Seed Technology

An International Journal Serving Seed Scientists and Technologists

Volume 21 1999 Number 1

Final Seed Research Reports

Projects funded by American Seed Research Foundation—

Volatile Compounds as Indicators of Seed Quality

A. Taylor, Cornell University

Increased Chilling Tolerance During Imbibition

P. Jennings, Kansas State University

Predicting Changes in Corn Seed During Storage

D. TeKrony and D. Egli, University of Kentucky

Isolation of Wheat Gene Controlling Kernel Color

M. Sorrells, Cornell Univeristy

ISSN: 1096-0724

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

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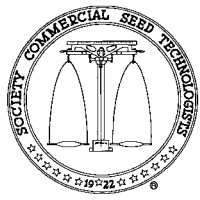
Volume 21, Number 1 • 1999



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Association of Official Seed Analysts
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ISSN: 1096-0724 Printed in the USA by Allen Press, Lawrence, KS

Seed Technology

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 Seed Technology *will establish a special section in this volume entitled* ***"Final Seed Research Reports"*** *of projects funded by the American Seed Research Foundation (ASRF). This foundation has funded more than 50 research projects for the past 40 years over a wide range of agronomic and horticultural crop species. These studies have ranged from basic to applied seed research that has often had a direct impact on the seed industry and seed technology. In the past the results of these research projects have been published in the independent publication of ASRF,* Search. *This publication had rather limited distribution and the results of many excellent investigations did not always reach the scientific community and seed technologists. Thus, I am pleased that the advisory board of ASRF has accepted our invitation to publish these final reports in* Seed Technology. *These reports will appear as projects are completed, which usually occurs at three year intervals.*

The titles of the projects that will appear in this issue and the primary investigator(s) are:

Volatile compounds as indicators of seed quality and their influence on seed aging. *Dr. Alan G. Taylor, Cornell University, Geneva, NY.*

Increased chilling tolerance of seeds during imbibition and early stages of germination. *Dr. Paul H. Jennings, Kansas State University, Manhattan, KS.*

Predicting changes in corn seed quality during storage. *Dr. Dennis M. TeKrony and Dr. Dennis B. Egli, University of Kentucky, Lexington, KY.*

Isolation and characterization of a wheat gene controlling kernel color and pre-harvest sprouting resistance using comparative genetics. *Dr. Mark E. Sorrells, Cornell University, Ithaca, NY.*

I'm happy to publish four Seed Tech Note articles in this volume, which relate directly to the seed testing laboratories of AOSA and SCST. I encourage others to submit either Seed Tech Notes or full manuscripts to future volumes.

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

List of Reviewers for *Seed Technology* – Volume 20

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 20.

Patricia Berjak	Gwen Koning	Steve St. Martin
Daniel Come	Randy Madden	Richard Sayers
Larry Copeland	Denis McGee	Peter Thomison
X. Duan	Lowell Moser	Roberval Vieira
Tim Gutormson	Valerie Pence	Bill Young
Alan Knapp	Todd Pfieffer	

Forty Years of Serving the Seed Industry and Seed Technology:

The American Seed Research Foundation

In 1959 the American Seed Research Foundation (ASRF) was organized as a scientific, benevolent and educational organization. The objective of the organization has been to ***"Encourage research which explores the basic principles underlying why seeds behave as they do".*** *The foundation is supported by some sixty members of the American Seed Trade Association who pay annual dues to support selected research projects.*

From its inception, the ASRF will have provided partial funding for more than 50 projects on seed research, totaling a direct seed industry contribution of over $750,000. ASRF approval of these projects has had a stimulating effect on other participating public and private groups with an estimated three to one multiplier. Thus, we estimate that another $2,000,000 of matching funds were provided to support these research projects.

Since 1961, the final reports of all research projects funded by ASRF have been published approximately every three years in the publication, Search, *which was an independent publication of ASRF. Although* Search *was an excellent publication, it had somewhat limited distribution and did not provide the best readership to the final reports of funded research projects. Thus, the ASRF board of directors was pleased to accept the invitation of the editorial board of* Seed Technology *to publish these final research reports in a special section of this international journal starting with this volume.*

The following four reports represent ASRF research projects conducted from 1994–1998. Additional reports of projects funded by ASRF will appear in future volumes of Seed Technology.

John E. Cross

John E. Cross, Chairman, American Seed Research Foundation Scientific Advisory Council, 601 13th Street, Suite 570 South, Washington, D.C. 20005-3807. Received 1 April 1999.

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 acknowledgement, 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 numberals 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 test 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:

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