The Seed Technologist Newsletter

A newsletter for

The Association of Official Seed Analysts
& The Society of Commercial Seed Technologist

Volume 82, Number 2
May, 2008

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Subscription: $35.00 per year, U.S. Funds. Includes; three newsletter publications and the conference proceedings. For subscriptions, contact Anita Hall, SCST Executive Director, or Jan Osburn, AOSA Business Office, 405-780-7372.

The Seed Technologist Newsletter is published jointly by the Society of Commercial Seed Technologists, Inc. and the Association of Official Seed Analysts, Inc.

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NOTES FROM THE EDITORS

The Newsletter Committee still has an opening for an SCST editor. The primary responsibility is to remind the regional editors of the deadlines and review SCST-submitted articles. If you are interested, please contact me or Anita Hall for more information.

At the annual meeting, the Newsletter Committee will meet at 8:00 am – 9:00 am on Sunday June 8. We will divvy up assignments (short articles on the workshops and events) and discuss future topics for the Newsletter. Everyone is welcome to attend.

Please remember that articles can be submitted at anytime. Don't wait for the deadline! Anyone can submit an article, but we consider the appropriateness and timing, and will not break copyright laws. We reserve the right to edit, but will not change content.

Some suggestions for articles:
Seed testing or method ideas, Analyst news, Lab spotlight, General interest, Technical information, Workshop announcements, Seed school announcements and Meeting summaries or announcements.

Cindy Finneseth, AOSA Editor

Deadline for the September 2008 Newsletter Issue: August 15, 2008

Submit articles by email to Cindy Finneseth or your regional editor. Find the names and contact information on page 4.

Websites
AOSA (www.aosaseed.com)
SCST (www.seedtechnology.net)

SCST Presidential Report

Dear SCST Members:

The annual meeting in St. Paul is fast approaching. I hope you will be able to attend this year. We have a long list of rules proposals to debate and vote on. The consolidation task force has put much work into drafting by-laws for your review. Input from both SCST and AOSA member's is needed, as well as direction to continue or to stop the process. Whether you are able to attend the annual meeting or not, please take some time to review the drafted by-laws, and forward the survey that was attached. Your input will be greatly appreciated. The consolidation effort is membership driven, and if we can address issues now, the process will go smoother if and when we decide to put consolidation to a vote. Of course the best part of coming to the meeting is seeing our seed-testing friends from around the US and Canada, and other parts of the world.

Some of you may have heard the controversy about who should be able to post workshop and seed school announcements on the SCST website. Through this process, the SCST Board of Directors has decided to allow all postings. The following statement has been added to the web page:

SCST includes workshop announcements on our website in order to inform members and the public about upcoming training opportunities. Continuing education points will be awarded to workshops that meet the appropriate criteria. SCST does not control or approve the content or policies of meetings and workshops posted on our website.

If there are any restrictions about attendance at workshops, such restrictions are now required to be included in our website posting. There is a form available on the website that will be used for posting workshop and meeting announcements on the website. As a society, we are better served by including all requests to post educational opportunities, even though some individuals may be restricted from attending.

I have been contemplating the uniqueness of our society. In most cases we are a society of competitors. Even though we compete in the market place, and for seed testing business, uniformity in testing is critical to all members. Over the years, we have cooperated with each other in society business, referees, rules proposals, workshops and seed schools, and in many other networking ways. Our businesses have benefited from this wise and uniting attitude. Let us do everything we can to protect these critical ideals, and our society will remain strong, and seed analysts, the seed industry, and ultimately the customers who purchase seed will all benefit.

I wish all a safe and enjoyable summer. Hope to see you in St. Paul!

Sincerely,

Gil Waibel, RST

SCST Membership Update

New RSTs- Congratulations!
David Johnston, SGS Memphis, Memphis, TN

New CGT- Congratulations!
Joyce Connelly (Electrophoresis), BioDiagnostics, Inc, River Falls, WI

RMI to RST
Marilyn Miller, Bejo Seeds, Oceano, CA

New Associate Members
Ryan Holl, Pioneer Hi-Bred Intl., Johnston, IA
Mark Miller, Syngenta Seeds, Ames, IA

CGT to CMI
Kevin Alberts, SGS Mid West Seed Services, Brookings, SD

RST to RMI
Patricia Skiles, Pioneer Hi-Bred Intl., Tipton, IN

AOSA-SCST Joint Conference Call Minutes
March 5, 2008

AOSA Board Members Present: President Brent Turnipseed, Vice-President Mike Stahr, Secretary-Treasurer Dan Curry, Board Members Janine Maruschak, Victor Shaul, Jim Effenberger, Johnny Zook, Aida Galarza, Mike Gill and Executive Assistant Jan Osburn.

SCST Board Members Present: President Gil Waibel, Vice-President Doug Miller, Directors-at-Large: Jane Penrose, Terry Dunfield, Mike Stahr, Jean Tolliver, Sue Alvarez and Executive Director Anita Hall.

The meeting was called to order at 10:05 a.m.

I. Approval of Agenda
Gil asked for additional agenda items; no additions were proposed.

II. Approve Minutes of Last Call
Dan made a motion to approve the minutes from the October 24, 2007 conference call, Jim seconded, motion was approved.

III. Update Annual Meeting Handbook with Policy Statement
The boards discussed the need for a clear statement that AOSA and SCST are ultimately financially responsible for the annual meeting. To date no meetings have been cancelled or significantly impacted by uncontrollable factors but this may happen in the future. A meeting cancellation or disruption would mean a significant financial burden. Meeting hosts assume that if a meeting was to lose money the associations, and not the hosting labs, would be financially responsible.

The boards agreed that a policy should be drafted that clearly states that AOSA and SCST are financially responsible for meetings. Because of this the organizations have the right to review all contracts before they are signed and to review the registration fee and budget to insure it will cover all expenses and make a profit.

The meeting place committee will draft a policy for the boards to review, Dan Curry agreed to research meeting insurance fees. This information will be forwarded to the boards for discussion.

IV. Clarify/Improve Policy for making Change to Handbooks
It was agreed that Handbooks should be reviewed more extensively and a stronger policy should be developed. Aida Galarza and Mike Gill will draft a policy statement for review by the AOSA and SCST boards. The policy will be presented to the members at the annual meeting.

V. Native Seed Survey Follow Up
The survey report has been sent to AASCO, AOSCA and ASTA. Gil Waibel will present the survey during the Native Seed Symposium at the annual meeting. Gil Waibel and Brent Turnipseed will offer to make similar presentations at the AASCO, AOSCA, and ASTA meetings this summer. The Conservation and Reclamation Species Committee will also discuss the survey during their committee meeting.

VI. Seed Law Guide
The guide is still being reviewed by the copy editor; it will be completed well before the summer meetings and sent to the boards to review.

VII. Renaming the Handbooks that are part of the Rules
The proposal is to rename the handbooks that make up the Rules in order to minimize confusion. The Rules and handbooks could be renamed: AOSA Rules for Testing Seeds Part 1- Methods and Procedures for Testing Seeds, AOSA Rules for Testing Seeds Part 2- Seedling Evaluation, AOSA Rules for Testing Seeds Part 3- Uniform Classification of Crop and Weed Seed, and AOSA Rules for Testing Seeds Part 4- The Uniform Blowing Procedure. The proposal to rename the handbooks will be discussed at the open Rules Committee meeting and the business meetings.

Gil Waibel and Brent Turnipseed will draft a letter explaining the history and reasoning for changing the handbook names, this will be sent to AOSA and SCST members, as well as AASCO and AOSCA. The name change should not impact state or federal seed laws.

VIII. Consolidation Name Ballot
A letter was sent from Brent Turnipseed and Gil Waibel asking AOSCA, AASCO, and Dr. Payne with the USDA, to provide information on the changes to state and federal seed laws that will be required if a new name is adopted for the consolidated organization.

The boards agreed that it would be best to wait on circulating the name ballot until these impact statements can be shared with the members of AOSA and SCST.

The board also discussed developing talking points for consolidation. This could be presented in a frequently asked questions format on the AOSA and SCST websites. Brent Turnipseed and Doug Miller volunteered to develop a list of questions and answers to circulate to the boards for comments.

IX. Finalize/Adopt the Meeting Workshop Policy
Several changes were suggested by board members, a revised document will be re-circulated. It was suggested that a template form be developed to assist workshop organizers in meeting the policy reporting requirements. Anita Hall will work with Brent Turnipseed to revise the policy and develop a form; these will be sent to the boards to review.

Our next joint conference call is scheduled for April 9 at 10 a.m. CDT

Victor Shaul moved to adjourn, Mike Gill seconded, motion passed. The call adjourned at 11:01 am CST.

AOSA/SCST 2008 ANNUAL MEETING

The 98th Association of Official Seed Analysts and the 85th Society of Commercial Seed Technologists (AOSA / SCST) annual meeting will be held in St. Paul, Minnesota June 5th – 12th, 2008. The Seed Analysts of the Midwest are hosting this event and invite you to help make this meeting as productive and educational as possible. Make your reservations today and join in the conversation! Reservations at the downtown St Paul-Riverfront Crowne Plaza Hotel MUST be made with the hotel directly and room rates are good until **May 1, 2008** after which regular rate will apply.
Toll free phone number: 1-877-424-4225
St Paul –Riverfront Crowne Plaza web site:
http://www.ichotelsgroup.com/h/d/cp/1/en/hotel/mspsp?_requestid=667707

Final Meeting Schedule

Time/Date	Meeting/Event
Thursday 6/5/2008	
6:00pm-6:30pm	Meeting with RGT Exam Candidates
Friday 6/6/2008	
7:00am-5:00pm	Registration/Business Office
8:00am-5:00pm	SCST Board Meeting
8:00am-2:00pm	**RGT Exam**
8:00am-5:00pm	RGT Exam Grading
12:00pm-1:00pm	Lunch
6:00pm-7:00pm	RGT Exam Results
7:00pm-8:00pm	Meeting with RST Exam Candidates
7:00pm-8:00pm	Native Workshop Reception
Saturday 6/7/2008	
7:00am-5:00pm	Registration/Business Office
7:00am-5:00pm	Business Office
7:30am-5:00pm	**Genetic Technology Workshop**
7:30am-5:00pm	**Native Seed Quality Symposium**
1:00pm-5:00pm	**Statistics Workshop**
8:00am-2:00pm	**RST Exam (MN State Lab)**

8:00am-5:00pm	AOSA Board Meeting
10:00am-10:30am	Morning Break
12:00pm-1:00pm	Lunch (for workshops)
2:30pm-3:00pm	Afternoon Break
6:00pm-8:30pm	Pure Harvest Software Meeting
7:00pm-8:00pm	RST Exam results
8:00pm-9:00pm	Joint Committee Chair Meeting
Sunday 6/8/2008	
7:00am-5:00pm	Registration/Business Office
7:00am	**Bean Buddy Walk Run**
7:00am-7:45am	Worship Service (Non-Denominational)
8:00am-9:00am	Newsletter Committee
8:00am-9:00am	SCST Computer Committee
8:00am-9:00am	AOSA By-laws
8:00am-9:00am	AOSA Research Committee
9:00am-10:00am	Proficiency Testing Committee
9:00am-10:00am	Purity Committee
9:00am-10:00am	Referee Committee
10:00am-12:00pm	**Opening Session and Brunch**
10:00am-12:00pm	Exhibitor Set-up
12:00pm-5:00pm	Exhibits
12:30pm-2:30pm	AOSA Affiliates/Liaison Meeting (by invitation)
12:30pm-2:30pm	Rules Committee (closed)
12:15pm-2:15pm	**Research Symposium & Papers**
2:15pm-2:25pm	Afternoon Break
2:25pm-4:15pm	**Research Symposium & Papers**
5:00pm-9:00pm	**Dinner Riverboat Cruise**
Monday 6/9/2008	
7:00am-8:00pm	Registration/Business Office
7:00am-8:00am	**Breakfast**
8:00am-5:00pm	Exhibits
8:00am-9:00pm	Meeting Place Committee
8:00am-9:00am	Electrophoresis Working Group
8:00am-9:00am	Conservation and Reclamation Seed Committee
8:00am-9:00am	Statistics Committee
9:00am-10:00am	SCST Ethics Committee
9:00am-10:00am	Cultivar Purity/GMO Committee
9:00am-10:00am	Lab Standardization and Documentation
9:30am-4:00pm	**Mall of America Shuttle**
10:00am-10:30am	Morning Break
10:15am-11:15am	Germination and Dormancy Committee
10:15am-12:00pm	Examination Committee (closed)
12:00pm-1:00pm	Lunch **AOSA Centennial Celebration**
1:00pm-2:00pm	Immunoassay Working Group
1:00pm-2:00pm	Tree and Shrub Committee
1:00pm-2:00pm	Rules Issues and Review Committee
2:00pm-3:00pm	Handbook Committee

2:00pm-3:00pm	Herbicide Bioassay Working group
2:00pm-3:00pm	Seed Technology Journal Committee (closed)
3:00pm-4:00pm	Teaching and Training Committee
3:00pm-4:00pm	Vigor Committee
4:00pm	Afternoon Break
4:00pm-6:00pm	**Poster Session/Seed Issues Forum**
7:30pm-9:00pm	**Referee Presentations & Buzz Session**
9:00pm-11:00pm	Joint AOSA-SCST Board Meeting
Tuesday 6/10/2008	
7:00am-5:00pm	Registration/Business Office
8:00am-5:00pm	Exhibits
7:00am-8:00am	Breakfast
8:00am-9:00pm	Flower Seedling Committee
8:00am-9:00pm	PCR Working Group
8:00am-9:00pm	Seed Pathology Committee
8:00am-9:00pm	Seed Moisture Committee
9:00am-12:00am	**AOSA/SCST Long Range Planning Session**
10:00am	Morning Break
12:00pm-1:00pm	Lunch
1:00pm-2:00pm	Tetrazolium Committee
1:00pm-2:00pm	Genetic Technology Committee
2:00pm-2:15pm	Afternoon Break
2:15pm-5:15pm	Open Rules Committee
6:00pm	**Social Hour and Silent Auction**
6:45pm	**AOSA & SCST Photos taken**
7:00pm-10:00pm	**Banquet**
Wednesday 6/11/2008	
7:00am-8:00pm	Business Office/Registration
8:00am-10:00am	Exhibitors break down
7:00am-8:00am	Breakfast
8:00am-10:00am	**Rules Voting-AOSA/SCST**
10:00am	Morning Break
10:15am-12:15am	**AOSA Business Meeting**
12:15pm-1:15pm	Lunch
1:15pm-3:15pm	**SCST Business Meeting**

Seed Issues Forum Reminder

May 15 is the deadline to notify the Teaching and Training Committee of interest in a demonstration at the annual meeting. Email Kalyn Brix-Davis (kalynb@mwseed.com) or Michael Gill (MGill@nmda.nmsu.edu) the title for your table and any extra requirements that you may need (electrical power, wall to project on, etc.)

