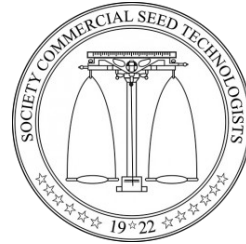




A newsletter for members of AOSA/SCST

Seed Technologists Newsletter



Volume 89 No. 1

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Thank you to all of our contributors who made this edition of the Seed Technologists Newsletter possible!



Letter from the Editor

Elizabeth Stewart, AOSA Editor

2021: Another year of virtual meetings and power point presentations! As we all know, last year’s AOSA/ SCST annual meeting was done over Zoom. It had some upsides: more people could attend, most committee meeting times were scheduled separately so we didn’t have to choose what to attend, and everything was recorded so we could go back and catch anything that was missed. However, the in person social interactions were missed.

In my personal experience, as an auditor for the USDA Accredited Seed Lab Program, virtual meetings were useful. We were able to complete several audits by doing “virtual tours” where the lab host would walk around with their laptops or cellphones showing us their lab procedures. It got a little shaky at times! In 2022 I am exciting to start traveling again.

As we look forward to getting back to “normal,” our committee hopes this newsletter will keep everyone in touch. In this edition of the Seed Technologist Newsletter, we will meet some new members, read another book review, learn about historical data on SCST voting, and more! To wrap up, who doesn’t love a good seed quote:

“Keep on sowing your seed, for you never know which will grow – perhaps it all will”

Albert Einstein





From the Leadership

By David Johnston—AOSA President

As your AOSA President, I consider it an honor and privilege to have served and represented AOSA members for the past year and a half. As my term winds down, I hope this letter finds you and your family well and in good spirits. The past couple of years have been very challenging and unsettled for sure, and at the moment there seems to be no clear end in sight. But I have confidence that we will all continue forward with success and will remain focused and committed to our daily responsibilities.

I happened across a list of the “*Six Things Mentally Strong People Do*”. I thought it might be of interest to you, to help you remain mentally strong in the times in which we find ourselves. The six items mentioned all require you to take some form of action. To be mentally strong or become stronger is not accomplished by being passive. This same “attitude of action” is also required to keep AOSA strong. It will not happen without you and your much needed and appreciated efforts!!!

The buzz phrase for the past couple of years in our world of seed testing has been “uniformity in seed testing”. As I have mentioned in my previous writings, uniformity in seed testing is a journey and not a destination. It takes the commitment of ALL seed analysts to follow the AOSA Rules precisely, to make our “journey to uniformity” as pleasant as possible. We cannot simply use the AOSA Rules “deviation” clause to make our lab lives easier. If there are specific methods and procedures for the species you are testing stated in the AOSA Rules, you are expected to follow them. Just do it.

Ok, let’s circle back to the topic of keeping AOSA strong through the “attitude of action” thing. A huge thank you to the AOSA membership for putting in place a strong Board of Directors and Executive Office team that demonstrate an “attitude of action”. The countless hours of volunteering their time and their dedicated service to AOSA, while still performing their normal work functions, is enormous. Unfortunately, much of their efforts are not seen by you but hopefully you have seen the outcomes. Also, thank you to the multitude of other AOSA members that fill the critical roles as committee chairs and committee members and do the hard work required to bring forth rule proposals. Your “attitude of action” is vital to keeping AOSA strong and keeping the AOSA Rules scientifically accurate and meaningful to the domestic and international Seed Industry.

Throughout my tenure as AOSA President, it has been my privilege to work with some of our members regarding issues they were experiencing in their labs or with other labs and provide support for them and help them resolve these issues. It is important for AOSA members to know and remember that AOSA leadership is here to support them and be a resource for them to utilize if they need support and/or advice or simply have questions. AOSA member labs need to network with each other and provide assistance when asked to do so and exhibit an “attitude of action”.

The AOSA/SCST Annual Meeting is scheduled for June 4 – 9, 2022 in Skokie, IL. We have a strong hope that this will be an in-person meeting. Hope to see you there!!! We have AOSA members that will be retiring before then. Thank you for your service to AOSA and I wish you the very best in the next exciting adventure of your life!!!

Take care – David J.

Six Things Mentally Strong People Do

1. They move on. They don't waste time feeling sorry for themselves.
2. They embrace change. They welcome challenges.
3. They stay happy. They don't waste energy on things they can't control
4. They are kind, fair and unafraid to speak up.
5. They are willing to take calculated risks.
6. They celebrate other people's success. They don't resent that success.



From the Leadership

By Steve Beals—STSC President

Thank you for the opportunity to serve as the SCST President. I count this a privilege and honor to serve the SCST Association. Thank you for your involvement in society, be it a board member, committee chair or co-chair, committee member, or a member of one of the SCST membership categories. Without your help and participation, the society would not exist as it is today. The last couple of years has been challenging to say the least with COVID-19. The shutdowns and restrictions that we all have encountered, along with normal everyday challenges that we face, have been taxing to the labs. Delays in supplies and products, price increases for those items, and a shortage in labor are just a few things that make it difficult for day-to-day operations in the laboratories. There are times we as analysts feel that we will never catch up with the workload that increases and we may fall a bit behind. Seed analysts are resilient and we will keep pushing to get the job done. I remember growing up as a child and being at my grandmother's house and saying to her, "wow, this day will never end?". She often reminded me, "just wait until you get older, you will find that the time will fly by and you will ask yourself, where has the time gone." As I got older, how true this is. Here we are embarking on a new year and looking forward to a return of some sense of normalcy and trying to move past the pandemic that disrupted or affected almost every industry in the world.

Uniformity is at the forefront of both the AOSA and SCST organizations and we continued to promote and work towards uniformity across labs. Committees are in place and working on proficiencies and looking at analysis reports to help with the uniformity issue.

We are looking ahead to the much anticipated AOSA/SCST Annual Meeting that will be held in Skokie, IL, June 4-9, 2022. This will be a welcome event as we were not able to have a meeting in 2020 or an in-person meeting in 2021. It will be good to come together and meet in person rather than look at a computer screen for the meeting. The meeting will also be the 100th Anniversary for SCST. The 2022 meeting planning group has been meeting to make sure that everything is in order for this historic event. I would like to take this opportunity to thank Heidi Larson, who has been spending countless hours working on and assembling the SCST 100th Anniversary commemorative book. I hope to see you at the Annual Meeting.

Thank you,

Steve Beals



AOSA SCST 2021 Virtual Annual Meeting Survey

Kelly Polzin, AOSA/SCST Executive Director

On a scale of 1-5, the majority of responses indicated their rating of the 2021 virtual annual meeting as a “4” with the level “5” rating coming in second.

When asked if any of the respondents experienced technical difficulties during the meeting, the overwhelming majority responded with a “no” answer; any responding “yes” indicated either the issue was on their end, i.e.: unreliable internet, or that some presenters were difficult to hear. All in all, the technology-side of the meeting seemed to work well.

The next question asked what components of the virtual meeting they would like to see incorporated into future in-person meetings, the following are the most common responses:

- Multiple responses that individuals would like to see committee meetings take place prior to the in-person meeting so that the in-person conference can focus on trainings, workshops, etc.
- Multiple responses noted that they liked the ability to vote virtually and this could assist with those unable to attend in-person due to budget constraints to still participate
- Numerous responses indicated being pleased that there wasn't any overlap in committee meetings or sessions, which could be achieved in person if some components were to take place prior to the meeting virtually

When asked what components of the virtual meeting respondents would NOT want to see continue, many stated that the open rules discussion needs to take place in-person as it is difficult with such a large number of virtual attendees to participate and be heard. It was also noted that for any new-meeting attendees, the virtual-only option is a difficult format to participate in and to get involved.

The next question asked whether respondents would like to see more hands-on training take place during the in-person meeting rather than in-person committee meetings. 75% of respondents replied yes.

Next, the question asked how important tours are to in-person meetings. Approximately 50% of responses noted this as a “3” on a scale of 1-5, with the other options receiving rather equal distribution. When asked if participants would rather attend a social, technical, or hybrid tour, the overwhelming responses indicated that a Hybrid tour is preferred; the example of a hybrid tour that was given was the tour that took place during the Portland meeting.

When asked if they would attend the 2022 meeting if they are approved for travel—over 80% replied yes.

When asked if a virtual meeting had to occur again, with no in-person option, what the desired length would be, it was evenly distributed between the two answers: same length as the 2021 meeting, and to condense it into 1-2 weeks.

Finally, it was asked what the ideal length of an in person meeting would be, with the options given of: 4-5 days, 3 days, or less than 3 days. Just under 70% responded that 3 days is the ideal length of an in-person meeting.



Report from the Joint AOSA/SCST Voting Procedure Working Group

Quinn Gillespie, SCST Constitution and Bylaws Chair

During the 2021 Annual meeting, held virtually, a change to the way that voting on the AOSA Rules for Testing Seeds is conducted was proposed to the AOSA membership by Johnny Zook, in response to concerns expressed by the state of Pennsylvania's legal team. Concern was raised that the SCST, as the commercial side of the seed testing, may have undue influence on rules used to regulate seed trade because SCST has an equal vote on the Rules for Testing Seed. The decision to grant SCST voting privileges was made in 2005, based on the work of the AOSA/SCST Voting Procedure Study Committee. The report of this committee was published in Volume 78, No. 2 of the Seed Technologist's Newsletter, and has been republished in this issue with additional supplementary information to provide background on the current issue to the membership at large. At the annual meeting AOSA decided to delay a vote on this matter until the 2022 meeting. In the interim AOSA and SCST have each formed a working group to look more closely at this issue and determine the best course of action for both organizations. Members from each group were assigned to come together as a joint working group to evaluate options and find a solution to present to the board of directors for each organization.

The original proposal presented at the 2021 annual meeting detailed that any rule which was supported by greater than eighty-four percent of AOSA votes would automatically pass, and any rule proposal supported by less than fifty percent of AOSA votes would automatically fail. If SCST failed to submit a vote and sixty-seven percent or more of AOSA votes were in favor of the rule, the rule would pass. If SCST failed to submit a vote and fewer than sixty-seven percent of AOSA members voted in favor of the rule, it would fail. If the percentage of AOSA votes fell between fifty and eighty-four, SCST votes would be tallied and added to the AOSA votes to and the rule would have to pass with a supermajority of both organizations.

Following the annual meeting, the working groups in AOSA and SCST worked to assess this proposal and to examine and propose alternatives that may address the concerns brought up by the original study conducted in 2005, and the more recent concerns brought up by the state of Pennsylvania. Each of the proposed alternatives was evaluated against the voting results for each rule proposal between the original adoption of SCST as an equal voting partner in the AOSA rules, and the most recent vote conducted virtually. The proposed methods discussed were as follows:

Option 1: As originally proposed by Johnny Zook to the membership of AOSA at the 2021 virtual meeting. Original proposal:

- a. If AOSA vote is less than 50%, rule fails.
- b. If AOSA vote is 85% or greater, the rule passes.
- c. If AOSA vote is between 51% and 84%, result determined by combining AOSA and SCST votes, in which case a supermajority (134/200) is required to pass.
- d. If no vote is submitted by SCST, the voting results to be determined by supermajority of the AOSA vote only.

Option 2: Similar to the original proposal, with the option to delay the vote for one year if AOSA votes strongly in favor and SCST strongly against.

- a. All passing scenarios require a supermajority (134/200) or greater to pass.
- b. If AOSA votes less than 49%, SCST votes 85%, but the total is less than 134 rule fails.
- c. If SCST votes less than 49%, but AOSA votes 85% in favor, the total is 134 or greater, the rule is delayed 1 year.
- d. If after the second year the AOSA is still in favor and SCST votes less than 50% in favor, the rule passes.
- e. If AOSA votes 49%, SCST votes 85% in favor, total is 134 or greater, rule passes.
AOSA votes 85% in favor, SCST votes 49%, the total is 134 or greater, rule passes.



Option 3: Based on the voting procedure developed by the USTO working group.

- a. Requires a supermajority (134/200) or greater for any rule to pass.
- b. If AOSA vote is less than 66%, but SCST vote is greater than 66%, and the total is 134 or greater, proposal is delayed one year.
- c. If the AOSA vote is still less than 66% the following year, the proposal fails.
- d. If AOSA vote is greater than 66%, but SCST vote is less than 66%, and the total is 133 or less, the proposal is delayed one year.
- e. If the result is the same the second year, the proposal passes.

