

# Seed Technology

*An International Journal Serving Seed Scientists and Technologists*

Volume 33

2011

Number 1



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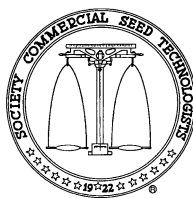
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# Seed Technology

*An International Journal  
Serving Seed Scientists and Technologists*

Volume 33, Number 1 • 2011



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SOCIETY OF COMMERCIAL SEED TECHNOLOGISTS

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# Seed Technology

**THIS 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.

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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 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 sent to the Editor electronically as a Word or WordPerfect document. Potential authors should note that there are no page charges and reprints can be ordered directly from the printer at a minimal fee. Refer to the last pages of this volume for Instructions to Authors for manuscript and Seed Tech Note submissions.

**SUBSCRIPTIONS** – *Seed Technology* is published one to two times annually. The annual subscription price for individuals is \$75.00 in North America and \$85.00 outside of North America; university and library annual subscriptions are \$125.00 in North America and \$135.00 outside of North America. All subscription prices are in US dollars and include postage. Subscriptions should be sent direct or through a bookseller to: Anita Hall, Executive Director, Society of Commercial Seed Technologists, Inc., 101 East State St., #214, Ithaca, NY 14850, USA, [www.seedtechnology.net](http://www.seedtechnology.net).

## EDITORIAL

*IT HAS BEEN MY PLEASURE to serve as part of the editorial staff of Seed Technology for the past three years. I want to express sincere appreciation to the many Associate Editors for the professional and timely peer reviews of journal manuscripts, to the many authors who have made contributions to the journal, and to Dr. Riad Baalbaki, who has been an efficient, reliable and knowledgeable colleague.*

*The joint effort by the Association of Official Seed Analysts (AOSA) and the Society of Commercial Seed Technologists (SCST), the two predominant seed technology organizations in North America, has made continued publication of this journal possible. A dedicated AOSA/SCST Journal Committee, chaired by Victor Vankus, and Anita Hall, representing AOSA and SCST, have promoted Seed Technology and supported content that represents applied and basic research in Seed Science and Technology.*

*Publication of two volumes per year and the transition to FastTrack, the online manuscript submission and review system have been two accomplishments of the Seed Technology editorial staff of which I am particularly proud. Primary benefits of the online system are improved communication between the editorial staff, reviewers and authors as well as the ability to monitor manuscript progress from submission to publication. The future will hold exciting new options in electronic delivery of the journal as we continue to serve an international community interested in seed physiology, technology, pathology and biology.*

*I bid a farewell and extend my best wishes to the members of AOSA and SCST and many other colleagues in the field of Seed Science and Technology. Please continue to submit ideas to the journal committee and the editors to improve Seed Technology. Although I will no longer be a part of the editorial staff, I anticipate enjoying many more superb issues of Seed Technology in the future.*

*Cindy Finneseth  
Editor-in-Chief*

COVER ILLUSTRATION: A few of the many known species of *Carthamus* (Asteraceae). Clockwise from top left: *C. baeticus* (Boiss. & Reut.) Nyman; *C. lanatus* L.; *C. leucocaulos* Sibth. & Sm.; and *C. tinctorius* L. (scale line = 1 cm). Photo credit: Riad Baalbaki, California Department of Food and Agriculture.

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*Seed Technology* is an international journal that publishes original papers, review articles, technical notes and symposia in all areas of seed science and technology. This includes information from applied and basic seed research in physiology, pathology and biology for all plant species. The journal relates to individuals interested in seed production, sampling, testing, conditioning, distribution and storage of agronomic, horticultural and forest seed crops. Papers are accepted on the understanding that they have not been published or submitted to any other scientific journal. The criteria for acceptance are originality, quality of research and interest to readership. Manuscripts are peer-reviewed by two or more anonymous reviewers, with final acceptance resting with the Editorial Board. The journal is published one to two times per year and is available as paper copies by contacting: Anita Hall, Executive Director, Society of Commercial Seed Technologists, Inc., 101 East State St., #214, Ithaca, NY 14850. Subscription information and order forms are available online at: <http://www.seedtechnology.net/journal.htm>.

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- a. **Full-length manuscripts** should report new information to the subject area or expand on established knowledge to contribute additional information of value. Manuscripts undergo peer review to determine that adequate scientific methods were applied, that interpretations and conclusions are valid, and that all aspects of the study are adequately presented.
- b. **Seed Tech Notes** are appropriate for the reporting of seed laboratory or seed production research that may 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. **Technical Papers** presented orally or by poster at the annual meeting of the Association of Official Seed Analysts (AOSA) and Society of Commercial Seed Technologists (SCST) are invited, which cover topics of general interest to the seed biologist or technologist.
- d. **Symposia** or workshops presented to the AOSA/SCST membership may be recorded in the journal for future reference. Organizers should prearrange with the Editor to receive papers from the presenters of symposia and workshops within a specified timeframe for inclusion in a single journal issue.
- e. **Review articles** are welcomed by special prior arrangement with the Editor or Editor-in-Chief. Reviews should cover a summary of a seed biology or

seed technology topic or an evaluation of a seed science or technology related publication. The content of reviews should have a strong technical and/or scientific base.

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Instructions for full length manuscripts should be carefully reviewed to ensure that the submitted manuscript complies with *Seed Technology* standards and requirements.

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The **abstract** should concisely summarize the entire scope of the paper including findings and conclusions without reference to text or figures. **All categories of manuscripts or papers submitted to the journal must have an abstract.** It should appear immediately below the title and authors and consist of not more than 250 typed words. Authors may provide a translation of the abstract in one additional language, which will be printed in the journal following the primary abstract in English. Availability of abstracts in alternate languages should be discussed with the Editor early in the submission process. Accuracy in regard to content and grammar of the second abstract is the responsibility of the corresponding author. Do not include a list of key words.