STRF 3rd Annual Silent Auction Reminder

Items are still being accepted for the Seed Testing Research Foundation 2008 silent auction. Remember all donations are tax deductible.

Questions? Need ideas?
Contact an STRF Board Member
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Diane Mesa diane.mesa@syngenta.com
Larry Nees neesl@purdue.edu
Anita Hall STRF@twcny.rr.com

Research Papers

Sunday, June 8, 12:15 – 4:15pm
Moderator: Jack Peters, SCST Research Committee Chair
JYR23@aol.com

Session 1 12:15 – 2:15pm

Adriel Garay, Oregon State University
(two presentations)
- Methodology to Develop a Uniform Blowing Procedure In Grass Seeds (Tall Fescue)
- Better Alternative to Breaking Multiple Seed Units in Tall Fescue

Sabry Elias, Oregon State University
Effect of Germination and Fluorescence on Plant Type Produced in Ryegrass

Reed Barker, Grass Genomic Testing
Allelic Discrimination as an Aid in Determining Genetic Purity in Ryegrass

BREAK 2:00-2:15pm

Session 2 2:25 – 4:15pm

Miller McDonald, Ohio State University (two presentations)
- American Seed Technology Using Distance Education
- A New Educational Resource: Seed Testing DVD

Jim Woltz, Syngenta Crop Protection
Analysis of Seed Treatment Loading Rates

Cindy Finneseth
Developing a Standard Seed Testing Protocol for Eastern Gramagrass (*Tripsacum dactyloides*)

Sabry Elias
Suggested Tolerances for Tetrazolium Tests

Research Paper Abstracts

Methodology to Develop A Uniform Blowing Procedure in Grass Seeds: An Example with Tall Fescue

Adriel Gara, Sabry Elias, and Heather Nott*

Oregon State University Seed Laboratory

ABSTRACT

Uniform Blowing Procedure is a technology that can be used to separate lightweight inert matter in grass seed samples. The benefits of this method have been demonstrated for many years with orchardgrass, Kentucky bluegrass and others. In 2006, the master calibration sample concept and the use of air velocity calibration were incorporated to the AOSA Rules. Based on these new innovations, a systematic research was conducted to develop a uniform blowing procedure for tall fescue. The studies started by finding an optimum blowing point to separate light inert from heavy pure seeds and concluds with a rule proposal to AOSA-SCST as follows:

First, a preliminary blowing point was identified by blowing samples at increasing air velocity points and assessing the blowings visually for presence of caryopsis, using the one third-caryopsis size rule. The planting value of the fractions blown out was evaluated by germination tests. **The results led to a preliminary identification of the "location of the optimum blowing point".**

Second, the blowing point was validated across a larger number of samples representing different varieties, years, production locations, and seed sizes, using the 1/3 caryopsis size rule. The 100-seed weight of the material blown out and retained portions were measured. Additionally, the germination of the structures blown out and the retained heavy fraction was tested. All these studies made it possible to understand the planting value of the light portion and the retained heavy portion and **demonstrated that the blowing point chosen was adequate across the broad range of samples tested.**

Third, master calibration samples of proven uniformity were developed. This step is critical because seed laboratories cannot use a blowing procedure unless calibration samples of proven uniformity are available. **This step made it possible to have calibrations samples for the referee studies so that all labs can find comparable blowing points in their specific blowers.**

Fourth, uniformity across blowers was tested. The first study was conducted in-house using seven blowers and many blind samples. This study was followed by a national referee where labs calibrated their blowers with the "tall fescue master calibration samples" provided to them and used 3 blind samples with different levels of light inert content. A second national referee was conducted in late 2007 to encourage more participation and familiarization with the new method. Regardless of the amount of lightweight inert present in the blind samples, all labs were able to blow out comparable amounts of light inert. **This proved that, the new standard blowing procedure contributes to uniform separation of light inert. As a result, a rule was proposed to the AOSA-SCST to add tall fescue to the list of species that use blowing procedure.**

The stepwise methodology used will be illustrated during the research presentation. The advantages of the new method for testing Tall fescue will be discussed. The importance of the methodology used to develop blowing procedures for other species will be discussed.

Better Alternative to Breaking Multiple Seed Units in Tall Fescue

Adriel Garay, Heather Nott and Sabry Elias
Oregon State University Seed Laboratory

ABSTRACT

The AOSA Rules for Testing Seeds treats multiple florets in grasses differently. For example in tall fescue and ryegrasses, it requires the analysts to break them apart manually to estimate the inert and pure seed units, which is time consuming and can create variability. In orchardgrass and fine fescues, it uses the factor method, which is more time efficient and reduces subjectivity. Kentucky bluegrass, which uses a blowing procedure, multiple seed units (MSU's) are left intact. The last option is efficient, eliminates subjectivity, does not change the nature of the sample and the result reflects the true condition of the seed as it is being marketed and planted.

Research was conducted to determine if a better alternative to breaking multiples can be identified for tall fescue. The research included the following steps:

First, the frequency of multiple florets in tall fescue samples was measured using samples from 2006 and 2007 crop years. The results in both years indicated that 96% of samples contained less than 50 multiples and less than 1% of samples showed 100 multiples or above. The low number of multiples present in the sample suggested that even if all multiples are left intact, its potential to influence purity and germination results would be small.

Second, blowing was used to determine if light weight multiples, which contain no caryopsis, can be separated. Regardless of the number of multiples present in the sample, blowing lifted most empty multiples which did not show germination value. On the other hand, most of the multiples that remained in the pure seed portion contained caryopsis larger than 1/3 and the majority of them germinated. This indicated that if a blowing procedure is used, tall fescue florets in the light fraction (including multiples) can be considered inert; whereas those in the heavy portion (including multiples) can be considered pure seed.

Third, the new method (blowing tall fescue first and leaving the multiples intact) was compared with the current AOSA method (where blowing is not required and multiples have to be broken apart). This comparison was performed in-house and followed by a national referee study. The new method produced comparable results to the current AOSA method, furthermore, when the number of multiple florets neared 100 in the blind samples, the new method produced more uniform results. A second year referee demonstrated that breaking or not breaking multiples present in the heavy portion, produced comparable germination results. This indicates that multiples found in the heavy portion (after blowing) has planting like single pure seed units.

The time efficiency was measured during the national referee study. All participant labs saved time using the new method over the current AOSA method. Based on all the above studies, a rule change is proposed. The sample would be blown using the proposed blowing procedure for tall fescue, then, any multiple present in the light portion would be considered inert and multiples present in the heavy portion would be considered pure seed units. In essence, tall fescue would

be treated the same as Kentucky bluegrass. The beneficial implications of the new method for testing tall fescue will be discussed.

Effect of Germination and Fluorescence on Plant Type Produced in Ryegrass

Sabry Elias and Adriel Garay
Oregon State University Seed Laboratory

ABSTRACT

Some ryegrass samples may achieve maximum germination and express maximum fluorescence or most of the fluorescent trait before the 14-day test period. However, the Cultivar Purity Testing Handbook states “Do not remove non-fluorescent seedlings before 14 days”, regardless of whether the sample attains maximum germination potential before the 14d test period. This study was conducted to explore the possibility and conditions under which the germination and fluorescence tests can be ended before 14 days. There is no published data to quantify or explain the relationship between speed of germination and rate of fluorescence over time. Research has been conducted at the Oregon State University Seed Laboratory to study the relationship between germination, fluorescence and grow out tests, and the effect of pre-chilling treatment on the speed of germination and fluorescence. The first study showed that the germination percentage of 117 out of 142 pre-chilled perennial ryegrass samples did not change from the first count (7d) to the final count (14d) or increased by 1%. Similarly, the fluorescence percentage of 132 out of the 142 samples did not increase in the final count compared to the first count (7d). All tests were conducted within 1-2 months after harvest in 2006. A national referee study was conducted in 2007 to determine the rate of germination and fluorescence of perennial, annual and intermediate ryegrass samples at 7, 10, 12 and 14 days. Nineteen laboratories from CA, FL, IA, IL, IN, KY, MI, MO, OR, PA, SD, TX, WA, WI, and Canada participated in this referee. Ten seed lots were used in the study representing various varieties from 2006 and 2007 crops. Perennial, annual, and intermediate ryegrass samples that reached maximum germination also expressed near full fluorescence at 7 or 10 days with some exceptions. A study at the OSU seed lab is being conducted to determine whether ending the germination/fluorescence test before 14 days would result in missing some annual ryegrass contaminants. The preliminary results indicated if a sample reached maximum germination and if the variety fluorescence level (VFL) description of a ryegrass cultivar is low (e.g., below 2%) and the number of the fluorescent seedlings in the first count (7d) is low (i.e., below the VFL), it is unlikely that this sample will have more fluorescent seedlings in the final count to affect the final results. If the VFL and the number of fluorescent seedlings in the first count (7d) is high, a full 14-day test period would be needed as a safeguard to avoid the potential of missing annual plant contaminants.

Allelic Discrimination as an Aid in Determining Genetic Purity in Ryegrass

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Salem, OR 97302

The seedling root fluorescence (SRF) test has been used to distinguish perennial (*Lolium perenne* L.) and annual (or Italian) (*L. multiflorum*) ryegrass since the 1930s. At times the test has been unreliable and overestimates the amount of annual contamination. The objective of our research for the past several years has been to find and characterize specific genes that may be associated with growth type. We have identified alleles (alternate forms of a gene) of three genes associated with flowering control in grasses. Alleles from two of the genes were effective in predicting growth type. Leaf tissue was harvested from seedlings used in an SRF test and DNA extracted using commercially available purification kits. To cut down on lab costs, only seedlings with SRF, plus five to ten seedlings with non-SRF were analyzed on a real-time PCR machine in Allelic Discrimination (AD) mode. Twenty cultivars were tested in a proof-of-concept panel. Following the SRF test, all seedlings were transplanted to a high intensity growth chamber under continuous light for a grow-out test (GOT) that lasted for 84da. Plants reached heading throughout the full time of the GOT, but approached a plateau at about 70da. These results supported that the GOT should be longer than the suggested 42da in order to be effective. Further, SRF was high in the earliest heading plants and declined in later heading plants, but never fell below 30% of the plants heading in each 7da increment demonstrating the problems that the SRF test has in predicting contamination. In contrast, however, AD using alleles from the two genes detected growth type differences to about a 3% level, a level equivalent to a 70da or greater GOT. Detection error rates for the non-SRF plants was less than 0.5% based on presence of two out of three markers that included SRF and alleles of the two genes we used in the study. Allelic Discrimination at the single nucleotide level based on alleles of the *Vrn-1* and *ID1* genes are an effective and rapid method to predict growth type contamination in ryegrass.

American Seed Technology Using Distance Education

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Today's American seed industry is global in stature. Seeds are increasingly produced in other countries based on advantages in personnel costs, counter-season production locations in the southern hemisphere, geographic location, and ability to produce a diversity of seed crops ranging from recalcitrant to orthodox seeds. Because of these necessary and increasingly complex international approaches to successful global competition, the seed industry requires students with a broader and deeper knowledge of various methods for high quality seed production. The objective of this research is to provide a new approach to global seed technology education that forges a consortium of five leading international agricultural research institutions with strengths in seed biology: The Ohio State University, USA; University of

California Davis, USA; Lincoln University, USA; Escola Superior Agricultura "Luiz de Queiroz," Brazil; and Pontificia Universidad Catolica de Chile. This consortium provides higher quality education in seed biology by drawing on the expertise of more faculty with a diverse knowledge of approaches to successful seed production in differing countries. Results of the consortium allow the use of advances in distance education technology that permit the teaching of courses and offering workshops using internet videoconferencing technology at any location in the world. Two courses (International Seed Production, International Seed Physiology) have been offered using this technology. The courses are listed on the web at http://seedbiology.osu.edu, click courses and HCS 630 and 631. Students can use the text, PowerPoint presentations, and podcasts as preview and review of online interactive videoconferencing classes. Each institution lists the courses as their own courses with visiting faculty providing lectures. In this way, they are able to obtain local student credit hours. Other results of the consortium include the collaborative development of DVDs for coffee, tropical forage grass, maize, and sunflower seed production. Each institution is viewed as a node in the consortium with an ultimate objective to provide a node in each country in the world thus expanding expertise in seed biology. The provision of students with greater international perspectives of the global seed industry and the continuing development of educational seed production resources will build a more globally competitive American seed industry.

A New Educational Resource: Seed Testing DVD

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Seed testing is a complex task requiring many diverse skills. Because of this complexity, one of the important aspects of professional meetings is to convene workshops to enhance analyst standardization. Other approaches to improve standardization are continuing education and publication of detailed handbooks such as the Seed Technologist Training manual. But, these approaches require the seed analyst to travel to the site of learning which requires time and cost. The development of DVDs highlighting various aspects of seed testing is a superior approach to education of seed analysts. Such a DVD has been developed and contains the following modules: The importance of seed testing, seed identification, seed sampling, physical purity testing, germination testing, seed testing tolerances, vigor testing, seed health testing, seed moisture testing, and genetic purity testing. Because the Rules are dynamic and changing yearly, this DVD will necessarily require periodic updating, but the digital format easily permits these changes simply by cutting and pasting. The principal advantage of this DVD is that it allows the professional seed technologist to prepare for certification examinations and permits those in the industry to remain current in latest technological developments. This approach also has benefits for non-traditional students and students at community colleges and agricultural technical schools that prepare students for four-year programs. Finally, such an approach allows the student the opportunity to learn at their own pace on a computer – an ideal and preferred approach counter to contemporary classroom settings. Portions of this DVD will be demonstrated.