Option 4: Proposed by the SCST Voting Procedure Working group

- a. Requires a supermajority (134/200) or greater for any rule to pass.
- b. In order to pass a rule must achieve greater than 50% of the vote from both organizations.
- c. If one organization does not submit a vote, the result to be determined by a supermajority of the votes submitted.

Only a very small percentage of the results were affected by any of the proposed changes, when the original votes were evaluated under the criteria for each option. Option 3 was the procedure that was the most likely result in a different outcome than the current voting procedure, however this only affected a small handful of voting outcomes. To the groups this indicated that during the time SCST has been voting on the Rules for Testing Seeds that the two organizations have a strong history of voting in tandem with each other.

Since 2006 AOSA and SCST have voted jointly on 339 rule proposals there have only been five proposals (1.47%) where the supermajority vote did not agree with the way AOSA voted. In the most recent case, Rule Proposal #27 from 2020, the difference between the AOSA vote and the SCST vote was only 1.28%. There has never been a case where a rule proposal receiving less than 50% in-favor votes from AOSA has passed, or a case where a rule proposal receiving greater than 85% in-favor votes from AOSA has failed.

Year	Proposal #	AOSA Vote	SCST Vote	Total	Result
2006	16	65.22%	81.82%	147.04	Pass
2008	26	76.90%	51.16%	128.06	Fail
2019	27	64.00%	75.81%	139.81	Pass
2020	1	73.5%	50.54%	124.04	Fail
2020	27	67.6%	66.32%	133.92	Fail

These five scenarios represent the only times since SCST began voting jointly that the supermajority joint vote did not align with a supermajority of AOSA votes.

After evaluating the options described, the SCST working group presented voting procedure option 4 to the SCST board. The SCST Voting Procedure Working Group felt that this option would also strengthen the Rules for Testing Seeds because any rule submitted must show demonstrable support in the form of a simple majority from both seed testing organizations to pass, and the final result would still be determined by a supermajority of both organizations. Upon approval from the SCST board this procedure was presented to the Joint AOSA/SCST Voting Procedure Working Group for discussion and consideration.

The AOSA members of the joint working group supported including the stipulation that in order to pass all rule proposals must achieve greater than 50% in-favor votes of both organizations and agreed that the language of the voting procedure should apply equally to both organizations. It was also recognized that the virtual meeting was a challenging time to be faced with the original proposal due to the limited scope of interactions and opportunity for discussions outside assigned meeting times. This proposal has been submitted to the AOSA board of directors for review at this time.

Once the AOSA board has reached a decision, the boards of both organizations will discuss possible changes to the voting procedure for the AOSA Rules for Testing Seeds. Proposed changes would then be submitted to regulatory and industry organizations to seek their feedback and support.

Historical Data on SCST Voting

Original study and text by Wayne Guerke, published in Seed Technology Newsletter Volume 78, No. 2

The AOSA – SCST Rule Voting Procedure Study Committee was formed in November, 2003 to objectively evaluate all factors relating to whether SCST should be given voting status for AOSA Rule proposals and to provide a recommendation for resolving this long standing issue. The committee was a joint initiative by the leadership of the Association of Official Seed Analysts (AOSA), the Society of Commercial Seed Technologists (SCST) and the Association of American Seed Control Officials (AASCO). Members of the committee were 1) Sharon Davidson, 2) Joe Garvey, 3) Wayne Guerke (Chair), 4) Deborah Meyer, 5) Larry Nees and 6) Larry Prentice. The basic operating principle for the committee was that any position(s) taken should be objective, factually based and, if necessary, supported by documentation.

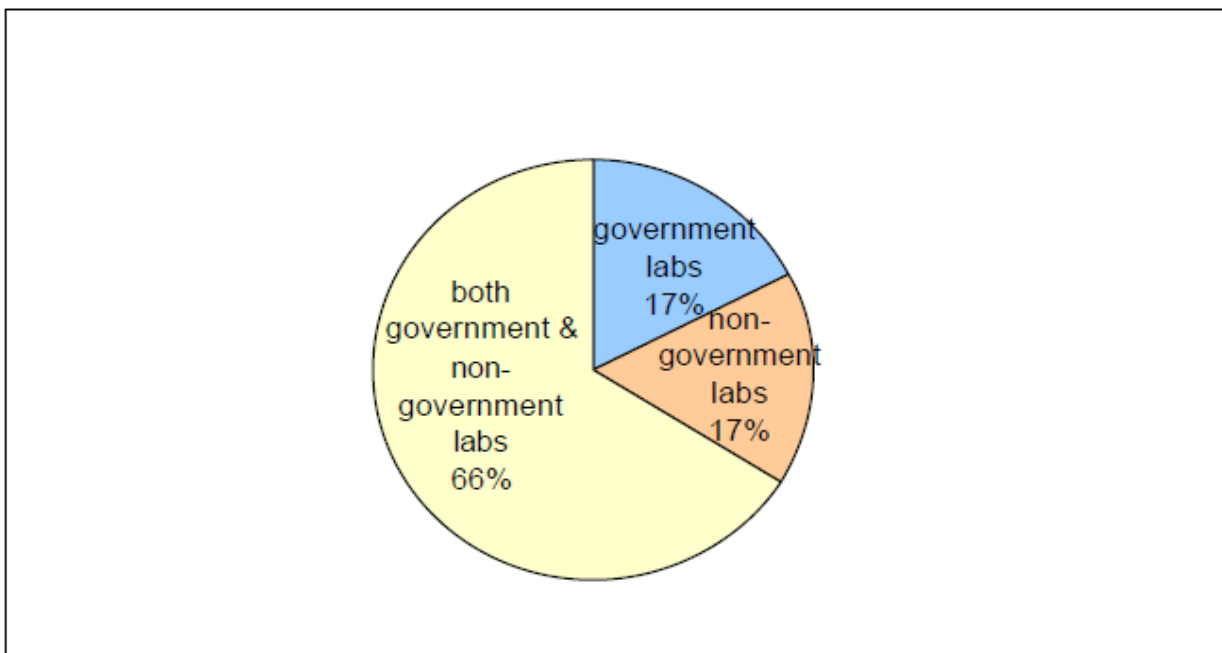
A question and answer format with background readings was used by the committee to evaluate each aspect of this issue; therefore, the same approach will be used for this report so readers may come to their own conclusions. The information presented here, in large part, comes from committee member contributions and readings compiled during the review of this issue. Regrettably, this report is lengthy, but it is highly recommended reading since it provides an in depth study of this issue, which may be pivotal to the future of our associations.

Question #1: *Considering the attrition in state seed programs, does AOSA have the capacity to independently generate relevant methods standardization and Rule proposals for traditional seed testing, as well as new technologies in today's changing agriculture?*

Discussion and background information: The committee unanimously recognized that over the last decade or more there have been widespread reductions in state seed laboratory testing programs. This includes loss of staff or cross utilization among programs, privatization and, in some cases, closing of laboratories. During this same period, workloads have been increased and compressed by the addition of new seed technologies, expanded markets and electronic high speed communication.

Most AOSA member laboratories have little time or funding to independently develop standardized methods. During the last five years, 19 proposals were submitted from governmental laboratories, 18 proposals were from non-governmental laboratories, and 72 proposals were developed collaboratively by both governmental and non-governmental laboratories. Figure 1 shows that AOSA and SCST each individually submitted 17% (19 and 18 proposals, respectively) of AOSA Rule change proposals over the past 5 years. Sixty-six percent of Rule change proposals (72) were joint efforts by representatives from industry and government. These data indicate that no single organization is an island, especially during these complex times.

Figure 1. Five-Year summary of the source for AOSA Rule change proposals.





Historical Data on SCST Voting (continued)

Question #2: If AOSA does not appear able to meet future needs of seed technology on its own, is there justification to examine a closer working relationship with SCST to pool resources to assure a dynamic and healthy seed trade that is able to meet challenges of new technologies and a global economy?

Discussion and background information: Most AOSA member laboratories have little time or funding to independently develop standardized methods. Only 17% of proposed Rules over the last 5 years were done singly by AOSA laboratories and no Rule proposals for new technologies were developed independently by government laboratories over the same period. Even the traditional proposals were only made by relatively few AOSA laboratories compared to the entire membership. Therefore, it would appear that the combined resources of both organizations are necessary to keep pace with current needs.

Question #3: Do you perceive the published AOSA Rules exist solely to support seed control? If so please reference documentation to support this position.

Discussion and background information: The objectives of AOSA from their By-Laws, last amended on June 10, 2003, are stated as follows:

ARTICLE III – OBJECT

The object of this Association shall be to improve seed testing in all its branches and to make it more useful to agriculture and society. The object shall be obtained through cooperative effort by:

1. Promoting uniform laboratory methods and practices through seed research.
2. Conducting referee tests among seed analysts of the Association for the purpose of developing uniform techniques.
3. Furthering the exchange of ideas among laboratories and among individual workers.
4. Fostering effective workable seed control legislation and regulation.
5. Improve seed testing in all its branches, to make it more useful to agriculture and society and any other lawful purposes. (1999)

Seed control is listed among the 5 objectives, but this is just one element integral to the overall mission. Certainly, regulation would not withstand a legal test if laboratory work were not based on valid, standardized, contemporary scientific methods.

Some seed control officials have stated that AOSA was founded by and for regulation; however, AOSA was founded much earlier than AASCO for the purpose of promoting standardized seed testing methods. According to the "History of the Association of Official Seed Analysts" published in 1941 by the Association, sixteen states, the United States Department of Agriculture (USDA) and the Department of Agriculture of Canada met in December, 1908 as an outgrowth of seed analysts from the Association of American Agricultural Colleges and Experiment Stations that had been meeting since the mid 1890s to form an "organization of those officially interested in seed testing." It was to be known as "The Association of Official Seed Analysts of North America." Prior to this development, the first committee to compile a set of Rules in the United States was appointed in 1896 and consisted of E.H. Jenkins (Connecticut), G.H. Hicks (USDA), G. McCarthy (North Carolina), F.W. Card (Nebraska), and W.R. Lazenby (Ohio). As a result, the Association of Experiment Stations adopted Circular No. 34, "Rules and Apparatus for Seed Testing" in 1897. This served as the precursor to the present day "Rules" until the AOSA adopted its first set of "Rules for Testing Seeds" in 1917. On the other hand, AASCO was not founded until 1949 from the merger of several regionalized meetings of seed control officials.

For many seed control officials, involvement of SCST in voting on Rule proposals appears to be a highly controversial issue. Some control officials have been known to claim that SCST involvement in Rule voting would be in conflict with their state seed statutes. If this is the case, it would indeed be a major deciding factor whether it is appropriate for SCST



Historical Data on SCST Voting (continued)

members to have Rule voting privileges; however, examination of a sister agricultural laboratory association appears to indicate otherwise. The AOAC International is the Rule standardizing association for chemical laboratory procedures and is uniformly accepted by states, the USDA and the Food and Drug Administration (FDA) for Official testing protocol used for regulation of feed, fertilizer, pesticides and food commodities, yet this association has evolved from a strictly governmental entity to a multi-discipline organization composed of government, university and industry members with appropriate checks and balances. More background on AOAC International will be provided in answer to the next question.

Question #4: Is there any other laboratory association involved in methods standardization and testing protocols that may be utilized in regulatory programs, which has experienced a parallel evolution of industry participation in voting on Rule proposals?

Discussion and background information: The AOAC International is a prime example of a laboratory methods standardization organization whose testing protocol is used by states throughout the United States for regulation of feed, fertilizer, pesticides, foods and many other agricultural commodities. The AOAC International has had a very similar experience to our seed laboratory associations, so it is valuable to take a closer look. The following history of the AOAC International was taken, in part, from their website: www.aoac.org.

The AOAC was founded in 1884 as the Association of Official Agricultural Chemists, under the auspices of the USDA, to adopt uniform methods of analysis for fertilizers. In 1885, a convention establishing AOAC as an independent organization was held in Philadelphia, Pennsylvania, and membership was restricted to analytical chemists in state and federal government positions only—a membership requirement that remained for nearly 100 years.

