1938, for example.

**Nomenclature.** Species should be described by their scientific (‘Latin’) names. At first mention in the main text the full binomial and authority must be given, but subsequently the genus should be abbreviated to its initial letter and the authority omitted. Authorities are not quoted after Latin names in the title or abstract. Crop varieties should be identified by single quotation marks at the first listing only, ‘Ranger’ alfalfa (*Medicago sativa* L.)

**Tables.** Tables should be numbered consecutively with Arabic numbers and should be reduced to the simplest form. Each table should be typed on a separate page from the main text. Table headings should be brief but complete and self-contained. Use the following symbols for footnotes, in this order: †, ‡, §, ¶, #. Asterisks are used only to indicate statistical significance, with \* and \*\* representing significance at the 0.05 and 0.01 probability levels. Do not duplicate table information in figures.



**Figures.** Photographs or halftone reproductions should be provided as original artwork or glossy prints with good dark and white contrast. Photographs should only be submitted if they are essential for understanding the manuscript.

Prepare drawings for graphs and charts with India ink, dry-transfer lettering system or laser printer output on white bond paper. All figures should be of sufficient size and quality to allow for reduction by half or more for printing. Lettering should be kept at a minimum in graphs. All lettering, symbols, and lines must be large enough, clear enough, and thick enough to still be easily read and prominent after reduction.

Preferred symbols for figures are open and closed squares, circles and triangles. Do not use varying shades of gray to identify bars on graphs or wedges on pie charts. Use parallel lines, widely spaced dots, or other black and white line art methods instead. Label the back of each figure with the name of author and figure number. Figure captions should be brief, self contained and listed consecutively on a separate sheet at the end of the manuscript.

**References.** Either the author-year or numbered notation may be used in the text. Citations by authors in the text should appear as Smith (1996) or (Smith, 1996). Use *et al.* each time when there are three or more authors for a reference in the text, but give all authors in the reference list itself. In the reference list, arrange all published references alphabetically by author: e. g., last name and then initials of the first and each subsequent author. Citations should include names of all authors, year, complete title, complete journal title, volume number and inclusive pages. Cite personal communication and unpublished work only in the text, not in the reference list.

**Proofs, publication charges and reprints.** One set of page proofs will be returned to the corresponding author for correcting which should be restricted to printer's errors and returned to the Editor promptly. The *International Journal of Seed Technology* does not require page charges, however reprints can be ordered from the publisher when returning corrected proofs.

**Submission on computer disk.** Initial submission should always be on paper. When the necessary revisions are made and the paper is accepted, authors **must** submit the final version on computer disk, accompanied by two identical copies on paper. Electronic submission reduces the interval between acceptance and publication and reduces typesetting errors. Both Macintosh and PC disks in double or high density 5¼- or 3½-inch sizes are acceptable. Electronic files saved in relatively recent Macintosh, DOS, or Windows versions of WordPerfect, MS-Word, MS-Works, or Wordstar are preferred, but RTF and ASCII files can also be accepted. Contact the Editor if you have questions.

### INSTRUCTIONS FOR 'SEED TECH NOTES'

The format for *Seed Tech Notes* is as for full length papers except that the text headings will be: Abstract, Experimental Techniques, Results and Discussion, and References. The Experimental Techniques section will include a brief narrative of those elements normally included in the Introduction and Materials and Methods sections of full length papers. *Seed Tech Notes* are usually much shorter and may

present only preliminary research data compared to full length papers.

**Submission of Manuscripts.** Four copies of the original manuscript and artwork (with originals not photocopies of photographic plates) should be submitted to the Editor:

Dr. Dennis M. TeKrony  
Department of Agronomy  
University of Kentucky  
Lexington, KY 40546-0091  
USA  
Tel: 606-257-3878  
Fax: 606-257-2185  
e-mail: dtekrony@ca.uky.edu







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