Analysis of Seed Treatment Loading Rates

James Woltz, Syngenta Crop Protection, Stanton, MN and Barbara Stefl, Cognis Corporation, Cincinnati, OH

Advances in seed treatment application and formulation technology have resulted in more precise dosing based upon “per seed” loading rates. This has led to treatment loading analysis becoming an integrated component of quality assurance programs. Analysis of seed treatment loading rates has traditionally been done using chromatography following extraction of the treatment from the seed. Now, a Fourier Transform Near Infrared (FT-NIR) method has been developed for non-destructive analysis of the ai on the seed. In 2006 and 2007, studies have been conducted to measure sample loading variability and assess the suitability of new analytical technologies for determining chemical loading analysis. There are several sources of variability: among samples, treating machinery and analytical method. Within a seed lot, seed weight from sample to sample could vary between from 0.7 to 2.5% for corn (*Zea mays* L.), 1.2 to 3.5% for soybean (*Glycine max* Merrill), and 0.8 to 2.9% for cotton (*Gossypium* spp.), depending upon sample size. Across 10 samples from a single batch of treated seed, loading results could vary as much as 9%. Comparisons of results from different testing methodologies for the same sample showed standard deviations of ~2% for High Performance Liquid Chromatography to ~6% for FT-NIR. A ring test demonstrated that FT-NIR was an acceptable alternative to other methods of analysis for rapid detection of gross chemical misapplication.

Developing a standard Seed Testing Protocol for eastern gamagrass [Tripsacum dactyloides (L.) L.]

Cindy H. Finneseth[1]* and Robert L. Geneve[2].

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Eastern gamagrass (*Tripsacum dactyloides* L.), a native warm-season perennial, is being promoted as a grass for forage, wildlife, and conservation purposes. Widespread use, however, is limited by germination and stand. Poor stands have been attributed to a combination of seed dormancy and low seed quality. Additionally, current AOSA Rules for Testing Seeds are limited in assessing seed quality. The objectives of this study were to review the current purity guidelines and develop preliminary recommendations for a standardized germination testing protocol for eastern gamagrass. Seed counts were conducted on 40 seed lots, including 8 cultivars and 10 ecotypes or selections. The average number of seed per gram ranged from 7 to 18 (3195 to 8344 seed per pound, respectively). The current AOSA Rules require analysis of 205 g., which is adequate for many cultivars. However, for large-seeded cultivars and collections the working weight for purity analysis should be increased to 340 g. The seed lot used to investigate germination temperature regimes demonstrated typical performance for eastern gamagrass seed lots, with a germination potential of approximately 67% based on initial TZ viability assessment. Stratification and germination temperature had a significant impact on germination percentage. Stratification between 2 and 8 weeks at 5ºC or 10ºC enhanced germination speed, total germination and reduced dormancy compared to untreated seeds. Alternating temperatures were generally more effective in promoting germination and minimizing

dormant seed than constant temperatures. Optimal germination occurred at 15/25, 15/35 or 20/30ºC (16 hr/8 hr), where germination averaged approximately 64% for seeds stratified at 10ºC for 6 weeks. In contrast, seeds germinated at constant 15 or 20ºC germinated at less than 5 and 12% without and with stratification, respectively. Germination temperature contributes to inconsistent seed germination; therefore, it is important that a standardized protocol is developed for this species. Based on preliminary testing, 15/25, 15/35 or 20/30ºC are acceptable temperature regimes for standard germination testing, however, before a Rules change is proposed, testing must be completed using additional seed lots and across laboratories to ensure low variability and repeatability.

Suggested Tolerances for Tetrazolium Tests

Sabry Elias, Stephanie Maguire, and Annette Miller

Regulators use tolerances to test the truthfulness of labeling and for comparing test results within and among laboratories. Tolerances are also used for service tests and for quality control purposes. The tetrazolium (TZ) test is increasingly used as a viability test for many crops because of its advantages, yet the AOSA does not have tolerances for that test. This year (2008), TZ tolerances are proposed to be added to the AOSA Rules by the authors of this paper. Tolerances are the largest non-significant differences between two values. Data of tetrazolium tests are expected to follow the binomial distribution, assuming sampling variation in the absence of experimental error, as do data of germination tests. However, in practice there are sources of experimental errors in each test. Experimental errors have to be identified, quantified and taken into consideration when calculating tolerance values. Possible sources of experimental error in the TZ testing may include but not limited to: improper cutting or piercing technique, variation in seed evaluation due to analyst experience, using different concentrations of TZ solutions, and using different methods and temperatures in moistening or preconditioning the seeds. The principles of calculating the TZ tolerances are established by Miles in his Handbook of Tolerances in 1963 and were revised by Michael Kruse who quantified the experimental error factor (f) by calculating the ratio between the observed standard deviation (s) among replications and the expected standard deviation (σ) based on the binomial distribution. Kruse developed tables for comparing two TZ test results of 400 seed each. The authors of this paper computed the tolerances for two tests of 200 seeds each, and for two tests, one 200 seeds and the other 400 seeds. This paper will explain the basis for calculating the experimental error for TZ tests as well as for computing the tolerance values.

Poster Session Abstracts

4:00-6:00pm, Monday June 9th

An index to quantify the relationship of seed moisture loss rate to seed desiccation tolerance in common vetch

Nezar H. Samarah[1'2], R. E. Mullen[1], A. Alqudah[2]
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[2] Department of Crop Production, Jordan University of Science and Technology, Irbid, Jordan.

Abstract

Common vetch (Vicia sativa L.) seeds are desiccation intolerant when seeds are harvested at immature stages of development and extracted from pods before drying. Drying immature seeds in intact pods may improve desiccation tolerance in association with slow drying rate. Therefore the objective of this experiment was to develop an index to quantify the rate of seed moisture loss of common vetch seeds subjected to four drying methods to their desiccation tolerance. During the reproductive growth stage, seeds were harvested at four development stages: 1) beginning seed fill (BS), 2) full-size seeds (FS), 3) yellow pods (Y), and 5) brown pods (B). Seeds were dried at 20oC ± 2 by four methods: 1) dried in intact pods, 2) extracted from pods and dried under ambient conditions (Ambient), 3) extracted from pods and rapidly dried over low relative humidity for 6 days (Low RH), 4) extracted from pods and slowly dried over a gradually declining relative humidity for 6 days (Gradually Declining RH). Seed moisture content was measured during the drying period. Seed desiccation tolerance was estimated by measuring the percentage of normal seedlings in standard germination test for air-dried seeds. An index was developed to quantify the drying rate over time. Drying seeds in intact pods improved desiccation tolerance (the percentage normal seedlings in standard germination) as compared with those seeds dried either under ambient, low relative humidity, or gradually declining relative humidity when seeds were harvested at the BS, FS, and Y stages. Slowly drying seeds under a gradually declining relative humidity improved the desiccation tolerance of the seeds harvested at FS stage as compared with those dried under ambient or low relative humidity. Drying seeds in intact pods or over gradually declining relative humidity slowed the drying rate as estimated by seed moisture loss index. As seed moisture loss (SML) index increased, seed desiccation tolerance decreased. A dramatically reduction in seed desiccation tolerance was observed at SML index of 19. These data emphasized that desiccation tolerance is an independent mechanism of seed development which can be acquired in seeds harvested as early as beginning of seed fill.

Stratification, hydrogen peroxide and germination temperature regime influence germination and dormancy release in eastern gamagrass [*Tripsacum dactyloides* (L.) L.]

Cindy H. Finneseth[1]*, Robert L. Geneve[2] and Joshua D. Klein[3].

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Eastern gamagrass (Tripsacum dactyloides L.) is a warm-season perennial grass recommended for forage, wildlife, and conservation purposes. However, its widespread adoption has been limited by poor germination and stand establishment. Less than adequate stands have been attributed to a combination of seed dormancy and low seed quality. The seed lot used for this study demonstrates the typical seed performance for eastern gamagrass with a germination potential of approximately 67% based on pre-treatment TZ viability assessment and lab germination in untreated seeds at approximately 15%. The objective of this study was to investigate whether germination temperature contributes to inconsistent seed germination following dormancy release by stratification or H_2O_2. Stratification between 2 and 8 weeks at 5ºC or 10ºC as well as H_2O_2 application enhanced germination speed, total germination and reduced dormancy compared to untreated seeds. Stratification was more effective than H_2O_2 for

dormancy release, but the impact on germination speed was similar. Germination temperature had a significant impact on germination percentage in both stratified and H_2O_2 treated seeds. Alternating temperatures were generally more effective in promoting germination and minimizing dormant seed than constant temperatures. Optimal germination occurred at 15/25, 15/35 or 20/30ºC (16 hr/8 hr), where germination averaged approximately 64% for seeds stratified at 10ºC for 6 weeks and 32% for seeds imbibed in 20% H_2O_2 for 18 hours. In contrast, seeds germinated at constant 15 or 20ºC germinated at less than 12 and 15% for stratified and H_2O_2 treated seeds, respectively. These data suggest that germination temperature contributes to poor stands observed for stratified seeds sown under field conditions. Additional work will determine if there is a benefit for combining stratification and H_2O_2 treatments to decrease seed sensitivity to germination temperature and possibly improve stand establishment.

Red to Far-Red Ratio during Seed Development Affects Lettuce Seed Germinability and Storability

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Abstract. Lettuce (*Lactuca sativa)* is one of the most important vegetable crops in the world. Thermoinhibition and photodormancy are two characteristics of lettuce seed that frequently reduce germination and seedling emergence in the field. In addition to germinability, storability is an important aspect of lettuce seed quality. The main objective of this study was to evaluate the effects of producing lettuce seeds under light with contrasting red to far-red ratios (R:FR) on seed germinability and storability. 'Tango' lettuce seeds were produced in growth chambers under one of two treatments: i) Red-rich light (R-treatment), and ii) Far-red-rich light (FR-treatment). Seeds produced under the FR-treatment were 5% heavier than seeds from the R-treatment, but in both cases the percentage normal seedlings germinated at 20°C-light was approximately 100%. When germinated in the dark, seeds from the R-treatment germinated 100% between 12 and 23°C, and over 50% at 30°C, while seeds from the FR-treatment germinated less than 35% between 12 and 23°C and less than 5% at 30°C. When germinating under light, seeds from the R-treatment had higher germination percentages and rates under a broader range of temperatures, having less thermoinhibition than seeds from the FR-treatment. Seeds from the R-treatment had lower abscisic acid (ABA) content and were better able to germinate when exposed to external ABA concentrations and reduced water potentials than seeds from the FR-treatment. Seed storability as assessed by the accelerated aging test was higher in seeds from the FR-treatment. These results suggest that seed production under environments with higher R:FR light represents a novel approach to the production of lettuce seeds with lower thermoinhibition and photodormancy; however, reduction in seed size and storability are two undesired consequences.

Temperature During Seed Development Affects Size, Germinability and Storability of Lettuce Seeds

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Seed germinability and storability are important aspects of seed quality determined by the genotype and environment of seed development. Lettuce (Lactuca sativa) is one of the most important vegetables in the world. The objective of this study was to determine how temperature of the mother plant environment affects lettuce seed quality. Seeds of cv. Tango were produced in growth chambers under one of two treatments: i) high temperature (HT), with day/night temperatures of 30/20°C, respectively, and ii) low temperature (LT), with temperatures of 20/10°C. Seeds produced at LT were 25% heavier than seed from HT, however germination at optimal conditions (20°C-light) was similar for both treatments. Seeds from HT presented better dark germination at 18, 24 and 29°C. Germinability (% and rates) under light at temperatures between 20 and 33°C was similar for seeds from both treatments, however at temperatures between 33 and 40°C seeds from HT performed better than those from LT. When germinated at negative osmotic potentials, germinability of seed from HT was less affected than LT. After accelerated aging (41°C, ~100%RH, 72 h) germination of normal seedlings was higher for seeds from HT. Germination after 1, 2 and 3 months of storage at 30°C and 74% RH was better for seeds from HT. The critical moment for temperature effects was also studied. Seed weight, dark germination at 30°C and germination at low osmotic potential were shown to be determined earlier during seed development (before 5 and 4 days after flowering for seeds from LT and HT, respectively). On the other hand, seed storability was determined at the end of seed development, after physiological maturity (~15 and 10 days after flowering for LT and HT seeds, respectively). In conclusion, for the lettuce cv Tango, higher seed germinability and storability were attained when seeds were produced at higher temperatures.

Comparison of Two Paper Towel Media Methods on *Triticum aestivum* Germination Results.

S.K. Dammen, K.A. Fiedler, A.L. Patin
SGS Mid-West Seed Services, Inc.
Brookings, South Dakota USA

The objective of this study was to evaluate two paper towel methods; horizontal unrolled towels versus vertical positioned rolled towels, as germination test methods for *Triticum aestivum* (wheat). Twenty commercial seed lots of *Triticum aestivum* were evaluated. The methods, substrata type, temperature and duration of the germination tests were identical. Four sheets of 38#, 12” x 24” paper toweling were utilized for the vertically positioned rolled towel method and two, 76#, 16” x 24” paper towels were used for the horizontal unrolled towel method. Germinations were conducted at 20°C and evaluations were performed at 7 days. The rolled paper towel (T) method had 100 seeds placed on a pre-moistened flat towel. After planting, the

towel was folded over, rolled up and placed vertically in a container. This planting process was repeated four times for each sample. The horizontal paper towel method utilized two 76# towels flat on a tray. Water was applied to the tray and paper towel as tray was conveyed under a spraying device. Four 100 seed replicates were planted on the tray while the towel remained horizontal and unrolled. After planting, the trays were inserted into a food service type germination cart and incubated at 20ºC. No significant differences in standard germination percentages were observed between the two methods. However, the horizontal paper towel method eliminated three planting and evaluation steps (watering, rolling up and unrolling to evaluate) thus producing a more streamlined and lower labor cost method.

COMMITTEE REPORTS

2008 Statistics Subcommittee Meeting

Sabry Elias, Chair
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Monday June 9, 2008 8:00 – 9:00 am
Riverfront Crowne Plaza Hotel, St. Paul, MN

Agenda

8:00 The new proposed noxious weed tolerance table to replace the current Table 8A.

8:20 The new proposed TZ tolerance tables.

8:45 Comments and suggestions on future statistics workshop.

8:50 Discussion on the need for a statistics handbook for seed research.

8:55 How can the statistics subcommittee help the members of the associations? Any other issues that the members would like to discuss.