The early years of AOAC were strongly influenced by Dr. Harvey W. Wiley, a founder of the Association who served as President and Secretary. In 1885, Dr. Wiley oversaw the publication of the AOAC Methods of Analysis, a 49-page bulletin of methods for analysis of fertilizers and precursor to the Official Methods of Analysis of AOAC International. By 1887, the publication had grown to include methods for feeds and dairy products, as well as fertilizers.

As in the 1890s, AOAC was in the forefront of methods development and validation during the 20th century. Sponsorship of the Association passed to the FDA when it was separated from the USDA in 1927 to keep AOAC methods aligned with federal regulations. The 1950s were an exciting era of rapid expansion for AOAC. New food legislation was passed and the need for new methods and techniques for regulatory purposes spurred rapid expansion of government laboratory facilities and participation in AOAC. In 1965, to recognize the expansion of AOAC's scope of interest beyond agricultural topics, the Association's name was changed to the Association of Official Analytical Chemists. The Association also began looking towards independence from the FDA. With funding secured from federal, state, and industry sources, AOAC became a truly independent organization in 1979.

The 1970s also brought about provisions for membership by scientists from outside the United States. Another significant change was the increased participation and acceptance of nonofficial (non-government) scientists. Although they had always been allowed and encouraged to participate in collaborative studies, and to hold methods development positions, it was 1987 before full voting membership was extended to industry scientists. Today, over 60% of AOAC International members are working in industry laboratories.

By 1991, the Association had long ceased to be limited to regulatory ("Official") analytical chemists in the United States. During the 1980s and 1990s, the attention of the analytical community, particularly the segment focused on foods, had changed dramatically from chemical to microbiological food contaminants. Additionally, as a result of expansion of international trade, there was increasing demand for quality control of laboratories and international laboratory accreditation.



Historical Data on SCST Voting (continued)

Consequently, in that year, the name of the Association was changed to AOAC International. The new name retained the initials by which the Association had been known for over 100 years, while eliminating reference to a specific scientific discipline or profession, and reflecting the expanding international membership and focus of AOAC as the "Association of Analytical Communities."

Question #5: What are some of the checks and balances utilized in the AOAC International to assure neutrality and to prevent any undue influence from special interests?

Discussion and background information: In addition to the obvious checks and balances inherent to large membership size and diversity, professional credentials of members and accreditation of laboratories, the AOAC International By-Laws restrict membership on their Board of Directors to a majority employed by or most recently retired from government, regulatory or academic organizations. Furthermore, their Official Methods Board is composed of the chair and members who are chairs of the various methods committees and membership shall be composed of members representing a balance of government, industry and academia as appropriate to the scope of the group and shall not be dominated by any single interest. The AOAC model may not be directly applicable for AOSA and SCST, but it demonstrates a process where the industry matured to a point characterized by diversity, professionalism and membership size and they were making significant contributions to the development of standardized methods. Furthermore, the AOAC International methods are referenced throughout the United States and the world as the Official testing protocol for feed, fertilizer, pesticides and other chemical analytical procedures. This means that these methods are accepted under state statutes for these commodities just as the AOSA Rules are accepted for Official testing of seed. In the late 1990s, the AOSA – SCST Collaboration Committee recommended that the AOAC International model be studied to help resolve the AOSA – SCST Rule voting issue.

Question #6: What other organizations involved in testing and regulation of agricultural commodities permit some form of industry involvement?

Discussion and background information: The Federal Seed Act (FSA), the American Oil Chemists Society's (AOCS) Feed Microscopy Division, the National Seed Health System (NSHS) and the International Seed Testing Association (ISTA) (in part) permit industry involvement in the Rule making process or development of laboratory testing protocol. Following is a brief synopsis of the voting process for each organization.

FSA. Proposed changes to the FSA may be submitted by anyone to the Seed Regulatory and Testing Branch staff.

If the proposal is supported through a review process, it is published in the Federal Register where anybody can comment on proposed changes and, barring any major objections, it becomes law after a set number of days.

AOCS. The AOCS's Feed Microscopy Methods Committee is composed of government, industry and academic members and adoption of methods is by consensus.

NSHS. The NSHS reviews proposed protocols rated by their technical review panels, which may include industry members, as either Class A (Acceptable as a Standard Test Method - to be published in Reference Manual B and required to be used for phytosanitary testing in conjunction with the issuance of a phytosanitary certificate), Class B (Acceptable as a Temporary Standard Test Method, pending further research that would make the method acceptable as a Standard Test Method. The Class B methods are only published and used when no acceptable Class A Method is available), and Class C (not approved for use). The Seed Technical Working Group (STWG), which is composed of representatives from the National Plant Board (1), the AASCO (1), the Association of Seed Certifying Agencies (1), the American Seed Trade Association (3), the Animal and Plant Health Inspection Service (1) and the NSHS administration (1), takes the technical panel's recommendation into consideration when making the final decision on rating and publication of methods. The STWG may choose to follow the technical panel's recommendation or may reject the recommendation. The literature review is done by the NSHS administrative unit (AU), which presently is located at Iowa State University.

Historical Data on SCST Voting (continued)

ISTA. Although ISTA originated in 1924 as an intergovernmental organization, it opened membership to all seed testing laboratories after the trade diversified and matured and some government agencies privatized laboratory testing. In 1999, ISTA began allowing private laboratories to issue ISTA certificates. This trend has greatly expanded membership in ISTA and a significant portion of their activities and finances come from industry participation. Therefore, ISTA is currently considering whether private laboratories should have voting privileges. If this should occur, AOSA would be the only Official seed laboratory Rules association remaining that excludes direct industry participation. As was stated in a recent newsletter article written by the ISTA Secretary General, Michael Muschick, "no rights without duties, but also no duties without rights."

Question #7: Since state seed laws specify labeling requirements and the seed quality requirements cited in state statutes must be based on a report from a qualified seed laboratory, would it be objectionable to include standardized methods in the AOSA Rules other than those required by statutes? That is, the various statutes reference the Rules as pertaining to their requirements, but not everything in the Rules is required by all states and newer technologies are also going to require standardized testing protocol.

Discussion and background information: As stated in the AOSA By-Laws, the objective of the Association is to "Improve seed testing in all its branches, to make it more useful to agriculture and society and any other lawful purposes (1999)." To do so requires that the AOSA Rules remain current and contemporary. Many aspects of the Rules are not used by all states in regulation or some may use portions of the Rules only for service testing. Management of seed quality is a primary function of seed testing protocol, yet not all laboratory assays would be applicable to regulation. Furthermore, testing procedures for new technologies must be developed to maintain quality. To stay relevant, the AOSA Rules must keep pace with requirements of the industry.

Question #8: Since the SCST has been conducting straw votes over the last 5 years, have there been any significant differences in the voting record?

Discussion and background information: Based on available data from the AOSA Rules Committee over the last four years, the pass/fail rate is essentially the same for both organizations. The two organizations have been in agreement 99% of the time. Of 82 Rule proposals considered by both organizations during this time period, there was only a single instance where SCST passed a proposal by a very slim majority that AOSA rejected. However, if SCST and AOSA had combined votes on an equivalent basis, the vote would have clearly failed.

Tables 1 and 2 compare the Rule voting records of AOSA and SCST for 2002 and 2003, respectively. Please note that abstentions are non-votes (i.e., a vote was not cast) and are not considered when calculating the percentages of affirmative and negative votes. SCST members routinely abstain on issues that do not concern them or with which they are not familiar. This speaks well for their professionalism.

Table 1. Voting record of AOSA and SCST for Rule change proposals in 2003.

Proposal #	AOSA VOTE COUNT				SCST VOTE COUNT			
	# of yes votes	# of no votes	# of abstentions	Total # of votes	# of yes votes	# of no votes	# of abstentions	Total # of votes
1	27	0	0	27	94	0	4	94
2	26	0	1	26	94	0	4	94
3	28	0	0	28	75	0	19	75
4	28	0	0	28	87	5	5	92
5	15	14	0	29	69	28	3	97
6	2	26	0	28	34	45	19	79
7	2	26	0	28	34	45	19	79
8	2	26	0	28	34	45	19	79
9	2	26	0	28	34	45	19	79
10	28	0	0	28	90	2	8	92
11	28	0	0	28	71	11	16	82
12	26	2	0	28	82	2	15	84

Historical Data on SCST Voting (continued)

Table 2. Voting record of AOSA and SCST for Rule change

Proposal #	AOSA VOTE COUNT				SCST VOTE COUNT			
	# of yes votes	# of no votes	# of abstentions	Total # of votes	# of yes votes	# of no votes	# of abstentions	Total # of votes
1	30	0	0	30	58	0	13	58
2	24	4	1	28	38	22	9	60
3	30	0	0	30	59	0	12	59
4	30	0	0	30	58	0	11	58
5	30	0	0	30	57	1	10	58
6	12	18	0	30	23	43	5	66
7	30	0	0	30	62	0	9	62
8	30	0	0	30	52	0	18	52
9	28	1	1	29	65	1	5	66
10	27	2	1	29	58	5	6	63
11	26	3	1	29	57	5	7	62
12	20	8	2	28	39	9	23	48
13	20	8	2	28	39	9	23	48
14	21	8	1	29	39	9	23	48
15	28	2	0	30	45	8	16	53
16	6	22	1	28	35	27	9	62
17	4	23	3	27	15	46	10	61
18	15	13	2	28	31	22	18	53

Question #7: Does the SCST membership appear to have matured to show diversity such that it is not dominated by any single segment of the trade, e.g., member affiliation, laboratory/company size, emphasis on seed kind, regional affiliation, independent vs. company laboratories, size of membership (each member with a vote), etc.? Are some aspects of this same diversity also reflected by AOSA member laboratories, e.g., regional affiliation, production vs. consuming areas, emphasis on crop kinds, etc.? Would this serve as a check and balance on any bias should joint voting be approved?

Discussion and background information: SCST has both size and diversity among its individual members, which functions as an inherent characteristic of the organization. Table 3 shows 237 total individual members in six membership types, which reflect diversity of applied and academic career disciplines within seed biology and technology. Furthermore, Figure 2 reflects the added dimension of regional diversity among the SCST membership. Clearly the Midwest region is most prominent, but some balance may be achieved between the grain and corn/soybean belts of the Midwest, plus influence from the other 5 regions. Therefore, each region would add diversity of different crop kinds and production areas. Figure 3 shows the percentage of individual SCST members categorized by affiliation. This is also diverse with 25% from universities, USDA, crop improvement associations and AOSA and the remaining 24% and 44% are independent and company members, respectively. Seven percent of the SCST membership is Canadian, which includes both industry and government members.

Table 3. SCST 2003 membership categorized by type.

MEMBERSHIP TYPE	NUMBER	PERCENTAGE
Associate members	63	27
Certified Genetic Technologist	11	4
Registered Genetic Technologist	10	4
Research	12	5
Registered Seed Technologist	135	57
RST and RGT/CGT	6	3
TOTAL	237	100



Historical Data on SCST Voting (continued)

Figure 2. Percentage of SCST members categorized by region.