The **text** of the manuscript should normally have the subject matter grouped under the following major headings: **Introduction**, **Materials and Methods**, **Results**, **Discussion** (Results and Discussion may be combined), **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. Use of a previous issue of the journal as a guide to format is recommended.

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- Bernard, R.L. and M.G. Weiss. 1973. Qualitative genetics. p. 117–154. *In Soybeans: Improvement, production, and uses.* B.E. Caldwell, R.W. Howell, J.W. Judd and H.W. Johnson, (eds.) 1st ed., Agron. Monogr. 16. ASA, CSSA, and SSSA, Madison, WI.
- Fehr, W.R. and C.E. Caviness. 1977. Stages of soybean development. Spec. Rep. 80. Iowa Agric. Home Econ. Exp. Stn., Iowa State Univ., Ames.

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AOSA. 2005. Rules for testing seeds. Assoc. Offic. Seed Anal., Las Cruces, NM.

It is always preferred for papers to have references, but some papers based on presentations or workshops may be acceptable without them by prior arrangement with the Editor.

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Address all inquiries **to the Editor:**

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The format for *Seed Tech Notes*, technical papers and presentations from symposia or workshops is as for full length papers insofar as practical. The text headings may be the same as a full paper or may be arranged by **Abstract, Experimental Techniques, Results and Discussion, and References**, if that format is more suitable to the presentation of the material. 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* and technical papers are usually much shorter and may present only preliminary research data compared to full length papers. These papers usually do not exceed four pages of printed text and a maximum of

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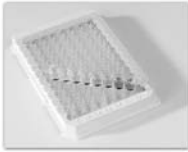
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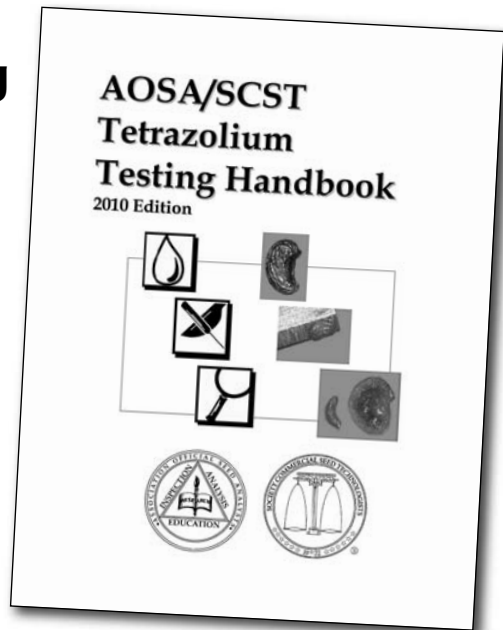
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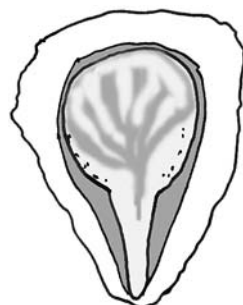
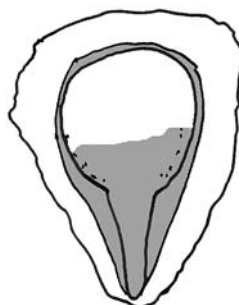
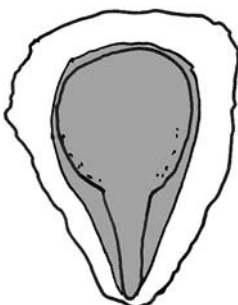
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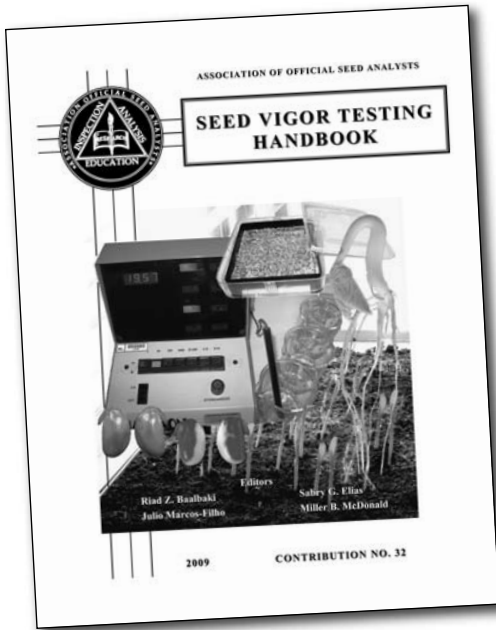


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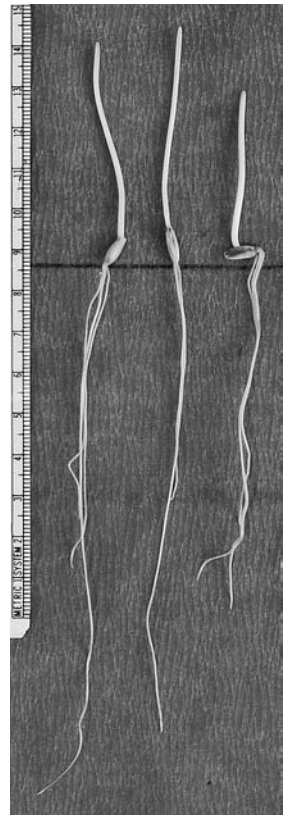
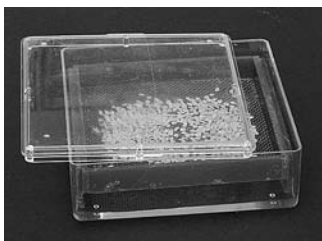
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