2008 Germination and Dormancy Subcommittee Meeting

Riad Baalbaki, Chair
California Department of Food and Agriculture
Plant Pest Diagnostics Branch
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Phone (916) 262-3292
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Email: RBaalbaki@cdfa.ca.gov

Monday June 9, 2008, 10:15 am – 11:15 am
Riverfront Crowne Plaza Hotel, St. Paul, MN

Agenda

- Discussion of "Rule Proposal 19: Modifications to the "Additional Directions" in Table 3 of the Rules" and main.
- AOSA website additions to 'Germination recommendations of species without AOSA testing procedures in the Rules'.
- Other Germination/Dormancy Rule Change Proposals discussion. Please read the Rule proposals pertaining to germination and dormancy before the meeting to have your input, comments, and questions ready.
- Discussion of suggested changes in rounding germination results.
- Any other issues that the members would like to discuss.

2008 TZ Committee Meeting

Annette Miller, Chair
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Meeting: Tuesday, June 10, 2008, 1:00 pm to 2:00 pm
Riverfront Crowne Plaza Hotel, St. Paul, MN

Draft Agenda (4/18/2008)

1. 2007 Handbook changes
2. Website review
3. 2008 Rule change proposals
4. Chenopodiaceae discussion: review of the new evaluation criteria
5. TZ Handbook 2010 edition
6. Referees
7. Open discussion:
   - Handbook page additions or changes, new species pages, addition of species to existing pages, other handbook changes

- Relationship of the TZ Handbook to the Rules
- Future rule proposals

2008 Vigor Subcommittee Meeting Agenda
R. Baalbaki and K. Fiedler RGT.,CGT Co-Chair
Monday June /9/2008
3:00-4:00 pm

- Reports of Sweet Corn, Vegetable and Soybean working sub groups
- Results of the Vigor Survey
- Overview of the revised Seed Vigor Testing Handbook
- Any other issues that the members would like to discuss.

For comments or suggestions: Kari.Fiedler@sgs.com or rbaalbaki@cdfa.ca.gov phone (916)262-3292. California Department of Food and Agriculture

2008 AOSA Rules Change Open Discussion and Voting

Cindy Finneseth, Chair
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Open Rules Committee Meeting - Tuesday, June 10, 2:15 – 5:15 pm
Joint Voting Session - Wednesday, June 11, 8:00 – 10:00 am

Twenty six proposals for changes or additions to the AOSA Rules for Testing Seeds will be discussed and voted upon at the annual AOSA/SCST meeting. Text of the proposals was published in the February edition of *The Seed Technologist Newsletter* for review. Please note that proposal #28 regarding ryegrass fluorescence in HB 33 has been withdrawn. All proposals are also posted online and can be accessed via the Rules Committee webpage (http://www.aosaseed.com/rules_committee.htm). Written comments (preferably via email) may be submitted to the Rules Committee Chair until June 1 or brought to the annual meeting.

Time will be available during the Open Rules Committee Meeting for discussion on each proposal. All proposal amendments will be completed during the Open Rules Committee Meeting, scheduled for Tuesday, June 10 at 2:15 pm. No amendments will be allowed from the floor during the joint voting session on Wednesday, June 11 at 8:00 am. Please bring your own hard copy of the 2008 proposals with you to the annual meeting, as additional copies of the proposals will not be available at the meeting.

Handbook Policy Announcement

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Over the course of a few AOSA Board and AOSA/SCST Joint Board meetings, questions on whether certain handbook updates should be approved by the membership or by the AOSA Board members have arisen. In the AOSA By-laws, Article X – Publications, the Executive Board is responsible for directing the publication of all handbooks. In order to assure that AOSA handbooks which are not part of the Rules are correctly updated the AOSA and SCST Joint Boards have approved a "Handbook Update Review Policy". This policy provides for review of a handbook update by the technical committee(s) and by both the AOSA and SCST Executive Boards. It also requires that justification or empirical evidence be provided for each handbook update. Although the final decision is made by the AOSA Executive Board this policy will better ensure that updates are thoroughly reviewed before approval and publication. It will also help to streamline the review process so that handbook updates will be published in a timely manner.

Handbook Update Review Policy

All updates to AOSA handbooks which are not part of the Rules should be submitted to the AOSA and SCST Boards for review before publication and after review by the appropriate technical committee(s). The AOSA and SCST Boards will determine if the updates - whether totally or individually - should be voted on by the membership before becoming part of the respective handbook. Justification or empirical evidence for the update(s) should be included with the submitted proposed updates. The AOSA and SCST Boards may delay or deny publication of handbook updates if insufficient evidence or justification is not included with submitted proposed updates. Proposed handbook updates should be submitted to the AOSA and SCST Boards by December 31 so that there will be sufficient time for review before the upcoming AOSA/SCST Annual Meeting.

As a reminder, handbooks that are part of the AOSA Rules for Testing Seeds include:

HB 24: Uniform Blowing Procedure
HB 25: Uniform Classification of Weed and Crop Seeds
HB 35: Seedling Evaluation Handbook

Changes to these specific documents must go through the Rules Committee proposal procedure and subsequently be voted upon by the AOSA/SCST membership at the annual meeting. As a courtesy, notification of proposed changes to these handbooks should also be given to the Handbook Committee prior to submitting a Rules change proposal.

The following cover sheet should be completed and submitted with the handbook update(s) requested:

Handbook Update Cover Sheet

Title of Handbook: _____

Submitter(s): _____

Contact information: _____

Pages and/or sections to be updated: _____

Target date for update publication: _____

Technical committee(s) that reviewed update(s): _____

Justification for update(s):

GENERAL AND TECHNICAL INFORMATION

National Seed Health System

from *Iowa Seed & Biosafety*
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www.seeds.iastate.edu/seedtest

The concept for the NSHS was born 10 years ago - an idea formed by a group of scientists interested in seed pathology and the international movement of seed. They wanted a system that would help facilitate the movement of seed internationally, and help standardize the growing world of seed health testing. From this idea came a team of organizers, a panel of representatives from the seed industry, government, seed regulators, and testing laboratories which worked under ASTA to develop an official system for the phytosanitary testing of seed.

The goals were of the system were:

- To create a flexible and efficient phytosanitary certification system that addresses the needs of the U.S. seed industry and to increase the involvement of the seed industry in phytosanitary certification.
- To respond to the global trend for the adoption of accreditation in seed regulatory systems.
- To help eliminate non-scientifically justified phytosanitary regulations.
- To provide a scientific, peer-reviewed basis for adopting seed health testing methods.
- To increase industry-government interaction and cooperation in the improvement of seed trade systems.

To meet these goals, three objectives of the system were established: to accredit organizations in the private sector to perform their own phytosanitary activities, to standardize seed health laboratory tests and phytosanitary inspection procedures, and to help promote international phytosanitary reform. In 2001, PPQ published a rule in the Federal Register (7 CFR 353.8) which provides the authority to accredit laboratory testing or phytosanitary inspection services (for field inspection, seed sampling, and visual inspection of seed) for use in supporting export certification activities. 7 CFR 353.9 established the National Seed Health System. Previous to this system, all work for phytosanitary certificate issuance needed to be done by state or federal officials and laboratories. Under these regulations, USDA-APHIS-PPQ still holds the authority for the operation of the system. To assist them in this process, the Iowa State University Seed Science Center has been named the Accreditation Unit of the NSHS, and works on the application process for organizations, paperwork, and providing scientific knowledge and support.

Eleven entities have joined the system (California Seed and Plant Lab, Idaho Crop Improvement Association, Illinois Crop Improvement Association, Indiana Crop Improvement Association, Iowa State University Seed Testing Laboratory, Nebraska Crop Improvement Association, Pioneer Hi-Bred International Inc., Professional Seed Research, Seminis, STA Laboratories, and Syngenta Seeds). Accreditation can be for any of four options:

- Seed Health Testing
- Phytosanitary Field Inspections
- Seed Sampling for Phytosanitary Testing
- Visual Inspections for Phytosanitary Certification

The majority of current accreditations are for phytosanitary field inspections. Recently, an interest in accreditation for visual inspection of seed and sampling seed for phytosanitary testing has been increasing. These two options can be viewed as an affordable and easy option for companies interested in accreditation but not wishing to invest in the setup of a pathogen testing laboratory or field certification program.

Recently there has been a surge in accreditation schemes within the seed industry for various programs. The NSHS, as one of the first accreditation programs, and one of the only with validation through the Federal Register, has recently been used as a model program for others wishing to start a certification system.

One of the unique components in the NSHS system of standardizing methods is the use of technical panels of experts (industry professionals, scientists, etc.) to determine the best protocols for use in the system. Many other systems often use referee (or ring) testing of methods among multiple laboratories where, for instance, every lab would receive a standardized sample to run according to a certain protocol, and lab to lab results would then be

compared. However, this process is time consuming, and with current restrictions against the movement of plant pathogens without proper permits, referee tests can be very difficult for use with seed health methods. The NSHS instead uses a system of having “experts” for each pathogen and/or crop look over sets of known methods, and they then send their expert opinions on whether or not the method is acceptable back to the NSHS's group of representatives for final approval. Tests are ranked as "a" (acceptable without changes), "b" (needs further research & development), or "c" (not acceptable for use as a standardized test). Part of the NSHS's future goal is scientific research to convert the "b" ranked-tests into acceptable standardized methods. This method of peer-reviewed method approval has allowed a number of commonly used test methodologies to become approved as standardized tests in a relatively short period of time.

While accreditation into the NSHS is not necessary for all companies moving seed,it does play a vital role in phytosanitary export, as accredited labs test seed with standardized methods, or state and federal officials use NSHS standardized guidelines for a uniform set of US regulations for the movement of seed. In the end, the US gains better credibility as a country with standardized phytosanitary protocols, which will help to harmonize and expedite the international movement of seed.

Seed Technologists and Seed Health Issues

Doug Miller
Registered Genetic Technologist

Lisa Shepard’s excellent article on the National Seed Health System is a great preface to my editorial on how to turn member interest in seed health into productive activities. As a starting point I have included the AOSA/SCST Seed Pathology Subcommittee Mission Statement below:

> The Seed Pathology subcommittee is comprised of people interested in seed health testing and seed borne plant pathogens. Our goal is to promote communication and cooperation on seed health issues between seed analysts, seed testing laboratories, seed producers and seed regulatory agencies. We seek to be informed about current problems in seed health and to resolve those problems, to respond to emerging seed health issues with timely solutions, to continually improve seed health testing methods and to promote uniformity in seed health testing worldwide. We desire to educate ourselves and others through discussion, presentations and workshops. Membership is open to all interested parties. (AOSA/SCST Seed Pathology Subcommittee, 2007 Annual Meeting)

It is obvious that all of three organizations (NSHS, SCST, AOSA) encourage proficiency and professional standards as well as cooperation between regulatory and commercial entities. The NSHS is, and should be, the guiding light on all seed health issues in the US. I believe there is enough potential synergy within the AOSA and SCST membership to cooperatively work with the NSHS in achieving uniformity in seed testing and equitable seed movement in all markets. However, seed health methods are firmly within the realm of the NSHS. The scientific, peer-reviewed process of adopting seed health testing methods is the only realistic way of addressing standardized methods. The complexity of working with two or more organisms, one domesticated (seed) and one wild (pathogen), demands groups of experts focused on specific

host-pathogen systems. While specific molecular methods are effective, I also believe that the unique genetics, and other molecular-polymorphisms, of plant pathogens precludes the universal application of PCR or Immunoassay methods for phytosanitary purposes. Traditional plant pathology techniques such as plate tests are still state of the art. The NSHS's goal of converting "b" ranked-tests (needs further research & development) to "a" is a laudable goal that should be supported by the seed industry as a whole. I would encourage those involved in this type of work to be a part of the SCST through the Research membership category with participation in the AOSA/SCST Seed Pathology Sub-Committee.

Based on the minutes of the 2007 AOSA SCST Seed Pathology Sub-Committee meeting, and related discussions, there are three main areas of interest in seed health or seed pathology within the AOSA and SCST:

1) Expansion of the Seedling Evaluation Handbook to include digital photos of primary and secondary infections on germinating seedlings as they relate to proper classification of abnormal seedlings.
2) Obtain basic information on seed pathology and seed health methods for analysts preparing to take exams (Teaching and Training Committee)
3) Basic information about pathology testing using immunoassays (Immunoassay Working Group)

The expansion of the Seedling Evaluation Handbook to include digital photos of primary and secondary infections on germinating seedlings would be of great benefit to viability analysts. Dr. Riad Baalbaki and Sandra Walker have made a call for photos and information as part of the sub-committee's activities (Items of interest in Seed, April 2007 & 2007 AOSA-SCST Annual meeting). I believe that APHIS and the NSHS should also support a higher level of seed health awareness among seed analysts. Analysts, armed with the proper information, could help defend against the introduction or dissemination of unique and exotic pests. Those "on the front lines" are often the first to identify something new for the experts to diagnose. Better education and reference material would address export issues as well as catch introductions that could spread through domestic seed markets. The issue of introductions may have funding opportunities through homeland security.

As expressed in items 2 and 3 there is also a desire to know more about "basic seed pathology and test methods." Can analysts, who are not plant pathologists, be adequately trained to consistently deliver NSHS approved methods? Yes, with the help of a trained plant pathologist. At present the NSHS seed testing fraternity is small and a new SCST membership category modeled after the RST and RGT concept for seed pathologists would be ill advised. However, I see some areas where the NSHS could benefit from a cooperative agreement with the AOSA and SCST. The AOSA and SCST membership represents a "critical mass" of companies and personnel that would be interested and able to become accredited under the sampling and/or visual inspection of seed options of the NSHS. While many member labs and companies could not afford, justify or staff a seed pathology lab the sampling and visual inspection options may be of benefit to seed companies, laboratories and state regulators. I see a significant opportunity to broaden the NSHS and address analyst's interest in seed pathology through this type of training. I would also appeal to the NSHS and the American Phytopathological Society to see if a sub-set of its membership could be identified for a targeted mailing to expand the Research member category. In short I would focus on the sampling and visual inspection training as a way to expand the knowledge base and opportunity for accreditation of the AOSA and SCST membership.

As indicated in the opening line this is simply an editorial based on my plant pathology training and work at Illinois Crop in the areas of phytosanitary field inspections, winter seed production and genetics. None of the views or opinions expressed in the article reflects the position of the NSHS, AOSA, SCST or the Illinois Crop Improvement Association.