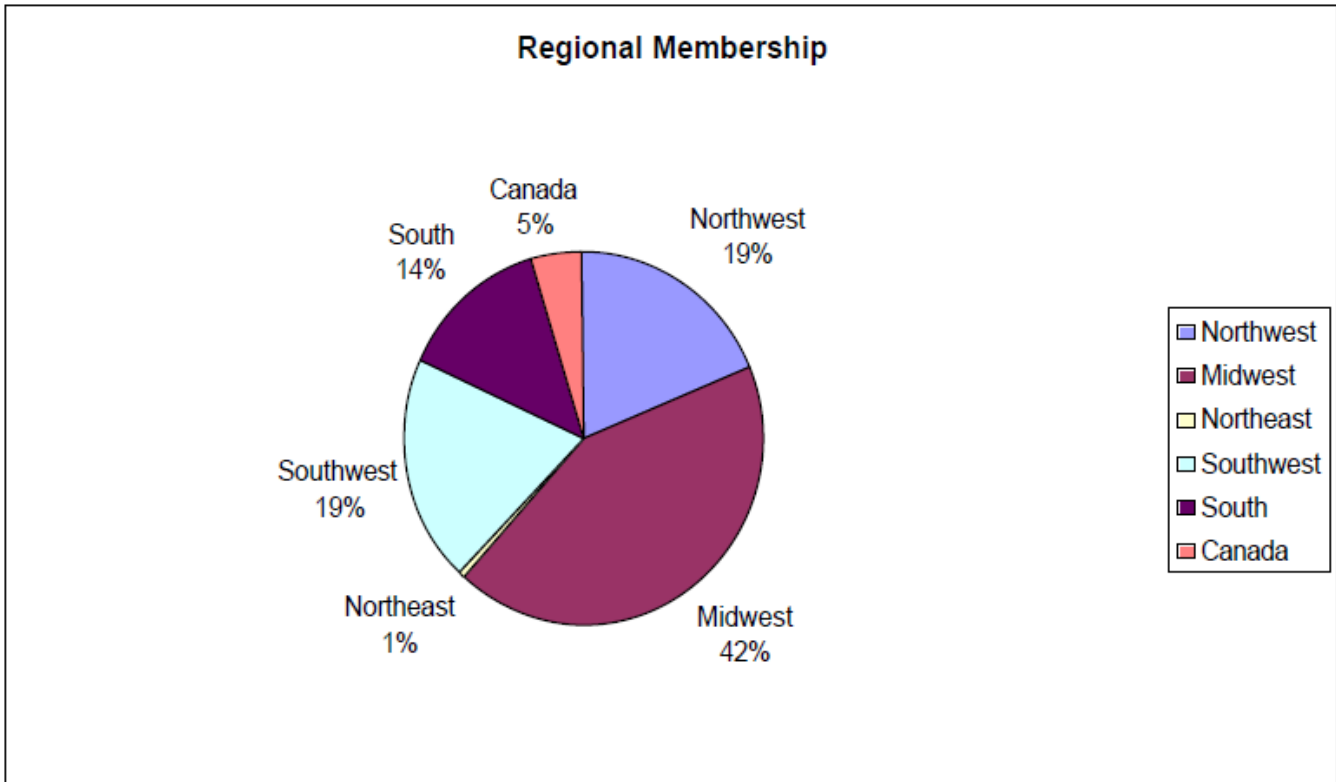
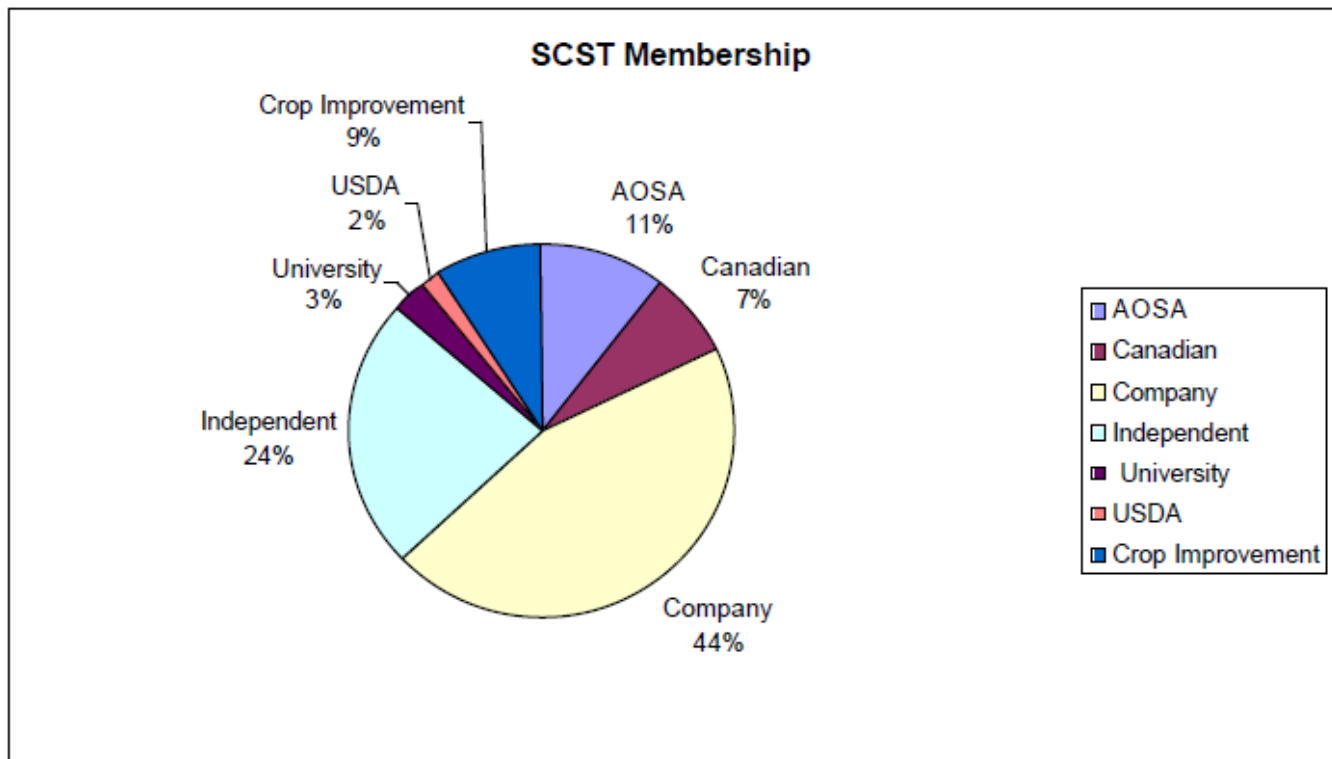


Figure 3. Percentage of individual SCST members categorized by affiliation.





Historical Data on SCST Voting (continued)

Table 4 shows the number of individual laboratories with SCST members and the affiliation of those laboratories, plus the number of laboratories with multiple voting members. Twenty-seven of those laboratories with SCST members are affiliated with AOSA, universities, USDA or crop improvement associations. Only 30% of those laboratories have multiple members and many of the managers of these laboratories have stated that their employees' voting record definitely reflects that they vote according to their own convictions.

Table 4. Number and type of laboratories with SCST members and laboratories with multiple SCST members.

Type	Laboratories with SCST members	Laboratories with multiple voting SCST members
AOSA	12	7
Canadian	8	0
Company	49	12
Independent	26	8
University	3	1
USDA	2	1
Crop Improvement	10	4
Total	110	33 (30% of laboratories with SCST members)

Comparison of the AOSA laboratory membership and the SCST individual membership, as shown in Table 5, indicates that each has relatively balanced representation by region if the two different systems (laboratory vs. individual membership) were reconciled on an equivalent basis. Figures 4 and 5 further confirm that the percentage of regional individual and laboratory membership for SCST and AOSA, respectively, is very similar.

Table 5. Combined and individual AOSA and SCST members categorized by region.

Region	# AOSA Voting Members	# SCST Voting Members	Total Combined Voting Members
Northwest	6	33	39
Midwest	13	74	87
Northeast	7	1	8
Southwest	11	34	45
South	9	24	33
Canada	2	8	10
Totals	48	174	222



Historical Data on SCST Voting (continued)

Figure 4. Percentage of SCST individual members categorized by region.

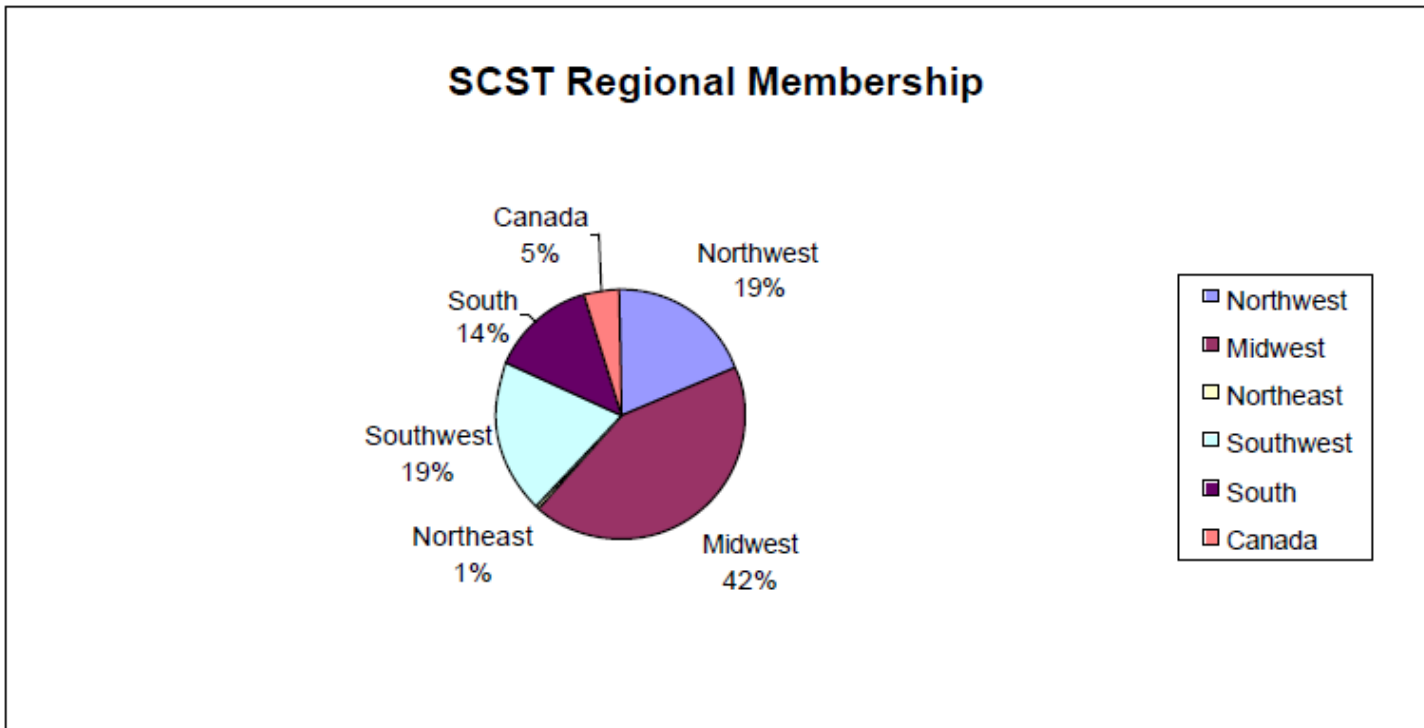
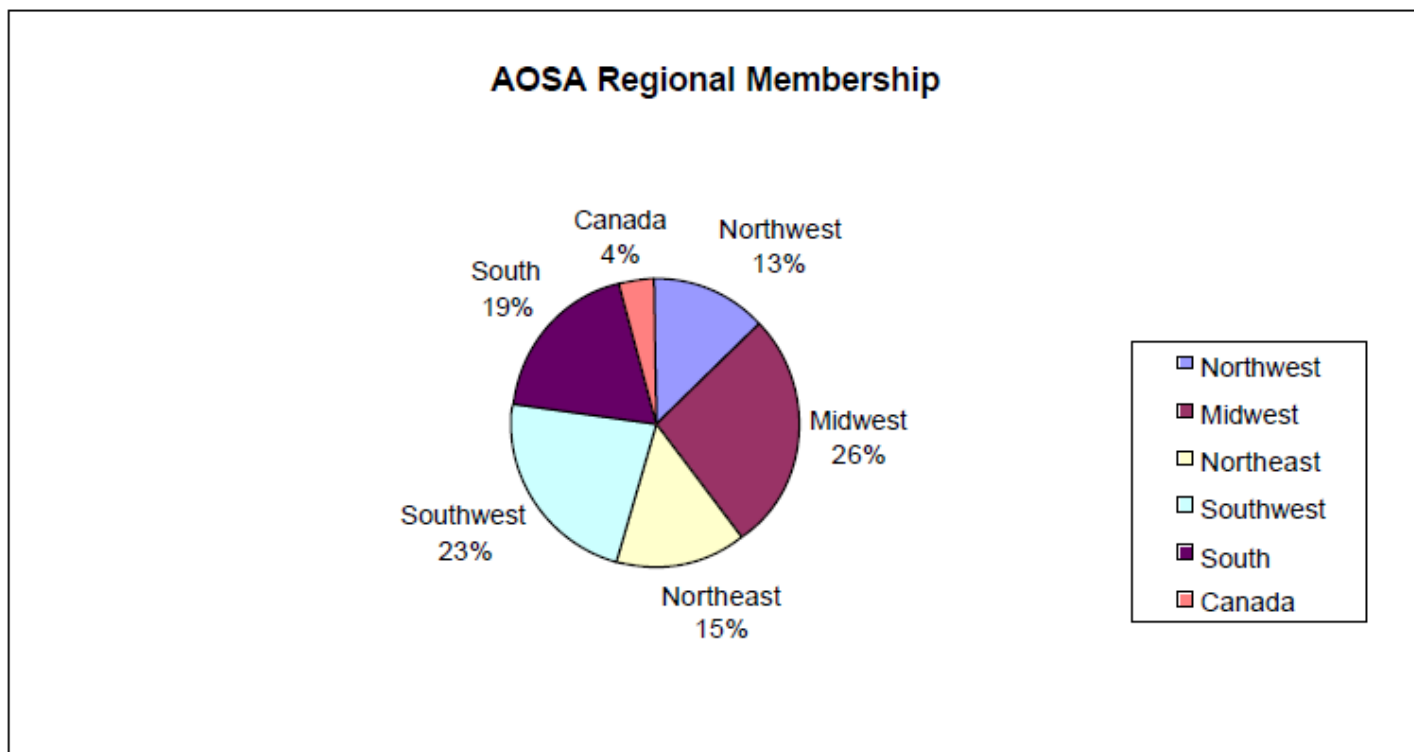


Figure 5. Percentage of AOSA laboratories categorized by region.