Statistical Bases for Tolerances of Noxious Weed Seeds

Sabry G. Elias and Deborah J. Lionakis Meyer

Current noxious-weed seed tolerances

The current AOSA Table 8A 'Noxious-weed seed tolerances' in the AOSA Rules is primarily used for regulatory purpose to test the truthfulness of the noxious weed seed value stated on a seed lot label. However, this table is not appropriate for that purpose. According to the AOSA Rules, the noxious-weed seed tolerances in Table 8A are computed from the following formula:

$$Y = X + 1 + 1.96\sqrt{x}, \text{ where}$$

X is the number labeled or represented
Y is the maximum number within tolerance

The above formula is in error for the following reasons:

1. When evaluating the truthfulness of a seed lot label for noxious weed seed contamination, we need only be concerned if the laboratory analysis (second test) shows a higher contamination level than stated on the label (first test). If the level of contamination is found to be higher than stated on the label then we must determine if the contamination level is significantly higher (i.e., out of tolerance). This requires the use of a one-way test of the upper limit and for this purpose the one-sided t-value of 1.65 is used. If the level of noxious weed seed contamination is found to be less than stated on the label there is no concern. Since the lower limit is not of concern, the current AOSA formula is in error because it employs the two-sided t-value of 1.96 (Miles, 1963; Dodge and Canfield, 1972; Elias et al., 2000). This error provides a wider tolerance that is biased towards the seed seller.

2. The correction factor of 1.0 in the above equation (also called Yates correction suggested by Leggatt, 1939) lends even more bias towards the seed seller. This correction factor overestimates the normal approximation of the Poisson distribution. Miles (1963) proposed using a correction factor of 0.8; however, the difference between the direct Poisson distribution values from Table 7 of Pearson and Hartley (1966) and the normal approximation of the Poisson distribution were found to range from 0.16 to 0.30 at the five percent probability level (Elias et al., 2000). Therefore, a correction factor of no more than 0.3 is appropriate.

Historical background of the formula used to calculate the AOSA tolerances

Although not stated in the current AOSA Rules, the source of the noxious weed seed tolerances (the current Table 8A) can be traced back to the early part of the 20th century. The Rules and Recommendations for Testing Seeds[1] (USDA, 1938), section 6, Noxious Weed Seed contained

[1] Adopted by the Association of Official Seed analysts of North America, August 27, 1937.

Table 2 – Range of values to be expected for a few selected degrees certainty for rates of occurrence from 1 to 30. This table was adapted from Pearson (1914) and shows for given rates of occurrence of 1 to 30 seeds the maximum number of contaminants that might be expected at selected degrees of certainty. In 1940, the Rules and Regulations Under the Federal Seed Act (FSA) (USDA, 1940), sec. 201.63 provided a tolerance table for labeled rates of occurrence of noxious weed seeds from 0 to 21. No reference was given for the calculation of the values, and only about half of the stated tolerances match those given in column three of Table 2 (USDA, 1938). The 1963 edition of the FSA, sec. 201.65 contained a table of noxious weed tolerances for labeled rates of occurrence form 0 to 30, for which the formula Y = X + 1 +1.96 $\sqrt{x}$ was used and the declared degree of certainty was five percent (USDA, 1963). This same table and formula appear in the current version of the FSA (USDA, 2006). In 1947, AOSA published a noxious weed seed tolerance table calculated from the formula Y = X + 1.96 + 1 (AOSA, 1947). The tolerance values for labeled rates of occurrence of 0 to 30 were the same as those found in the FSA (USDA, 1940); however, the table contained tolerance values for rates of occurrence up to 335. These same values appeared in the 1960 AOSA Rules, but the stated formula for calculation was changed to Y = X + 1 +1.96 $\sqrt{x}$ (AOSA, 1960). The current AOSA tolerance values in Table 8A (AOSA 2007) are also similar to those found in Table F3 "Foreign seed numbers to test a specification by an estimate 1-way or 2-way test" (Miles, 1963). However, Table F3 shows the numbers of noxious weed seeds upon which a seed lot is either accepted or rejected, whereas Table 8A shows tolerance values. The difference between the reject/accept value and the tolerance value is that the reject value is equal to the tolerance value plus one, and the accept value is equal to the tolerance value minus one. Another difference between the values given by Miles (1963) and those in the FSA and the AOSA Rules is that Miles correctly used the 1.65 t-value for a one-tailed test at the five percent probability level, whereas the 1.96 t-value for a two-tailed test at the five percent probability level was incorrectly used in the FSA and AOSA tolerances.

Suggested noxious weed tolerances

Currently we are using an inappropriate statistical method to determine the tolerance values for noxious weed seed contamination. To solve this problem, an alternative tolerance table based on appropriate statistical procedure is proposed. The proposed table (seed Table 1 below) is adapted from Elias, et al. (2000). In the proposed table the tolerance values for noxious weed seeds were obtained by using Table 7 of Person and Hartley (1966) for contamination levels up to 25 with appropriate linear interpolation at the five percent probability level. For contamination level beyond 25, normal approximation of the Poisson distribution was used. The proposed table provides more accurate and precise tolerances by computing the accumulated probabilities under the Poisson distribution using the SAS Program (SAS, 1997).

The tolerances in the proposed table are slightly narrower (more conservative) than the current AOSA tolerances in Table 8A. For example if the rate of occurrence of noxious weed seeds claimed on the label is 10 the current tolerance is 17 and the suggested tolerance is 14. The narrower tolerance is appropriate since the presence of noxious weed seeds has serious consequences.

To test the precision of the suggested tolerances, a computer simulation was performed to determine the rejection rate with the use of the suggested tolerance limits. Five percent of the samples from the same population would be expected to be rejected (by type I error) when inspected for noxious weed seeds when a five percent probability level is used (the same probability level used in the current and the proposed tolerances). Five thousands simulated samples from a Poisson distribution for means 1 to 99 noxious weed seeds were randomly drawn and tested. The results (Elias, et al., 2000) showed that the average rejection rates were

3.88% using the suggested tolerances, 1.02% using the current AOSA tolerances, and 2.46% using tolerances suggested by Miles. This proved the suggested tolerance values are closer to the theoretical rejection rate of five percent than the current AOSA tolerances and those suggested by Miles (1963).

Conclusion

The proposed noxious weed seeds tolerance table is computed based on sound statistical procedures, has a source of references to review, and complies with the concerns of introduction and spread of noxious weed seeds and the cost of weed control.

Table 1. Proposed maximum tolerated difference of noxious weed seeds between two tests or a labeled value and a second test made from equal weights in the same or different laboratories (one-way test at 0.05 probability level). Note: if adopted this table would replace AOSA tolerance table 8A.

Number labeled or represented X	Maximum number within tolerance Y	Number labeled or represented X	Maximum number within tolerance Y
0	2		
1	2	51	62
2	4	52	63
3	5	53	64
4	7	54	65
5	8	55	67
6	9	56	68
7	11	57	69
8	12	58	70
9	13	59	71
10	14	60	72
11	16	61	73
12	17	62	74
13	18	63	75
14	19	64	76
15	21	65	78
16	22	66	79
17	23	67	80
18	24	68	81
19	25	69	82
20	27	70	83
21	28	71	84
22	29	72	85
23	30	73	86
24	31	74	87
25	32	75	89
26	34	76	90
27	35	77	91
28	36	78	92
29	37	79	93
30	38	80	94
31	39	81	95
32	41	82	96
33	42	83	97
34	43	84	98
35	44	85	99

36	45	86	101
37	46	87	102
38	47	88	103
39	49	89	104
40	50	90	105
41	51	91	106
42	52	92	107
43	53	93	108
44	54	94	109
45	55	95	110
46	56	96	111
47	58	97	112
48	59	98	114
49	60	99	115
50	61	100*	116

* To compute tolerance values beyond 100, use the following equation $P = x + 1.65\sqrt{x} + 0.3$ (*From Elias, et al. 2000*), where P is the maximum tolerated difference between a label or first test and a second test, and x is the number of noxious seed labeled.

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Effect of Germination and Fluorescence on Plant Type Produced in Ryegrass

Sabry G. Elias, Adriel E. Garay, Cindy House, and Heather Nott

Background

The current AOSA germination Rule 4.9.d. states that "any test may be terminated prior to the number of days listed under 'Final count' if the analyst is positive the maximum germination of the sample has been attained". However, the Cultivar Purity Testing Handbook states "Do not remove non-fluorescent seedlings before 14 days" regardless of whether the sample attains maximum germination potential before the 14d test period. The relationship between ryegrass germination and the time when the roots of the germinating seedlings express fluorescence is not well understood. There is no published data to quantify or explain the relationship between germination and fluorescence over time. Therefore, studies were conducted at the Oregon State University seed laboratory to explore the feasibility and conditions under which the germination and fluorescence tests can be ended before 14 days. Not all seeds germinate and express fluorescence at the same rate, generally, high quality seeds with no or low dormancy levels germinate faster and more uniformly than lower quality seeds or seeds with deeper dormancy. Thus, some samples may achieve a maximum germination in 7 or 10 days while others may take 12 or 14 days. Similarly some samples express full fluorescence in 7 or 10 days while others take 12 or 14 days.

Following are an overview of the biological principles of germination and fluorescence, and a summary of some studies conducted at the OSU Seed Laboratory in addition to a national referee. The main objective of all studies was to understand the effect of germination and fluorescence on the type of plants produced (i.e., annual or perennial in ryegrass).

Biological principles of germination and fluorescence tests

The expression of fluorescence in ryegrass requires healthy seedlings with well- developed root tissues. Therefore, in most cases when a sample has reached maximum germination in 7 or 10 days, waiting additional days is not likely to change the final germination or the fluorescence test results. It was observed in the studies conducted at the Oregon State University (OSU) Seed Laboratory that when the fluorescent seedlings of a perennial ryegrass sample are planted for a grow-out test, not all the fluorescent seedlings express annual characteristics, i.e., they fluoresce, but plants are morphologically similar to the perennial type. Furthermore, in a recent study at the OSU Seed Lab, it was found that if a ryegrass sample has reached maximum germination and the variety fluorescence level (VFL) description of that cultivar is low, and the number of the fluorescent seedlings in the first count (7d) is low (i.e., below the VFL), it is unlikely that waiting for 14 days would affected the final test results. On the other hand, if the VFL description of a variety and the number of the fluorescent seedlings in the first count (7d) is high, a full 14-day test period would be needed. In addition, it was also found that pre-chilling treatment speeds up and evens out germination (Figs. 1), which in turn expedites the detection of fluorescent seedlings.

Progression of germination

A study was conducted at the OSU Seed Lab to evaluate the pattern of germination in 142 perennial ryegrass samples. Evaluation was completed within 1-2 months after harvest in 2006. The results showed that many perennial ryegrass samples, even freshly harvested seeds,

reached maximum potential germination at the first count (7d) when seeds were pre-chilled at 10°C and germinated at 15-25°C. The germination percentage of 117 out of 142 pre-chilled perennial ryegrass samples did not change from the first count (7d) to the final count (14d) or increased only by 1%. The results also indicated that in the absence of prechilling treatment, germination was sporadic and was delayed (Fig. 1). This may be attributed to the importance of pre-chilling treatment in breaking dormancy and enhancing germination.

A similar germination pattern was observed in the national referee study that was conducted in 2007. The referee was conducted to determine the rate of germination and fluorescence of perennial, annual and intermediate ryegrass samples at 7, 10, 12 and 14 days. Nineteen laboratories from CA, FL, IA, IL, IN, KY, MI, MO, OR, PA, SD, TX, WA, WI, and Canada participated in this referee. Ten seed lots were used in the study representing various varieties from 2006 and 2007 crops. The results showed that the germination percentage did not change from the first count (7d) compared to the final count (14d) by more than 3% in 15 out of the 19 labs (Fig. 2). A few labs differed from the majority of the other labs and found large variation between the first and the final count. At 10d, all 19 labs were within 1% germination compared to the final count (14d) for sample No.1 (Fig. 2). A similar trend was observed for all perennial, annual and intermediate ryegrass samples. It is worthy to note that the variation among laboratories is much greater than the variation among dates (i.e., 7, 10, 12 and 14 days) (Fig. 2). This fact was observed in each individual sample.

The germination results of all 10 samples in the19 laboratories strongly suggest that many ryegrass samples do reach maximum germination potential before the end of the 14-day test period. Samples that do not reach maximum germination potential would need to wait for the full 14 days.

A study is being conducted at the OSU Seed Lab to evaluate the relationship between germination, fluorescence and plant type in ryegrass. The preliminary results confirmed the findings of the previous two studies in that many samples attained maximum germination potential before the final count (14d). The preliminary results of the fluorescence and plant type will be discussed below.

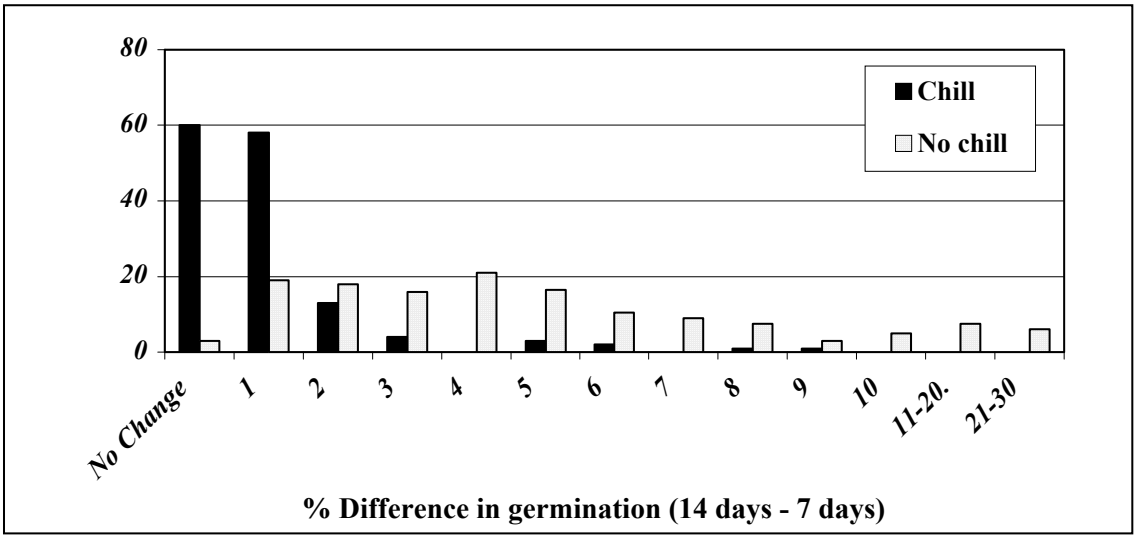

Figure 1. The difference in germination between the first count (7d) and the final count (14d) of 142 perennial ryegrass samples planted with and without pre-chilling treatment in standard

germination tests. Pre-chilled samples germinated faster than samples that did not receive pre-chilling treatment.

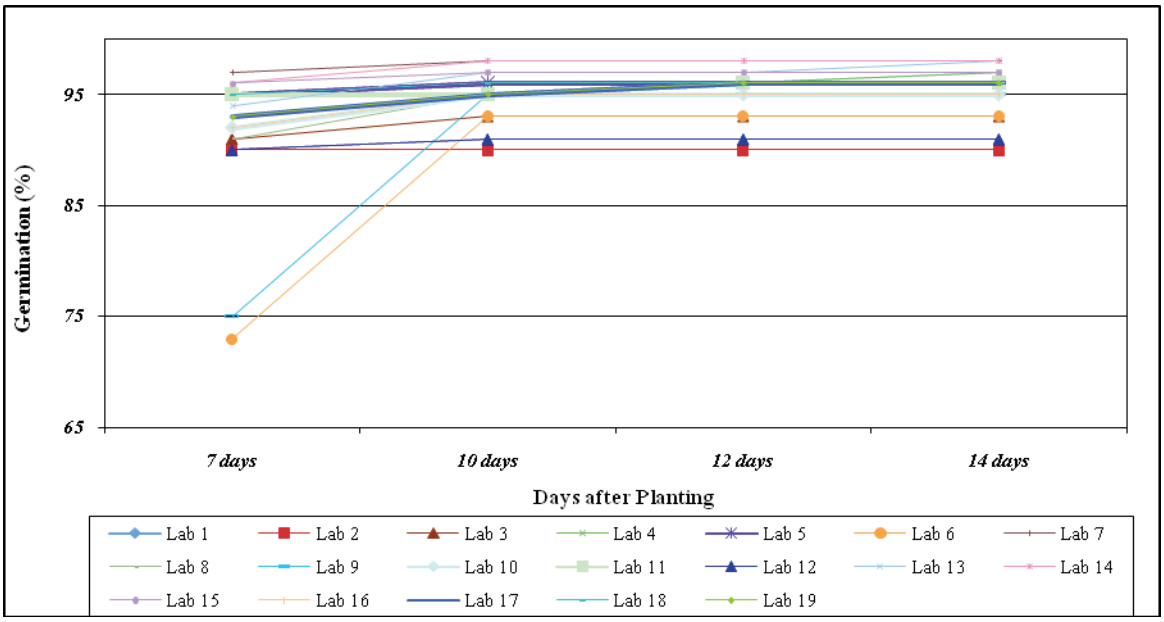

Figure 2. Germination of perennial ryegrass sample (No. 1) over two-week period.

Progression of fluorescence

The first study was conducted at the OSU Seed Lab to evaluate the pattern of fluorescence in 142 perennial ryegrass samples. The fluorescence percentage of 132 out of the 142 prechilled perennial ryegrass samples did not increase from the first count (7d) to the final count (14d) (Fig. 3). The results also indicated that in the absence of prechilling treatment, the expression of fluorescence was delayed (Fig. 3). These results indicate that many samples do achieve their maximum germination and express full fluorescence level before the currently prescribed 14 days; hence, there is a possibility of avoiding unnecessary delay in such cases. Naturally, samples that have not achieved their full germination potential should be given the full 14-day test period to evaluate germination and fluorescence.

In the national referee study, the results showed that even though the 19 sub-samples of each of the ten varieties distributed to the participant labs were sister samples from the same submitted samples, the fluorescence results obtained by the 19 laboratories varied significantly (Fig. 4). For example, in figure 4, one lab (No. 15) found less than 1% fluorescence, whereas another lab (No. 7) found above 4%. This variation in fluorescence does not indicate error on the part of the labs, it simply reflects the variable nature of fluorescence. It shows clearly how different groups of 400 seeds contain different numbers of fluorescing seeds simply due to random sampling variation. This type of variation is unavoidable and was observed in all 10 ryegrass samples. This kind of variation is not unusual for those who are familiar with the fluorescence testing. This strongly suggested that fluorescence of sister samples taken from the same submitted sample can vary among labs more than the variation among dates, i.e., 7, 10, 12 and 14 days (Fig. 4).

The fluorescence level did not change significantly between the first count (7d) and the final count (14d) in many labs. For example, at the first count the fluorescence level of sample No. 6

did not change in 15 out of the 19 labs and remain steady until day 14. Similarly, the fluorescence level of sample No. 4 did not change after 10d in 16 out of the 19 labs (data not shown). A similar trend was observed for all ryegrass samples.

The results of the national referee demonstrated that perennial, annual, and intermediate ryegrass behaved similarly in regard to fluorescence, in that samples that reached maximum germination, expressed near full fluorescence at 7 or 10 days with some exceptions.

The relationship between fluorescence and plant type

In some cases, the fluorescence test might overestimate the annual ryegrass contaminants in perennial seed lots. Therefore, the grow-out test was developed to distinguish more accurately between annual and perennial types based on the differences in the growth habits and headings of each type. An earlier study conducted at the OSU Seed Lab found that the mean percentage of annual ryegrass detected in 45 perennial samples was 10.07% by the fluorescence test and it was 3.11% by the grow-out test. Therefore, a study is being conducted at the OSU Seed Lab to identify the plant type of the seedlings that fluoresce at 7, 10, and 14 days of a germination test.

The preliminary results showed that few seedlings fluoresced after 7 or 10 days if the sample has attained maximum germination and the VFL description of a variety and the number of the fluorescent seedlings in the first count (7d) is low (i.e., below or equal to the VFL) such as groups 1 and 2 (see the description of each group below). Also, most of the fluorescent seedlings expressed morphological characteristics of perennial type when a grow-out test was conducted. The four perennial ryegrass groups included in this study to represent a range of sample conditions observed in routine testing are:

Group 1. Samples that do not fluoresce at all: They are considered pure perennial and have no problem by any means. This group represents the cleanest samples that have no annual type contaminating perennial ryegrass samples.

Group 2. Samples that fluoresce less than their VFL: They exhibit fluorescence within the VFL description of the variety being tested.

Group 3. Samples that fluoresce higher than their VFL, but show low number of annual plants by the grow out test: They show higher level of fluorescence than the VFL of the variety being tested. After a grow-out test, they show low number of annual plant types.

Group 4. Samples that fluoresce much higher than their VFL and show high number of true annual type plants in the grow-out test. This group represents the most contaminated perennial ryegrass samples with annual type.

A total of four samples within each group representing different varieties, and years are used.

The preliminary results indicate that if the VFL description of the variety under investigation is low and the number of the fluorescent seedlings in the first count (7d) is low, i.e., below the VFL, it is unlikely that this sample will have more fluorescent seedlings in the final count to affect the final results. If the VFL and the number of fluorescent seedlings in the first count (7d) is high, a full 14-day test period would be needed as a safeguard to reduce the risk of missing potential fluorescent seedlings. Complete results will be provided when the study is concluded.

In summary, the results of all studies indicated that many samples do achieve maximum germination and express full fluorescence level days before the currently prescribed 14 days.

They also indicated that not all the fluorescent seedlings grow-out to exhibit true annual characteristics (e.g., wider blades, lighter color, elongated stems, and forming heads without vernalization). In addition, the results showed that if a sample has low VFL description and low number of fluorescent seedlings in the first count (7d) and the sample has reached maximum potential germination, the germination and fluorescence test can be ended before the 14-day test period without affecting the final results. Hence, there is a possibility of avoiding unnecessary delay in such cases. However for samples that have a high VFL description and showed high number of fluorescent seedlings in the first count (7d), a full 14-day test period would be needed.

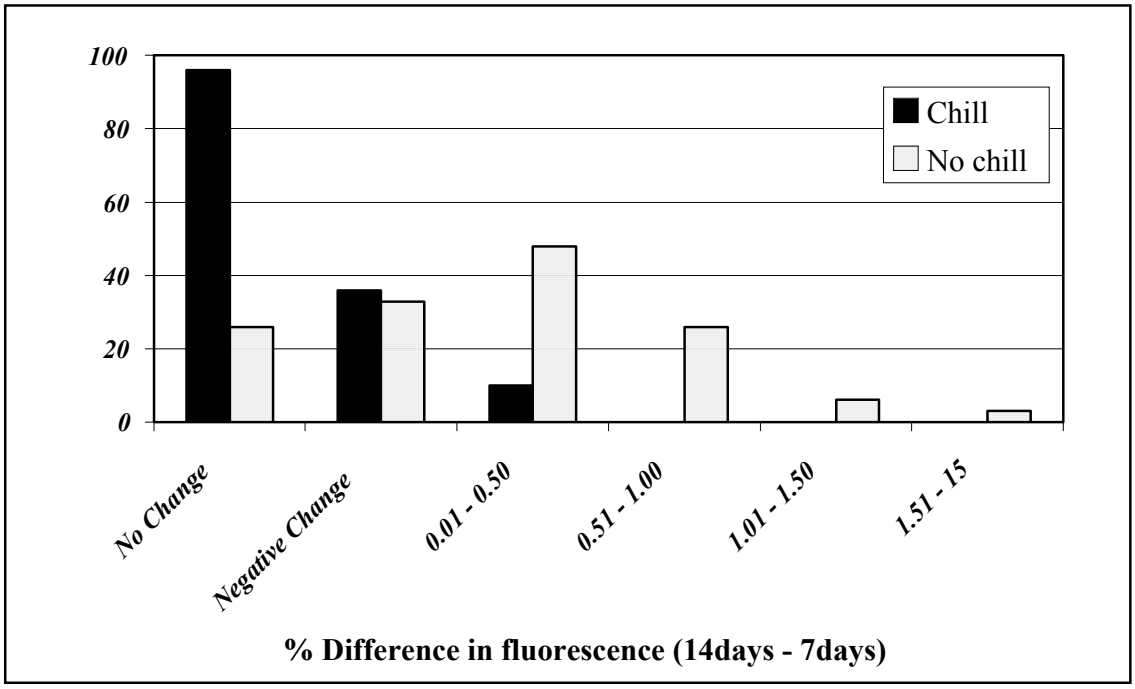

Figure 3. The difference in fluorescence between the first count (7d) and the final count (14d) of 142 perennial ryegrass samples planted with and without pre-chilling treatment in standard germination tests. Negative change means fluorescence percent of 7d is more than the 14d because more non-fluorescent seedlings germinated after the first count (7d). Pre-chilled samples fluoresced faster than samples that did not receive pre-chilling treatment.

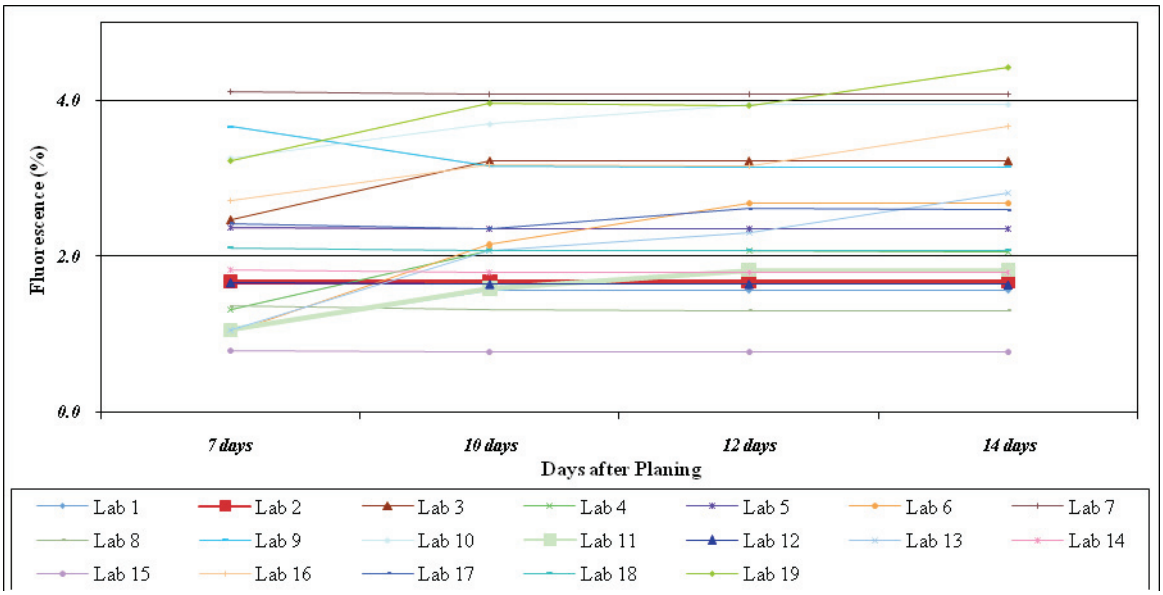

Figure 4. Fluorescence of perennial ryegrass sample (No. 1) over two-week period.

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AOSA. 2007. Rules for Testing Seeds. Association of Official Seed Analysts, Stillwater, OK.

AOSA. 2003. Cultivar Purity Testing Hand-book. Association of Official Seed Analysts, Stillwater, OK.

Elias, S.G., and A.E. Garay. 2008. Effect of pre-chilling treatment on the germination and fluorescence of perennial ryegrass. *In* W. C. Young III (ed.), *Seed Production Research at Oregon State University*. Department of Crop and Soil Science Ext/Crs 127, 3/08.

BOOKSHELF

I recently added another book to my bookcase.

Flower Seeds Biology and Technology, 2005. Edited by M.B. McDonald & F. Y. Kwong. CABI Publishing. 372p. ISBN 0 85199 906 9

Most of you do not know that one of the reasons I chose to attend the Ohio State University was due to Miller's ability to write scientific text in a manner that I actually understood what I was reading. This book is a compilation of chapters by an assortment of authors. Some of the authors have deep ties with AOSA/ SCST: Miller McDonald, Debra Lionakis Meyer, Marian Stephenson, Jolan Mari and Annette Miller.

The flower seed industry has experience consistent growth over the previous twenty years. There has been a proliferation of varieties, rapid adaptation of technology and increasing species adapted to the flower trade.