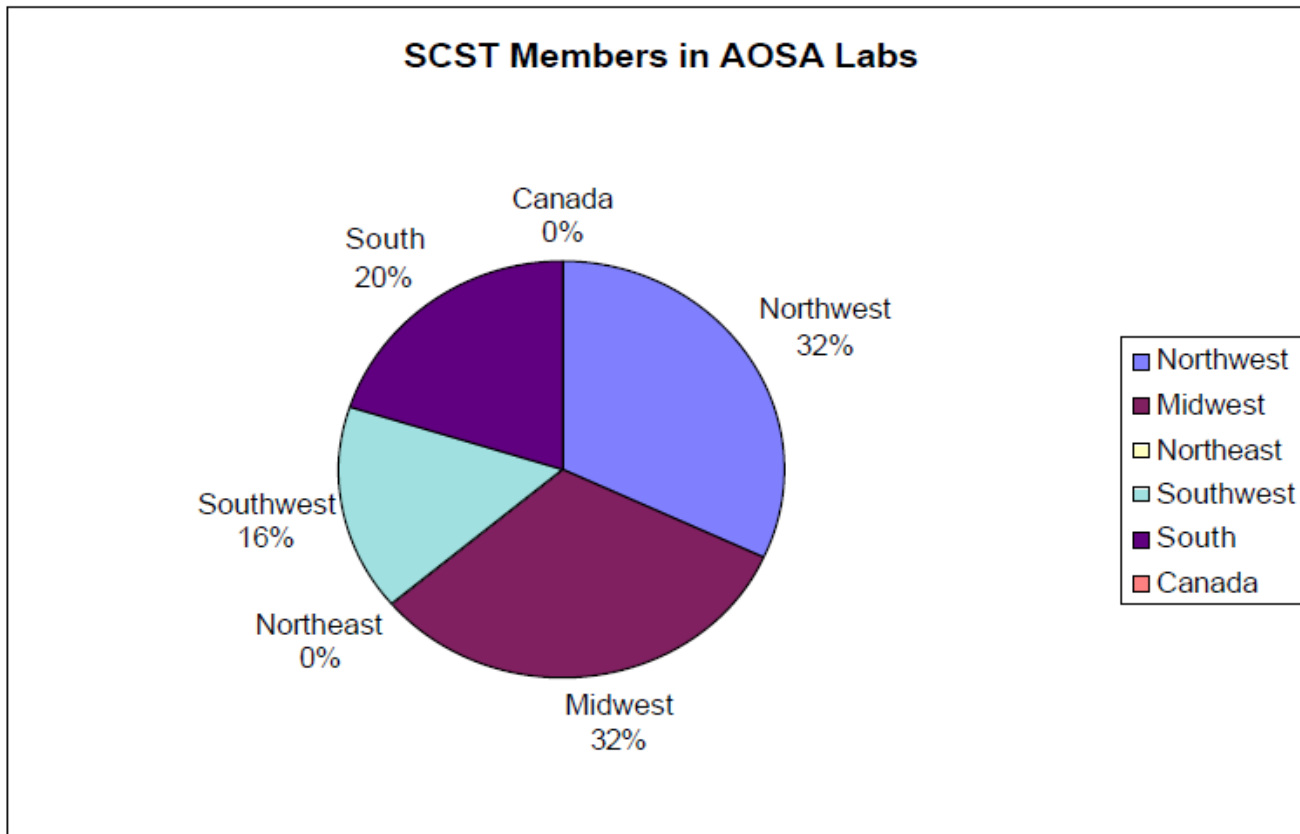




Historical Data on SCST Voting (continued)

There are 25 members of SCST employed at 12 AOSA laboratories, consisting of 22 Registered Seed Technologists, 1 Research member and 2 Certified Genetic Technologists. Figure 6 shows that the regional distribution of these SCST members affiliated with AOSA laboratories is relatively even throughout the United States. This crossover membership serves to balance representation between the two associations.

Figure 6. SCST members employed at AOSA laboratories by region.



Question #8: If SCST members are given voting privileges, should those holding membership in both organizations be allowed to vote twice?

Discussion and background information: Initially, the reaction to this question would likely be negative; however, after closer examination, there may be merit in allowing it. On controversial issues, AOSA representatives may be expected to vote according to what is “politically correct” for their state or region; however, when voting within SCST, they are voting as individuals and may well take a different position on an issue. Allowing dual voting would permit them to exercise their right as an individual member of SCST, yet this is not likely to impact close votes because of the few members that hold dual membership and the implementation of other checks and balances that would prevent passing of a Rule by a marginal vote. Furthermore, some of these members may not be the Official voting representative for their AOSA laboratory and would not actually be voting with both organizations. If dual voting privileges may be of any concern, it would appear to have a slight bias toward AOSA, since the primary job of these SCST members is with AOSA laboratories.

Question #9: If voting were broadened to include the SCST membership and keeping in mind the diversity represented in their membership, what additional checks and balances might be necessary to assure no single entity gains undue influence in the voting process?



Historical Data on SCST Voting (continued)

Discussion and background information: The committee unanimously recommended that a 2/3 “super majority” vote should be required to pass a proposed Rule. Most of proposed Rules are passed with an overwhelming majority. This is appropriate once a proposal makes it through the full review process. Indeed, if a proposed Rule is entirely justified as standardized testing protocol, it would seem that there should be more than a simple majority in support of it. If there is such controversy over a proposal, it would appear that more study is in order before implementing it as a standardized Rule for all to follow. Furthermore, if we install joint organizational voting, the diversity of the broad membership (AOSA & SCST combined) would give sufficient representation to justify a 2/3 super majority vote for passing a Rule. This would be part of the checks and balances gained by joint membership voting; i.e., voting representation by the diverse membership body, but checked by requiring two-thirds of the membership to vote for passage of a Rule proposal. Rule making should be a very thoughtful and conservative process supported by sound justification since it may carry broad impact. An intrinsic benefit to having a broader base of qualified representation in the voting process is that the effects and validity of a proposed Rule will gain more consideration and input. Also, the actual voting process would likely reflect a better assessment of the proposal by including a broader, more diverse voting population. The majority of committee members described voting experiences over the last two and half decades where Rules were rushed and poorly considered, where representatives appeared fatigued at the end of the very intensive annual meeting or a 50:50 tie vote was broken by the single vote of the President on a controversial proposal that might have benefited by more study. Another trend that would undoubtedly influence the professionalism of the joint membership is the broad implementation of quality management systems and laboratory accreditation. Increased discipline and precision among laboratories would inevitably give a secondary benefit of uniting our greater community of seed laboratories.

Question #10: Since AOSA is an organization of laboratory members and SCST is an organization of individual registered members, how might voting be configured for joint membership participation?

Discussion and background information: Once the Rule voting study committee discussed and reviewed all background information, the main goal was to work out an acceptable approach to the joint voting process. It was recognized that each organization needed to remain independent, yet have equality in the voting process. Following are the three approaches proposed by committee members and possible advantages and disadvantages for each.

PROPOSAL #1

Allow each organization to vote on Rule proposals as they see fit. Currently, SCST allows individual members to vote. In AOSA, each member laboratory is allowed one vote. If a Rule proposal is passed independently by each organization, it is formally adopted. If a Rule proposal is passed by only one organization, it is officially rejected. If a Rule proposal is failed by both organizations, it is officially rejected. With this method, each organization remains independent and has the ability to adjust its voting practices as it sees fit. The final result is still dependent on the majority approval by both organizations. If a super majority vote is adopted within each association, an increased measure of affirmation would be realized.

Advantages:

- 1) Each association remains totally independent in the process.
- 2) No major changes in By-Laws would be required.
- 3) The voting process is simple.

Disadvantages:

- 1) There is potential for conflict between the two organizations on sensitive issues. Such conflict detracts from achieving the long term mission of each association and the objectives of the annual meeting.
- 2) The member votes would be condensed into a single vote for each organization. Therefore, the “black or white” voting process representing each association would exclude much of the diversity as votes are condensed to a single vote for each organization. This would exclude the diversity within the joint membership, which would otherwise function as checks and balances on the system; although, use of a super majority vote by each association would give an added dimension to assure affirmation of a proposal.



Historical Data on SCST Voting (continued)

PROPOSAL #2

Allow each organization to vote independently. Then take the percentages from both votes and add them together, e.g., AOSA votes 80% "Yes" and 20% "No". SCST votes 70% "Yes" and 30% "No". This totals 150 in favor and 50 against the proposal. Hence, each organization would be treated equally regardless of the number of members in each association. Of course, implementation of a super majority would add another check to the process.

Advantages:

- 1) Each association remains totally independent in the process.
- 2) The voting procedure incorporates the diversity within each organization.
- 3) There is equality in compiling votes for each organization.
- 4) Voting is by the memberships, not the organizations.
- 5) There is less likelihood of conflict between the associations over a voting issue.
- 6) The voting process is simple.

Disadvantages:

- 1) More significant changes may be needed for the By-Laws.
- 2) Vote totals would need to be converted to percentages.
- 3) Converting votes to percentages and the addition of percentages for a joint total does not show voting count or tally, which may be valuable for long term records.

PROPOSAL #3

Allow each organization to vote independently. Then divide the total number of AOSA members voting into the total number of SCST members voting to derive a factor. Divide this factor into the SCST "Yes" and "No" votes to convert them to equivalency with the AOSA member votes. For example, of 160 SCST members voting, 30 vote "Yes" and 130 vote "No". There are 20 AOSA members voting in their business session, so the AOSA total (20) is divided into the SCST total (160) to derive a factor (= 8). This factor is then divided into the 30 "Yes" SCST votes (= 3.75) and the 130 SCST "No" votes (= 16.25). These "Yes" and "No" votes would have an equivalent basis with AOSA and the votes of each organization could be

combined for a total result. Rule passage could be further checked by implementation of a super majority vote.

Advantages:

- 1) Each association remains totally independent in the process.
- 2) Voting procedure incorporates the diversity within each organization.
- 3) There is equity in compiling votes for each organization.
- 4) There is voting by the memberships, not the organizations.
- 5) There is less likelihood of conflict between the associations over a vote.
- 6) The voting count would remain in numerical form for data processing and long term records.

Disadvantages:

- 1) More significant changes may be needed in the By-Laws.
- 2) The conversion formula may be somewhat more involved compared to proposal #2 above, but this could be facilitated with use of a computer.

After careful consideration of each proposal, the committee voted unanimously in support of proposal #2, which adopts individual voting within each organization and conversion of those votes to percentages that are then added to determine whether a Rule passes or fails. This allows each organization to be treated equally as organizations regardless of the number of members in each association and it provides for equitable conversion of individual votes, which capitalizes on the membership diversity as a check and balance. The committee also favors adopting a 2/3 super majority for passing a Rule proposal. This approach would incorporate the multi-dimensional diversity from each association in the voting process and requiring a 2/3 vote would certainly prevent control of any special interests within the joint membership. The 2/3 vote would also work to ensure that only well justified proposals are adopted. Hence, sufficient checks and balances would be fully in place. All members expressed interest in maintaining voting records.



Historical Data on SCST Voting (continued)

Summary and committee recommendation: After careful review and discussion of all factors, the committee recommends the following:

- 1) Implementation of changes to include the SCST voting membership in voting on proposed AOSA Rule changes, with appropriate checks and balances.
- 2) Adoption of a joint voting scheme for equivalency between the two membership types, i.e., individual members vs. laboratory members. The Rule voting study committee recommends proposal #2. That is, allow each organization to vote independently and convert both organizations' "yes" and "no" votes to percentages and add them together for a final tally.
- 3) Adoption of a two-thirds super majority vote to pass a proposed Rule.
- 4) RSTs holding dual membership may vote as individual members with SCST and as laboratory representatives with AOSA. Employees of AOSA laboratories holding membership in SCST that are not acting as the Official representative for their AOSA laboratory, may vote as members of SCST.

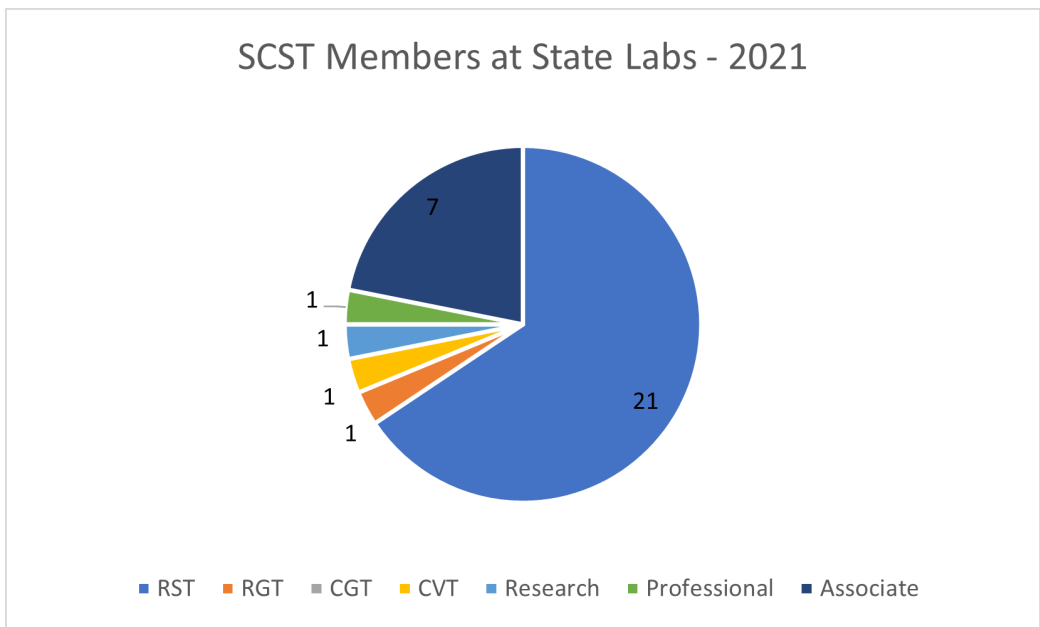
Text and charts are published here exactly as originally published in the Seed Technologist's Newsletter, Seed Technology Newsletter Volume 78, No. 2.. Minor correction was made to the numbering of questions, Question 9 was originally listed as Question 7.

2021 Update on SCST members at State Labs

Data provided by Heidi Jo Larson, written by Quinn Gillespie

As of 2021, there are 255 total members of SCST. This represents 105 RST members, 14 RGT members, 3 members who are both RST and RGT members, 3 members who are both RST and CGT members, 5 CGT members, 10 CVT members, 109 Associate members, 3 Research members, and 3 Professional members.

32 SCST members are also employed at State Seed Labs, representing 12.5% of the total SCST membership. When the original data was collected by the AOSA / SCST Rule Voting Procedure Study Committee 11% of SCST members were employed at AOSA labs, as reported by the committee. This represents a slight increase in the percentage of SCST members employed at state seed labs.





Note from the AOSA President on Voting

A bit more information will be helpful with the discussion of AOSA reevaluating the current annual voting process on AOSA Rules proposal. AOSA leadership cannot stress enough the importance and appreciation of SCST member contributions to the AOSA Rules and to the entire process of seed testing and laboratory operations over the past several decades. AOSA is greatly supportive of SCST members continuing to contribute to seed testing research and to voting on AOSA Rule proposals every year. The reevaluation of the voting process by AOSA is by no means to be misconstrued as an effort to inhibit or reduce the crucial involvement of SCST members with the AOSA Rule evolutionary process.

The focus of the AOSA Rule voting procedure reevaluation was first started several years ago as an effort to address concerns of “undue influence” from non-governmental organizations (NGOs) on the AOSA Rule making process. These concerns were first brought to AOSA leadership from the State Attorneys General Office of Pennsylvania. As this discussion continued, regarding the issue of possible undue influence, AOSA leadership asked the Association of American Seed Control Officials (AASCO) and the USDA AMS SRTD for their opinions on this matter. They too expressed concerns on the current voting process. (Please refer to the letters of support on the following pages that were issued by these two organizations for changing the current voting process.)

The methods and tolerance tables found in the AOSA Rules for Testing Seeds are used by States in the enforcement of their seed regulatory compliance program. The AOSA Rules are often used by the USDA AMS STRD staff as a guide to consider making changes to the official seed testing methods they use for enforcement of the Federal Seed Act. Since the AOSA Rules are in part, being used as a foundation for the regulatory oversight of the Seed Industry, it is critical that there is no possibility nor perception of undue influence being exercised in the AOSA Rules making process by NGOs. Thus, the voting process is being reevaluated for these possibilities and safeguards put in place.

The AOSA Rules are not the only standardized rules being used for seed testing that have a process for making changes to said testing methods. As mentioned previously, USDA has their own testing methods, ISTA has their own testing methods, and CFIA has their own testing methods. None of these three organizations permit NGOs to actually vote on the acceptance or rejection of proposed changes to their official seed testing methods. The AOSA Rules are the exception to this practice. At one time, only AOSA member labs were allowed to vote on rule change proposals. All four seed testing organizations have a robust process in place that openly seeks and invites NGOs to contribute and to comment upon proposed rule changes.

—David Johnston



Letter from AASCO

31 December 2021

To: Association of Official Seed Analysts (AOSA)

RE: AOSA Voting By-Laws

The Association of American Seed Control Officials (AASCO) support an AOSA Voting By-Law change that allows a proposed rule to automatically pass with a decisive supermajority vote (85% or 90% and higher) of AOSA members. Any rule proposal that is strongly favored by AOSA members should be passed and this type of voting by-law would help continue the acceptance of the AOSA Rules for Testing Seed by regulatory agencies. AASCO would not be in favor of a voting by-law that requires both AOSA and SCST to have 50% approval for a rule to pass, such a voting by-law can make it harder for a rule proposal favored by AOSA to pass and would be moving in the opposite direction of the intent of the original voting by-law proposals made by Johnny Zook. AASCO believes SCST should be part of the rule making process, but AOSA should always be part of the rule proposal voting and, in the event, AOSA does not have a quorum for voting no rule voting should take place.

Respectfully,

Jeff Claxton

President



Letter from USDA Seed Regulatory and Testing Division

June 14, 2021

Johnny Zook, AOSA Vice-President
Pennsylvania Department of Agriculture
2301 North Cameron St.
Harrisburg, Pennsylvania 17110

In Reference to:

AOSA By-law Proposal #5

Dear Mr. Zook,

For more than 100 years, the USDA's Seed Regulatory and Testing Division (SRTD) has worked closely with the Association of Official Seed Analysts (AOSA) to establish rules and regulations that promote a robust seed market within the United States. This partnership has been so successful that for decades, State regulatory agencies have opted to include references to AOSA rules in their State seed laws. Similarly, the USDA has generally considered AOSA rules when updating the Federal Seed Act regulations. These government agencies were able to make these changes, in part, because of the perceived impartial and independent position of AOSA.

SRTD fully supports efforts to consolidate similar functions between AOSA and the Society of Commercial Seed Technologists (SCST). This consolidation makes sense from both a financial and an efficiency standpoint. While there is high value in receiving industry input, there has always been established regulations within all levels of government, that prohibit agencies from conducting activities that appear to have a conflict of interest. Currently, within AOSA, the ability of the industry to hinder even a unanimous vote of State and Federal Government Agencies can be easily viewed as a conflict. This is especially true when we consider that due to the reference of AOSA rules in State laws, the State may be hampered from changing its own laws by the industry it regulates. I suspect that in time, as this truth becomes evident to State government officials, State support for the rules may change.

We believe that the current AOSA By-law proposal #5 corrects the perhaps unintentional appearance of conflict within the organization. I strongly support this proposal and urge AOSA member laboratories and SCST members to do the same.

Ernest L. Allen, Director

USDA-Agricultural Marketing Service

Seed Regulatory & Testing Division



Freezing Seedlings:

Proper Disposal of Restricted and Regulated Seedlings

SCST Genetic Technology Committee

Proper stewardship of regulated or restricted seed and seedlings is the responsibility of the laboratory. Stewardship generally refers to the specialized handling and disposal procedures that ensure novel genetics and technologies do not escape, establish themselves in the environment, or enter the food chain before approval. New technologies such as genetic engineering and gene editing are often subject to stewardship programs designed by the developer to meet regulatory requirements. Samples with stewardship requirements start to show up in seed testing laboratories during the pre-commercialization phases of product development but they should never show up unexpectedly.

All necessary permits and approvals must be in place for the laboratory to receive regulated materials that require stewardship. If you receive samples marked as regulated and have not been made aware of the stewardship requirements, the best course of action is to call the sender and advise them of the situation. Do not open or handle regulated seeds without being a) listed on the permit, b) trained by the permittee, and c) having the necessary resources in place for the specific stewardship program. Placing the shipment in a locked storage area would be appropriate if you unexpectedly receive materials subject to stewardship requirements.

Once properly engaged, the relevant laboratory, greenhouse, seed-conditioning, or storage facilities must follow the developer's stewardship program. Critical control points include proper seed packaging, storage, preparation of plant material for planting, and disposal of all materials. A good source of information is the Excellence Through Stewardship (ETS) organization, a non-profit that promotes stewardship and quality management systems in the seed and plant industry. ETS defines a product's life cycle stages as; 1) Research and Discovery, 2) Product Development, 3) Seed or Plant Production, 4) Marketing and Distribution, 5) Crop Production, 6) Crop Utilization, and 7) Product Discontinuation.

Laboratories that conduct germination and purity tests may see regulated or stewarded seed samples in Stages 3 and 4, Seed Production and Marketing. However, testing services are required anytime viability and purity of seed needs to be assessed. Crop Production (Stage 5), generally does not begin in earnest until the product is deregulated and approved for commercialization and stewardship requirements are eased. Closed-loop production systems are the exception, and they utilize identity-preserved techniques to contain specialty agricultural products.

In many cases, these types of products are never fully commercialized. Examples of closed-loop production systems include gene-edited waxy corn, genetically engineered high oleic soybeans, and GE sugar beets, along with GE versions of tomatoes, potatoes, and what can be loosely called direct-to-consumer foods. Closed-loop systems are the opposite of open commodity markets where individual growers deliver grain to an aggregation system. Regardless, good stewardship protects the environment and prevents the disruption of commodity markets and specialty markets in an increasingly global food production network.

During the 2021 virtual annual meetings, the Genetic Technology Committee discussed the issue of seedling disposal methods under stewardship requirements. Participants indicated that desiccation of germinated seedlings before disposal was a standard method of devitalization. Further discussion revealed that facilities



Freezing Seedlings:

Proper Disposal of Restricted and Regulated Seedlings

with greenhouse space can efficiently perform this task. But an alternative approach has been studied by Maranda Gillen and Brenda Johnson at Eurofins BioDiagnostics (EBDI) – River Falls, Wisconsin.