There is a fascinating chapter as to the history of the flower seed industry. I recognized many of the companies, but was not familiar with many others. The development of the flower seed

industry is explained along with developing the bedding market and incorporation of various seed technologies.

Clearly the bedding plant industry is a major, visible, portion of the flower seed trade. The advent of the specialized plug market and plug grading increased the value of the flower trade. Increasingly, native flowers are becoming more available to the average homeowner, which requires field taxonomy skills and knowledge of native species for seed collection. The native species market is not only environmentally 'green'; it may be an extremely attractive alternative in areas with limited water or in xeroscape plantings. Major challenges exist in identification and production of local ecotypes and introducing newly collected species with a limited database of germination methodology.

Flower breeding, whether via public or private sector, is utilizing very specialized knowledge of traditional breeding techniques and is requiring adaptation of cell culture, embryo rescue and plant transformation techniques and skills.

The chapter written by Debra Lionakis Meyer on Seed Development and Structure in Floral Crops provides some of the best pictures that I have ever seen of floral and seed structure. I would highly recommend using this chapter as a basis of training fellow analysts floral and seed structure and anatomy. The chapter on Flower Seed Physiology and Plug Germination, Miller McDonald, boils down an entire book into 15 pages which also include a table for germinating a wide variety of species.

A chapter on Seed Dormancy in Wild Flowers is logically followed by Seed Longevity and Deterioration. As a seed technologist I would next focus on Chapter 14. Laboratory Testing of Flower Seed. This chapter contains many excellent seedling photos of various Families with attention paid to hints to evaluation of the seedling. **I am encouraging RST/CVT candidates that may not encounter these families to study these pictures and evaluations.** Knowledge of the Tetrazolium Test is critical for flower seeds since many of the emerging species in the flower trade are natives with deep dormancy. Valuable technique hints for cutting and evaluation are demonstrated in the Tetrazolium Testing for Flower Seeds chapter. Both the black and white and color photographs are a valuable starting point for training analysts on evaluation of the Tetrazolium test.

Vigor testing specifics are commonly viewed as proprietary. The generalities of specific vigor tests do provide a valuable framework for a wider understanding of vigor testing and the breadth of vigor tests. This discussion is followed by a chapter on germplasm preservation.

I intend to use this book in the future while training novice analysts. The knowledge contained in the book easily spills over into many of the other sectors of the Seed Testing Industry and can be used as a basis of knowledge that should not intimidate the reader due to the ease of reading. We should all congratulate our fellow seed technologists for their contributions in this book. I heartily recommend this book; however do plan on spending about $200 for it. You also may end up spending more time reading the book than you had originally thought because you may end up becoming engrossed in the topic.

Submitted by Harold Armstrong, RST

ANNOUNCEMENTS

Bill Gault Obituary

Bill Gault, who was with the Ohio Department of Agriculture, passed away on December 25, 2007. The following obituary was published in the Columbus (OH) Dispatch:
William A. "Bill" Gault Jr., age 41, of Columbus became God's gift to Heaven on Tuesday, December 25, 2007 at his residence. Bill was greeted by the greatest gift given to mankind, Jesus Christ his Savior. Born May 24, 1966 in Ashland, Ohio to his parents William A. and Betty J. (Coburn) Gault Sr. Bill was employed by the State of Ohio, Department of Agriculture. He was a 1984 graduate of Ashland High School and a 1988 graduate of the Ohio State University. Survived by loving wife of 19 years, Tabatha; daughters, Rebecca, Meghan and Caitlin Gault; parents, William and Betty Gault, Ashland, OH; sister, Laura (Chris) Stewart, Ashland, OH; niece, Olivia Stewart; other family members and dear friends.

Visitation was held at the Dwayne R. Spence Funeral Home, Winchester, OH and the funeral service at Lockbourne Church of Christ in Christian Union, Lockbourne, OH, with Pastor Tim Huffman officiating. Interment is at Fernwood Cemetery, Lockbourne, Ohio. Donations may be made to HomeReach Hospice in his memory.

Steve Binns Retirement

Stephen J. Binns retired from the Virginia State Seed Laboratory on December 1, 2007 with 30 years of service to the Virginia Department of Agriculture and Consumer Services. He served as the Purity Team Leader and represented the lab at AOSA annual meetings and was on the Purity Committee for many years.

Steve plans to spend his time restoring his 100 year old grandmother's pre-Civil War farmhouse that he moved to a week after his retirement. Steve can be reached at: stevebinnsric@yahoo.com.

David Johnston Announcement

David Johnston began his career with the Michigan Department of Agriculture Seed Lab in January of 1987.Prior to that, Dave had served as a seed analyst with the Missouri Department of Agriculture working for Tm Umsteadt. Dave had become an AOSA Certified Analyst in both purity and germ before coming to Michigan. While in Michigan, Dave's skills as an analyst just improved each year as he always chose to tackle every kind of seed submitted. This included flowers and vegetables, native species, tree seed all the agricultural seed and many special tasks such as testing under Canadian requirements for seed to be exported. Dave developed skills in TZ testing and served equally well in both purity and germ.

In 2003, severe cuts were made to the Michigan Seed Program gutting all the money earmarked for enforcement and testing. Three staff left the seed lab for other positions leaving no active manager of the seed lab, and just Dave and Willie Luu to continue the work with minimal funds.

Dave's dedication and work ethic pushed him forward taking on more and more responsibilities and also achieving a Bachelor's Degree in his "off time" With little progress materializing with funding and insufficient recognition of Dave's extra effort's, he decided it best to become active in pursuing employment elsewhere. With Dave's talents, this was not a long process. Dave accepted a position with SGS North America beginning March 1, 2008 in Memphis, Tennessee. Dave will be developing a lab there where there was none before. This has been a big gain for SGS and has been a huge loss for Michigan. The faltering program in Michigan is in grave jeopardy and in a much weaker position to rebuild should the opportunity become available. Dave's Michigan friends and colleagues wish him all the best. You haven't heard the last of Dave Johnston.

Steve McGuire, Director of Operations
1615 S. Harrison
East Lansing, MI 48823
Phone: 517-337-5084
Fax: 517-337-5094
mcguires@michigan.gov

AOSA/SCST Research Funding Announcement 2008

Mike Thompson and Sabry Elias, Chairs
BioDiagnostics Inc., and Oregon State University Seed Laboratory

AOSA/SCST provide financial support to conduct research to innovate and incorporate new technologies to improve seed testing methods, develop new tests, or increase efficiency and effectiveness of current methods.

The AOSA/SCST Research committee invites researchers to submit research proposals for the 2008 cycle fund. The deadline for submitting proposals is May 15th, 2008. Please submit proposals to:

Dr. Mike Thompson
BioDiagnostics Inc.,
507 Highland Drive,
River Falls, Wisconsin 54022
(715) 426-0246
Michael.Thompson@biodiagnostics.net

Or

Dr. Sabry Elias
Oregon State University Seed Laboratory
3291 Campus Way,
Corvallis, OR 97331
(541) 737-4799
Sabry.Elias@oscs.oregonstate.edu

GUIDELINES FOR AOSA/SCST SEED RESEARCH PROPOSAL

A. Title Page

1. Concise descriptive title (100 characters or less)
2. Name of the organization submitting the proposal
3. Name, title, full mailing address and telephone number of the principal investigator and/or investigators
4. Proposed project starting date, duration and total cost

B. **Overall Aim and Specific Objectives** - This should be a concise statement of what you will actually do and why. It should not exceed one paragraph. Leave more detailed, context-setting to the "Background" section.

C. **Relevance to Seed Testing/Technology** - Discuss the relevance of this work to seed testing/technology. What differences will it make? How does it relate to the established research priorities? Discuss the potential for effective utilization of the results for the benefit of seed testing.

E. **Rationale** - Provide a substantive rationale for the proposed research. Explain the existing problem, the status of previous efforts to solve it, and the logic behind your new approach. Spell out your assumptions, theories, and research hypotheses; address the likelihood of success. Include a brief but complete literature review if appropriate. If you must cite unpublished work, please enclose copies.

F. **Technical Work Plan** - Describe in detail your experimental design (including any statistical issues) and research protocols (including any special techniques). Provide an estimated time schedule for meeting the research objectives.

G. **Staff and Resources** - List all investigators essential to the project and describe the institutional facilities and resources available for the proposed research.

H. **Budget Information** - Provide a full, detailed, justified budget for each year of the proposed project plus appropriate totals. Travel and training must be directly related to the research. No overhead is allowed.

Itemize:

1. salaries
2. equipment
3. materials and supplies
4. travel (purpose, duration, when, where)
5. other costs.

I. Submission of Proposals (Not to exceed 5 pages)

1. Submit an e-mail copy to the above address.
2. The deadline for receiving grant proposals is June 1, and investigators awarded grants will be notified before July 1, the following year. Grants will be funded on a fiscal year basis from July 1 to June 30.

J. Selection of Proposals for Funding

The proposals will be evaluated utilizing the following criteria:

a. Scientific and technical quality of the proposal
b. Scientific validity and quality of research approach
c. Relevance of proposed research to seed germination, dormancy, or purity
d. Feasibility of attaining objectives during proposed time period
e. Adequacy of professional training or research experience of investigators

K. **Reporting Requirements**

1. **Progress Reporting** – An interim report is due on February 1st.
2. **Final Report** - The final report due on June 1st and shall be prepared in a publication format to document the entire effort. Reports shall be published for the AOSA/SCST membership in either the AOSA/SCST Newsletter or the Journal of Seed Technology.

Seed Purity and Taxonomy
Application of Purity Testing Techniques to Specific
Taxonomical Groups of Seeds
By: Doris Baxter and
Lawrence O. Copeland

The first new handbook of seed testing and taxonomy in more than 50 years, *Seed Purity and Taxonomy* is the most complete and up-to-date resource of information available on seed identification and seed taxonomy. *Seed Purity and Taxonomy* contains a comprehensive listing of seeds along with approximately 3,000 black-and-white drawings, photographs, and computer-scanned images of species most likely to be encountered in seed testing laboratories in North America. Internal morphological features of different family groups are also included. These images are complemented with detailed descriptions and numerous dichotomous keys that will help in making definitive identifications.

The book also presents a useful how-to approach to many seed testing procedures, and purity testing of each species is discussed in a way that is intended to provide useful information about purity testing issues. The material is arranged in order of nongrassy monocotyledons, grassy monocotyledons, and dicotyledons, which are arranged alphabetically by family, genus, and species. It also includes identification features of the seed itself, and a general background about the species— its origin, distribution, culture, production, and use—which are intended to help seed laboratories efficiently serve their customers. Cited symbols are provided in all of the seed lists, indicating whether the species are considered to be crops, vegetables, herbs, or weeds in North America.

This book is an indispensable resource for beginning and experienced seed analysts, seed industry personnel, students, and others interested in seed testing and seed identification. While it provides the most comprehensive resource available for seed analysts, Seed Purity and Taxonomy will also be of value for botanists, taxonomists, agronomists, and anyone interested in seed taxonomy and identification.

Doris Baxter retired in 1982 as Officer-In-Charge of the USDA Federal Seed Laboratory in Sacramento, California. Throughout her long career she was active in all aspects of seed testing, but specialized in purity testing and taxonomy associated with seed testing. After many years of conducting federal seed testing workshops for purity analysts across the United States, she wanted to pass on her expertise in purity testing to successive generations of analysts, thus, the origin of this book. Doris earned her Master of Arts degree in botany from the University of Michigan.

Lawrence O. Copeland is Professor Emeritus at Michigan State University where he spent his entire career in extension, teaching, and research in seed technology and field crops. He has also consulted in seed technology programs in Southeast Asia, India, and Africa. He is author and co-author of several books on seed science and technology.
For additional information and ordering information visit the Michigan State University Press website, the webpage includes a chapter excerpt.
http://msupress.msu.edu/bookTemplate.php?bookID=3421
Price $240.00
ISBN #978-0-87013-822-5
744 pages, 8.5 x 11, cloth June 2008, World Rights

2008 North East Seed Analysts Workshop

The North East Seed Analyst Workshop will be held in Harrisburg Pa on Wednesday October 8 and Thursday October 9, 2008. The Thursday session will be a half day session. The workshop announcement can be found at: http://www.aosaseed.com/docs/2008-NESAW.pdf.

Attending this workshop will earn an analyst 3 points towards the education credits required to maintain certification. The points earned are 1 point for each half day session (3 hours). Tentative agenda items include a hands on separation of meadow fescue, tall fescue and ryegrass. We are also planning another virtual germination practical examination.

We are now seeking other items that you would like to see on the agenda and we need people willing to make presentations. This workshop is only as good as those people willing to make a contribution. You can contact me with suggestions and ideas at jgarvey@state.pa.us.

Joe Garvey
Seed Program Supervisor

The Idaho Seed Analyst Association Workshop

Hosted by BioDiagnostics West
College of Southern Idaho, Twin Falls, ID
May 19 - 21, 2008

Topic: Canadian M & P and ISTA Rules for Testing Seed

- Participants Testing Concerns as outlined in registration questions.
- Reporting issues, pre-examples to be sent to each participant for hands on completion.
- Recent changes to Canadian Regulations.
- Grade tables will be covered in regards to species tested by workshop participants.
- Idaho Noxious Weeds law
- Wed afternoon will be spent reviewing AOSA 2008 Rule proposals.

Speakers:
Joanne Hinke, Laboratory Supervisor, Canadian Food Inspection Agency
Sharon Davidson, RST, Agri Seed Testing
Idaho Department of Agriculture

For more information, contact:

Pat Brownfield
BioDiagnostics West, LLC
1775 Eldridge Ave.
Twin Falls, Idaho USA 83303
Phone: 208-732-0013
Email: pat.brownfield@BDWTesting.net

Federal Seed School Reminder

The Seed Regulatory and Testing Branch will be hosting another workshop this year in Gastonia, NC, August 4-8, 2008. The first three days will be purity and identification of similar crop and weed species, including Bromus, Brassica, Setaria, Poa, quackgrass and wheatgrasses, and other topics such as the uniform blowing procedure will be covered. Germination topics may be included, depending on interest of the attendees and the availability of samples for demonstration purposes. Presentation of topics will be on a level appropriate for experienced seed analysts. The last two days of the week will be on Quality Management Accreditation training. The purpose of the QA training is to assist a company develop a quality management system for ISO, ASL, or ISTA accreditation.