EBDI presented a freeze method during the fall 2021 AEIC meeting, as a high throughput technique for the devitalization of germinated plant material. Three (3) crops, corn, cotton, and soybean, were used in the validation design. The procedure began with the evaluation of non-regulated samples. Seeds that evaluated as un-germinated or innate were removed, and devitalize by another devitalization method such as mechanical destruction or steam treatment. After evaluation, the samples were then packed into labeled 5 gallon trash bags. Dimensions of the bag are 1 ft 11-15/32 in x 2 ft 1-3/8 in or 59.6 cm x 64.5 cm, with a fill-weight limit of 3200g or approximately 35 rolled towels. Sample bags were then placed in frozen storage in a -20°C chamber. Samples were taken out of the cold chamber approximately 72 hours afterwards and allowed to defrost. Defrosted samples were then transferred into buckets, given additional water to facilitate growth, and stored in the 25°C light chamber. After 2 days, crops were evaluated for vigor and vitality, if the results were not definitive, then the growth period in the 25°C light chamber was extended. The samples that were determined to be devitalized could then be disposed of in the garbage.

The concept of freezing seedlings before disposal is a simple, efficient, and energy-conserving approach for devitalizing seed. After the Genetic Technology Committee meeting, a small working group was formed. The working group's goal was to develop a validation study that would generate data for submission to USDA APHIS Biotechnology Regulatory Services (BRS). The following is a brief outline of the study. Samples of corn, soybean and cotton would be prepared and distributed to participating laboratories. The samples would be evaluated per standard germination test procedures and then packaged in plastic bags and frozen to temperatures of -10°C to -20°C. After 3 days the temperature of the sample would be determined (core temperature). The samples would then be thawed and allowed to continue under normal germination conditions. Viability would be assessed at intervals of 5 days. The effect of hard and ungerminated seeds will also be studied.

The results of the validation would be shared within the seed industry in general and specifically the seed testing community. Based on the data generated by this validation study, a new method of devitalization could be made available for use in stewardship protocols and official permits. The ability to more efficiently devitalize seed would raise the effectiveness of protecting intellectual property, protecting trade and reduce the risk of unintentional release of regulated articles through laboratory testing.

A request of funding has been submitted to the Seed Science Foundation. At publication time the request is still under review. If funded the benefits of a successful project would include increased confidence in the handling and disposal of regulated articles by company and independent laboratories tasked with germination, bioassay and work relating to seedling evaluations. By including both company and commercial laboratories the devitalization method would be uniform and widely available.



Validation study on germination method for hybrid bromegrass (*Bromus riparius* X *B. inermis*)

Ruojing Wang^{1*}, Jitao Zhang² and Julie Lu¹

*Email: Ruojing.wang@inspection.gc.ca

Hybrid bromegrass is generated by crossing meadow bromegrass (*Bromus riparius*) and smooth bromegrass (*B. inermis*), which is a slightly creeping, winter hardy, long-lived perennial, dual-purpose forage grass for both hay and pasture systems. Two varieties, Knowles and Success, were released in Canada (Coulman, 2004, 2006). Another variety, BigFoot, was released from USDA as a new forage crop. Since the superior quality of hybrid bromegrass in fast growth and high yield than their parental species (Coulman, 2004 and 2006), it was widely used for dual purposes forage as hay or pasture in Canada and the USA. However, the hybrid bromegrass has not been included in seed-testing rules, e.g. Canadian Methods and Procedures for Testing Seeds, the AOSA Rules for Testing Seeds, and International Rules for Seed Testing.

We conducted in-house studies that compared the effect of pre-chilling treatments of 3 days at 8°C in darkness and 0.2% KNO₃ with six seed lots. The results showed no significant difference from the germination with or without dormancy treatments. The accumulative germination was also leveled off at 14 days with further increments at 21 days. The inter-laboratory study was conducted with seven participating laboratories and four seed lots. The results showed the laboratory variation was the most significant factor among other variables. The germination at 15-25°C had the lowest variation measured by statistical repeatability and reproducibility, compared to the other three temperatures.

In conclusion, germination at 15-25°C without dormancy treatment at 14 days was the optimum and reliable method for testing seeds of hybrid bromegrass, a new forage crop proposed to the AOSA rules.

Reference:

Coulman, B. 2004. Le brome hybrid Knowles. Can. J. Plant Sci. 84: 815–817

Coulman, B. 2006. Success hybrid bromegrass. Can. J. Plant Sci. 86: 745–747

¹Seed Science and Technology Section, Saskatoon Laboratory, Canadian Food Inspection Agency, Downey Road, Saskatoon, Saskatchewan, Canada

²A visiting scholar from Northeast Institute of Geography and Agroecology, China Academy of science



Validation study on germination method for hybrid bromegrass (*Bromus riparius X B. inermis*)

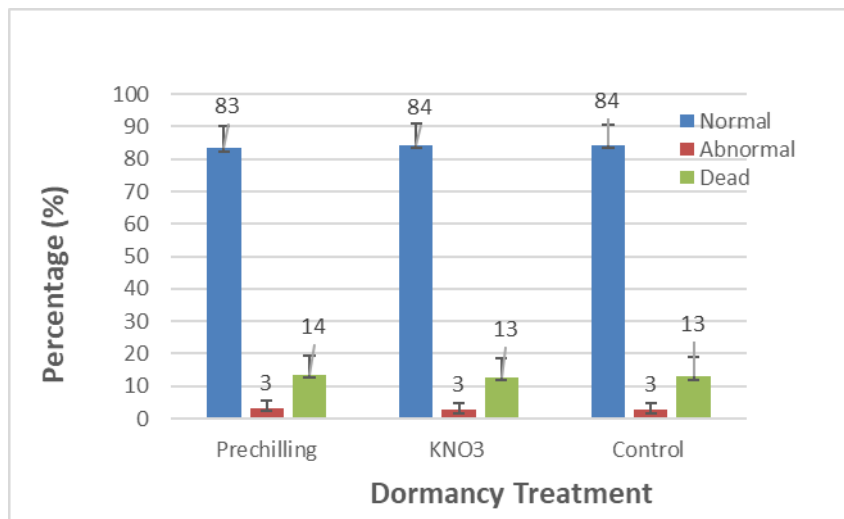


Figure 1. Average germination percentage (%), abnormal seedlings and dead seeds in 6 lots of hybrid bromegrass with dormancy treatment of pre-chilling (3 KNO3, at 15-25°C and 20-6 seed lots used had average 79-89% at 21 days.

days at 8°C) and 0.2% 30°C. The germination of the age germination ranges from

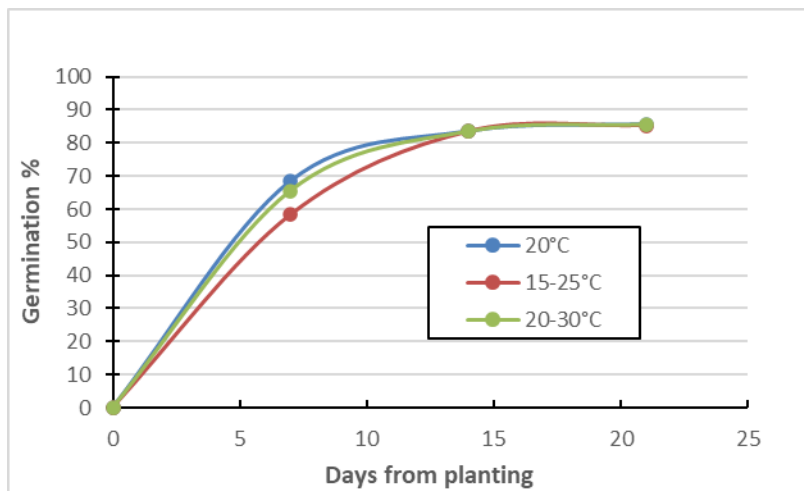


Figure 2. The accumulative germination percentage at 20°C, 15-25°C, 20-30°C with 3 different counting days (7th days; 14th days; 21 days after planting) in hybrid bromegrass. Note: six seed lots used had average germination ranges from 79-89% at 21 days.



Validation study on germination method for hybrid bromegrass (*Bromus riparius X B. inermis*)

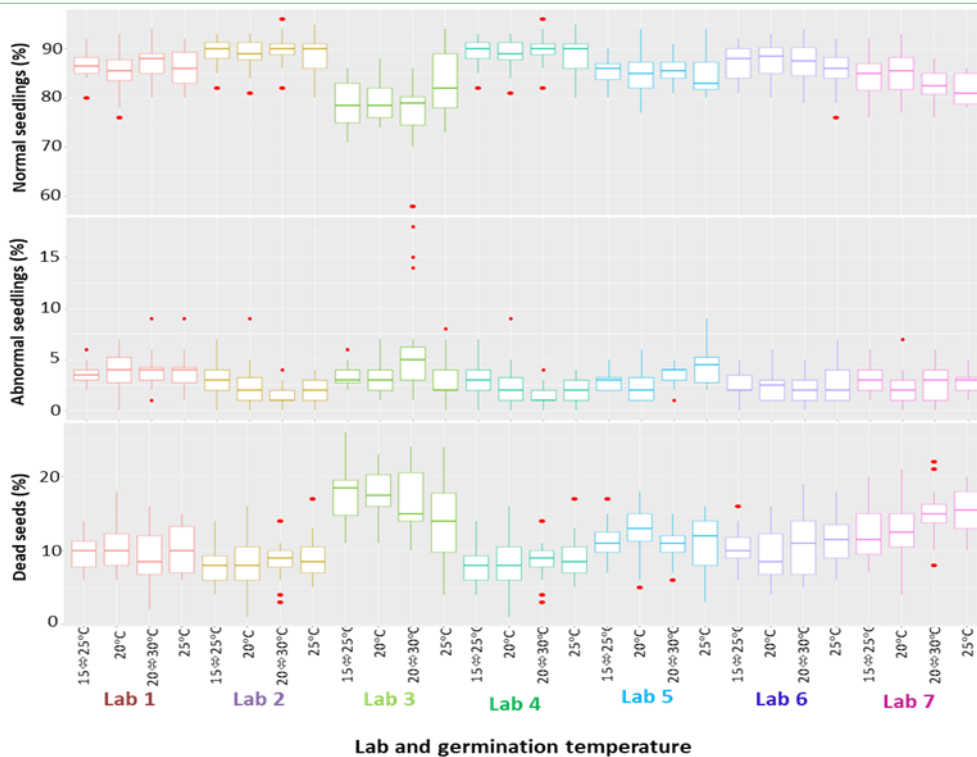


Figure 3. Plot box of the percentage results of normal seedlings, abnormal seedlings and dead seeds from seven participating laboratories in four germination temperatures with four seed lots of hybrid bromegrass.

Table 1. Analysis of variance of normal and abnormal seedlings and dead seeds results of four different seed lots of hybrid bromegrass subjected to four germination temperatures at six different laboratories.

Source of variance	df	Mean Square		
		Normal	Abnormal	Dead seeds
temperature	3	26.91	5.95	19.58
Seed lot	3	190.41**	22.43**	142.13**
temperature*seed lot	9	6.49	3.33	8.27
lab	5	324.67***	23.84*	269.26***
lab*temperature	15	10.25	3.43	11.43
lab*seed lot	15	23.74*	3.37	17.50**
lab*temperature*seed lot	45	11.55	3.73**	7.36

*significant at p=0.05, ** significant at P= 0.01, *** significant at P =0.001.