This seed school is open to seed analysts from private and government seed testing laboratories as well as seed companies. Enrollment at the seed school will be limited to 20 participants due to the hands-on nature of the topics and one-on-one attention from the instructors. Participants from non-government laboratories will be charged a fee of $32/day. Notice of acceptance will include payment instructions, travel and hotel information.

For more information about the seed school, please contact Botanist Pattsy Jackson at pattsy.jackson@usda.gov or Laboratory Supervisor Susan Maxon at susan.maxon@usda.gov.

Susan R. Maxon
Laboratory Supervisor/Asst. Chief
USDA AMS LS Seed Regulatory & Testing Branch
801 Summit Crossing Place, Suite C
Gastonia, NC 28054
704-810-8870; fax 704-852-4189

ISU Seed Science Center Workshops

The Iowa State University Seed Science Center will be offering a full schedule of workshops in the coming year in seed conditioning, treatment, and analysis. All workshops will consist of hands-on and lectures with handouts to take home.
http://www.ucs.iastate.edu/mnet/seedscience/register.html
http://www.ucs.iastate.edu/mnet/aosashortcourses/home.html

Workshops:

Color Sorting – Sortex	June 2-3
Color Sorting – Satake	June 4-5
Commercial Seed Corn Conditioning	June 16-19
Seed Treatment	June 25-26
Soybean & Small grain Seed Cond.	July 7-9 & July 28-30
Gravity Separation	August 5 & August 7
Research Seed Corn Conditioning	August 11-14
Corn/Soybean Quality Evaluation	August 20-21

Additional information for these workshops can be found at www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

SGS Mid-West Seed Services, Inc. Seed Sampler Training Workshop Reminder
May 21-22, Brookings, SD

Mid-West Seed Services, Inc. (SGS MWSS) will be holding a seed sampling workshop at Mid-West Seed Services, Inc. Brookings, SD, on May 21-22, 2008. Sessions will begin at 8:00 a.m. on the first day and conclude by noon on the second day. More information is available at www.mwseed.com, or 877-692-7611.

SGS Mid-West Seed Services, Inc. Seed Technologist Training Workshop Reminder
May 12-16, 2008 Brookings, SD

Seed Technologist training sessions will be held May 12-16, 2008 in Brookings, S.D. The five-day training is comprised of three different sessions, Purity & Seed Identification, Tetrazolium, Genetic and Seed Germination Testing. Participants may attend any or all sessions. For more information or to register for this workshop, please visit: /www.mwseed.com/WorkshopsTraining/SeedTechnologistWorkshop/tabid/119/Default.aspx

STEP
Into The World of Seeds

Seed Technology Educational Programs

It is still time to renew your subscription to the virtual seed herbarium SEEDIMAGES.COM. This database has been available to you for the past three years as a STEP promotional, paid for you by your association at a greatly reduced rate. We hope it has been a valuable tool for your lab.

There are five different subscription options available. However, the most cost effective is the 24 month subscription for $200.00 wherein subscribers are able to lock in their subscription rate and avoid the risk of a price increase after the first 12 months. Otherwise, the 12 month subscription rate is $100.00. If you would like a trial subscription there are three options: 3 days/$10.00, 3 months/$35.00, and 6 months/$65.00. To renew your subscription or to initially subscribe, visit the Seedimages.com web page at www.seedimages.com and click on *Subscribe Now*.

The benefits of this database include over 1700 images of seeds; 100x magnification; user friendly search mechanism; identification by scientific and common names; identification by noxious, weed, and crop categories including seeds that are on the associations' professional

examinations. These are just a few of its valuable features. Seedimages.com is the go to resource for seeds.

Those laboratories that are using the two photo books to identify seeds can up-date the books by subscribing to www.seedimages.com and copying the seed photos that you do not have and need in your books. The resolution of the seed photo can be improved if you click on the picture and obtain the larger view of the seeds.

STEP at Colorado State University is also part of the National Seed Science Distance Education Program in collaboration with Universities in Kentucky, Virginia, and Iowa. The program offers six distance education courses and a certificate program. Several courses are being pilot tested and will be available in the near future. These courses are Seed Conditioning; Seed Storage and Deterioration; and Large Seeded Legume Seed Production, Colorado State University; Vegetable Seed Production, Virginia Polytechnic Institute and State University; and Seed Dormancy, Iowa State University. A Seed Vigor course is now available through the University of Kentucky Distance Learning Program. Information about this course is available by contacting Jackie Briscoe at jbris01@email.uky.edu. For more information on these courses at Colorado State University and the affiliated institutions, please visit http://www.seedprograms.colostate.edu/index.html.

The courses currently available for registration at Colorado State University are Seed Anatomy & Identification; Seed Development & Metabolism; Seed Purity & Analysis; and Seed Germination & Viability. For information on these courses and to register, visit the Continuing Education website at www.learn.colostate.edu/courses.

EMPLOYMENT OPPORTUNITIES

Seed Laboratory Manager
Seminis Vegetable Seeds
Oxnard, CA

Thank you for your interest in career opportunities with Seminis. At Seminis, a division of Monsanto, we are committed to recruiting and retaining the best individuals through our team-oriented culture that encourages creativity, decision-making, and entrepreneurial spirit. Seminis is the largest developer, grower and marketer of fruit and vegetable seeds in the world. We lead the development of hybrids that improve nutrition, boost crop yields, limit spoilage and reduce the need of chemicals. Research is the heart of Seminis and its future as we are committed to consistently introducing innovative products for our customers. It's amazing to consider that improving human health, promoting environmental stewardship and fostering greater economic growth for the agricultural community can all start with something as small as a seed.

We seek a motivated individual for our **SEED LAB MANAGER** role at our Oxnard, CA position. In this role the candidate is responsible for managing all seed lab activities and includes personnel supervision, training, scheduling and accurate reporting of routine testing, productivity and costing metrics, budget and expense control, proper operation / maintenance of seed lab equipment and facilities. The Oxnard Seed lab is a one of a kind, world class seed lab involved heavily in the development of new and exciting technologies in the area of seed physiology. The

position is involved in the implementation of new tests and improvement of existing methods as well as various official certifications and collaborations from a global perspective.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Personnel management of lab employees with strong human relations and leadership skills. Provides environment of teaching, training and developing employees to increase skill set and facilitate professional growth.
Other related duties include:
a. Perform employee appraisals. Recognize employee disciplinary problems, conflicts and effectively communicate to management.
b. Manage conflict and identify problems to arrive at constructive solutions while maintaining positive working relationships. Carry out responsibilities in accordance with departmental guidelines, company policies and applicable laws.
c. Administer, review and approve employee time cards. Maintain direct link with payroll.
- Quality assures consistency, reliability and credibility of lab data within Oxnard lab and cooperates with efforts for harmonization among global labs. Sees that benchmark strategies and procedures (ring testing, daily controls and analyst to analyst) are followed and corrective measures are taken.
- Productivity- Assures planting and evaluations are completed according to established timelines. Leads a team oriented environment and works on an individual basis for employees to meet personal targets. Assess work capacity, schedule vacations and advise when temporary help is required
- Costs-manages assigned budget and continuously looks for ways to optimize, increase efficiency and reduce costs. Understands and manages lab to meet over / under absorption objectives.
- Innovation Leads and provides an environment of optimizing and improving test methods. Works with special services testing team to transition new tests into the commercial lab.
- Safety (ESH) - leads and sees that all environmental, safety and health requirements are met. Meets all ESH training requirements and provides leadership and clear direction for employees. Create a safe work environment that supports quality work and high productivity. Exercise maximum care and good judgment at all times to prevent accidents and injuries. Promote awareness, training and enforcement of ESH procedures.
- Other related duties include:
a. Maintain inventory control of seed lab supplies. Ensure employees have proper equipment and tools to do their jobs.
b. Coordinate, plan and monitor the daily functioning of all seed lab equipment and facilities.
c. Communicate regularly and effectively with peers, subordinates and managers. Interpersonal skills are of key importance. Must be able to interact with others in a professional, calm, and tactful manner under a variety of situations and must retain confidentiality in personnel matters.
- Additional duties may be assigned.

The successful candidate will possess the following requirements:
- Knowledge of seed testing methods, ISTA and / or AOSA rules, seed testing equipment and facilities.
- Excellent human relation skills, effective oral and written communication skills required.
- Demonstrated supervisory abilities are critical.
- Ability to read and interpret documents such as scientific journal articles, seed testing procedures and methods, safety rules, operating and maintenance instructions, and procedure manuals as well as train others in use.
- Ability to write routine reports and correspondence, including the use of email and

memorandum.
- Ability to speak effectively before groups of visitors or colleagues.

Desired skills/education/experience/attributes (ideal candidate):
MS degree with 3+ years experience in seed lab management with emphasis on personnel development or BS degree in related field with 5+ years experience or equivalent combination of education and experience.

Please visit our Career website at www.seminis.com to apply online and select the location: Oxnard, CA and **SEED LAB MANAGER- req. #mons-00008469.** Monsanto is an equal opportunity employer. We value diversity.

Seed Technology Research Associate
Seminis Vegetable Seeds
Oxnard, CA

Seminis Vegetable Seeds, a division of Monsanto and the world's largest developer, grower and marketer of fruit and vegetable seeds is seeking a **SEED TECHNOLOGY RESEARCH ASSOCIATE** at our **Oxnard CA** location. The selected candidate will be responsible in the development, implementation and will provide data for vigor, greenhouse and other specialized tests from a global perspective. In this role the candidate will conduct and support all special services lab activities including project management and coordination, train technicians and operation/maintenance of seed lab equipment and facilities, support the evaluation of new products and technologies and assure proper test methods are followed and test results are accurate. Additionally, the candidate will implement process protocols, monitor quality results, support continuous improvements, and assist with market validation activities.

The candidate will also have the following responsibilities:
- Organize, prioritize and conduct special services testing
- Coordinates activities with counterpart and related functions: Development and implementation, Production technology, Operations Technology, Seed technology, and Quality Assurance support
- Execute collaborative research projects according to project objectives, act as cooperator and training link with in-house staff, collect data, summarize results, and conduct preliminary analysis for project reports
- Follow assigned protocols and methodology to accurately complete special services testing in a cooperative effort with other onsite and/or global staff
- Assist and/or lead projects to develop protocols and methodology to be practical and executable within company information system from a global perspective
- Support and provide training link in commercial lab for transition of new tests
- Conduct and train for specialized tests (such as TZ, thermo-gradient), assist with interpretation of results and provide recommendations
- Implement market validation and shelf life projects when requested
- Support lab and/or field trials for evaluation of product quality and provide data for continuous improvements related to seed production, operations and seed technology processes
- Provide research support in seed technology or other areas to improve current protocols or develop new methods
- Collaborate or conduct trials related to priming and/or pelleting

The successful candidate will possess:
- Master or Bachelor of Science degree with 3+ years of related experience in plant or seed physiology; related field or combination of education and experience is appropriate for this position as well; or must be an RST (Registered Seed Technologist).
- Excellent human relations skills, effective oral and written communication skills required.
- Ability to read, analyze and interpret scientific journal articles, technical procedures, government regulations, seed testing procedures as well as train others.
- Ability to write routine reports and business correspondence, and procedure manuals.
- Ability to speak effectively before groups of managers, clients, customers and the general public.
- Ability to work with mathematical concepts such as algebra, trigonometry and statistical techniques.
- Ability to define problems, collect data, establish facts, and draw valid conclusions.
- Ability to interpret an extensive variety of technical instructions in mathematical or diagram form and deal with the concept of variables.
- Knowledge of seed germination, vigor and UT testing methods, seed testing equipment and facilities is highly desirable.
- Supervisory abilities are also desirable.

Please visit our Career website at www.seminis.com to apply online and select req. **#mons-00005822.** Monsanto is an equal opportunity employer. We value diversity.

CALENDAR

2008

May

19-21 Idaho Seed Analysts Association Workshop. Information: Pat Brownfield, BioDiagnostics West, Twin Falls, ID, 208-732-0013, pat.brownfield@BDWTesting.net.

21-22 Seed Sampler Training Workshops SGS Mid-West Seed Services, Inc. Brookings, SD. Information: www.mwseed.com or 877-692-7611.

26-28 ISF Congress. Prague, Czech Republic. Information: www.seedtest.org.

June

2-3 Color Sorting – Sortex Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

4-5 Color Sorting – Satake Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

6-11 AOSA/SCST Annual Meeting. St. Paul, MN. Information: http://www.aosaseed.com/workshops.htm

16-19 ISTA Annual Meeting. Bologna, Italy. Information: www.seedtest.org.

16-19 Commercial Seed Corn Conditioning Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

21-25 ASTA Annual Convention. Kissimmee, FL. Information: www.amseed.com.

23-25 CSAAC Annual Meeting. London, Ontario. Information: www.seedanalysts.com.

24-27 GMO Conference. Como, Italy. Information: www.seedtest.org.

25-26 Seed Treatment Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

July

6-11 9th ISSS Conference on Seed Biology. Olsztyn, Poland. Information: http://www.seedbio2008.pl/index1.php.

7-9 Soybean & Small grain Seed Conditioning Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

14-18 AOSCA Annual Meeting. Quebec City, Canada. Information: http://www.aosca.org/2008AnnualMeeting/2008AnnualMeetingHomePage.html.

28-30 Soybean & Small Grain Seed Conditioning Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

August

4-8 Federal Seed School. Gastonia, NC. Information: Pattsy Jackson (pattsy.jackson@usda.gov) or Susan Maxon (susan.maxon@usda.gov) at 704-810-8870.

5 & 7 Gravity Separation Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

6-9 AASCO (Association of American Seed Control Officials) Annual Meeting, Nashville, TN. Information: http://www.seedcontrol.org.

11-14 Research Seed Corn Conditioning Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

20-21 Corn/Soybean Quality Evaluation Workshop. Iowa State University, Ames, IA. Information: www.seeds.iastate.edu/seedtest or contact Connie Sandve (515-294-6821).

October

8-9 North East Seed Analyst Workshop. Pennsylvania Dept. of Agriculture Seed Program, Harrisburg PA. Information: http://www.aosaseed.com/docs/2008-NESAW.pdf or contact Joe Garvey (jgarvey@state.pa.us or 717-787-4843).

2009
June 15-18 - ISTA Annual Meeting 2009, Zurich, Switzerland. Information: www.seedtest.org

2010
June 16-22 - 29th ISTA Congress 2010, Cologne, Germany. Information: www.seedtest.org