Validation study on germination method for hybrid bromegrass (*Bromus riparius* X *B. inermis*)

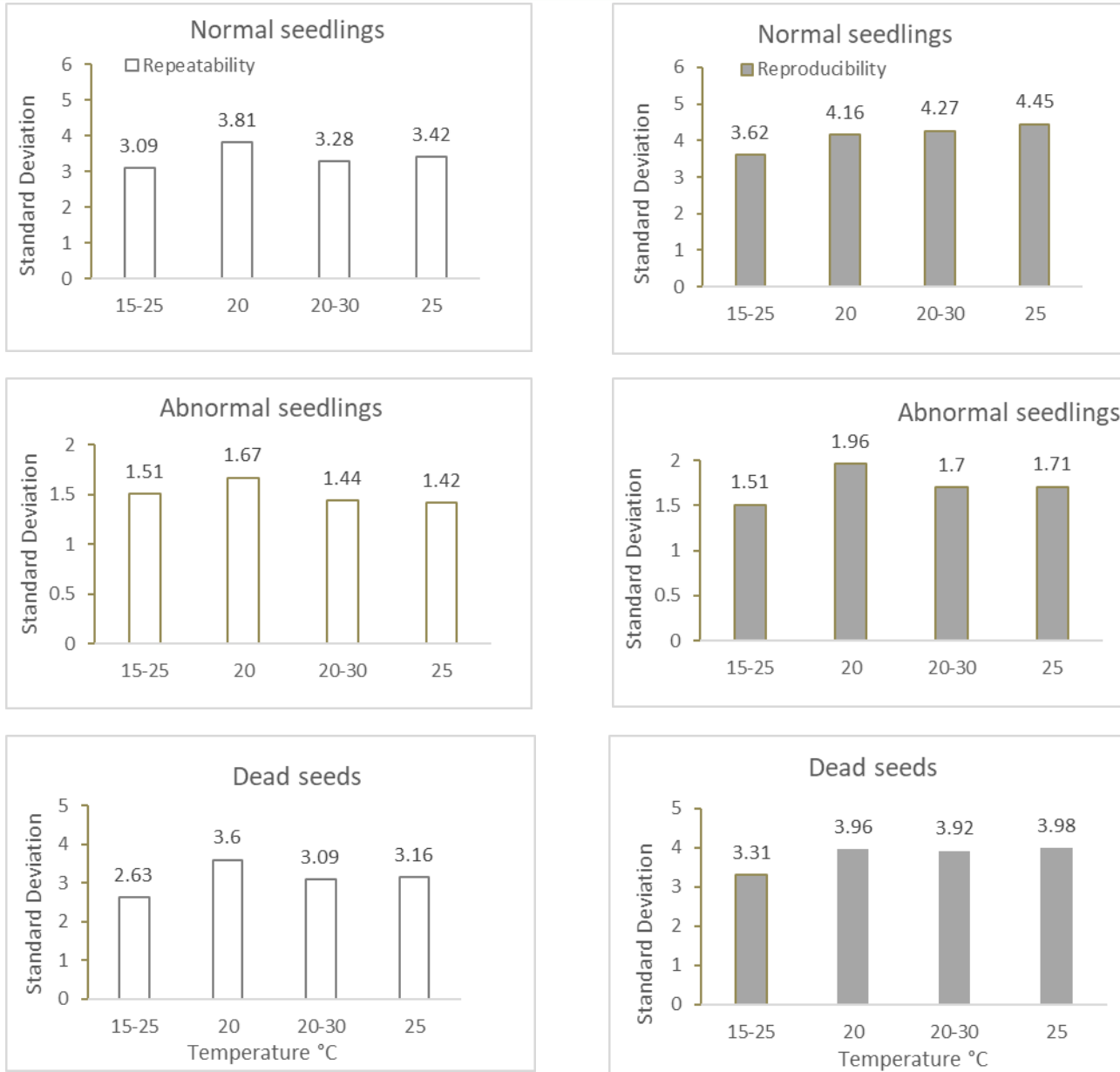


Figure 4. The repeatability δ and reproducibility measured by the standard deviations of testing results under four temperatures from six participating laboratories in hybrid bromegrass. Four seed lots were used with germination ranges from 82-91% based on pre-tests.



Referee Study on Germination of *Lactuca sativa* L.

Lei Ren, Ruoqing Wang*, and Julie Lu,
*Email: Ruoqing.wang@inspection.gc.ca

A referee study is an inter-laboratory study that can be used for evaluating the performance of testing methods, particularly, the testing uniformity among participating laboratories. It can also provide evidence for method improvement or harmonization. The current germination methods described by *International Rules for Seed Testing* (ISTA), *AOSA Rules for Testing Seeds* (AOSA), and *Canadian Methods and Procedures for Testing Seed* (Canadian M&P) allow different germination temperatures and dormancy breaking treatments for lettuce seeds (*Lactuca sativa* L.). For germination temperatures, current ISTA and AOSA Rules have only a constant 20°C, while Canadian M&P has two temperatures of 15 or 20°C. For seed dormancy breaking, ISTA Rules and Canadian M&P use the method of pre-chilling, while AOSA Rules allow pre-chilling or testing at 15°C.

This referee study evaluated the equivalence of four different germination temperatures and pre-chilling treatments on the germination of lettuce (*Lactuca sativa* L.). Three seed lots of lettuce were selected and used from the germination range between 51.3 % and 97.0% with pre-tests. There were 31 laboratories or analysts from Canada and the United States who participated in the study. All testing samples passed a homogeneity test after mixing and dividing with ten random samples. Randomly numbered samples from the samples prepared from three seed lots were then sent to each participant.

The results of the referee study showed that germination temperatures and dormancy-breaking treatments did not significantly impact lettuce germination (Figure 1). There was a tendency that pre-chilling treatment had lower germination results (Figure 1 and Figure 3). Although the testing variation of germination in high germination seed lots (Lot 1 and Lot 2, average germination at 96%) was low (Figure 2A), high intra laboratory variation in a few participating laboratories were observed. There was no testing uniformity in the lower germination lot, Lot 3, in this referee study (Figure 2B, Figure 3). The germination reported could be as low as 10% or as high as 98% (see the distribution of reported results in Figure 3). The method equivalency cannot be concluded due to high variation in the lower germination seed lot and higher germination lots used.

The referee revealed that it would be more important to address the testing uniformity than the differences in germination methods in lettuce. We suggest organizing further investigation on testing uniformity in lettuce, for example, conduct an image survey using normal and abnormal seedlings, seedlings with physical or diseased necrosis, or other borderline seedlings.



Referee Study on Germination of *Lactuca sativa* L.

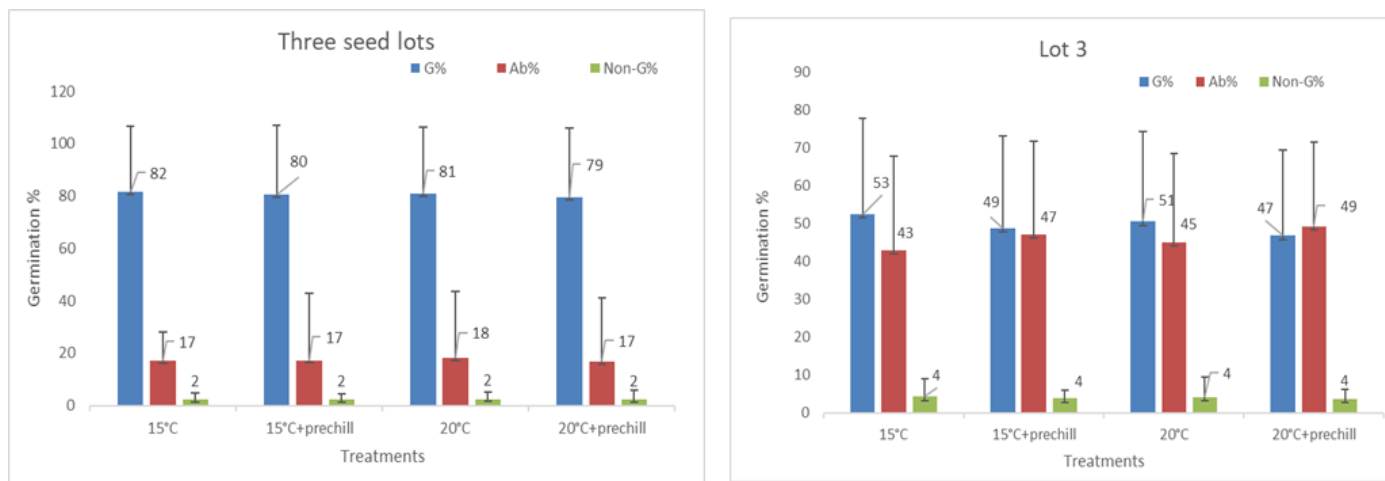


Figure 1: Average percentages of germination, abnormal seedlings and non-germinated seeds of lettuce under different germination treatments for all three seed lots and Lot 3 from 31 participating laboratories.

Lots 1 and 2 Combined

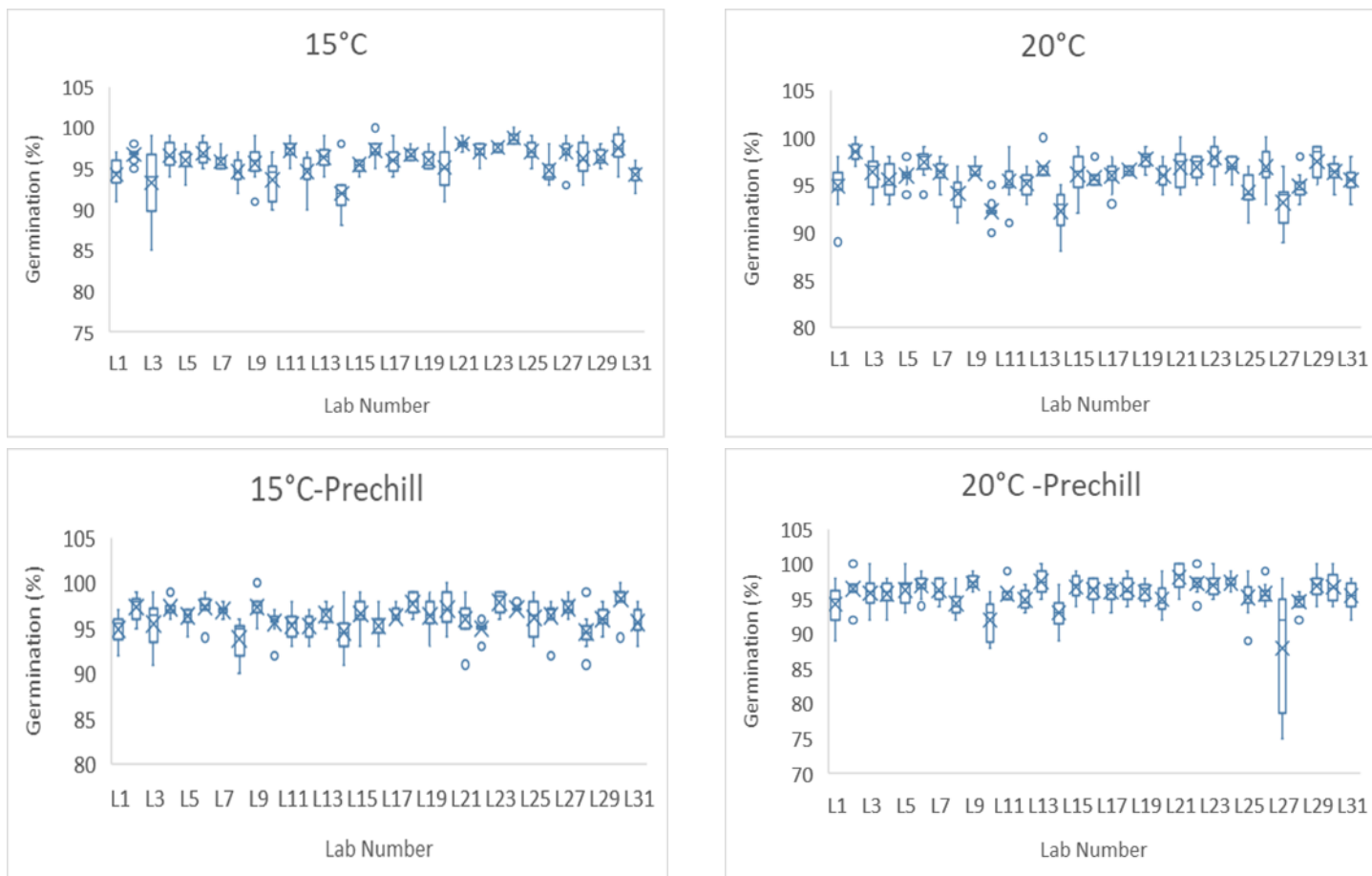


Figure 2A. Test results of germination percentage of Lot 1 and Lot 2 from 31 participating laboratories under different germination conditions or treatments in lettuce.



Referee Study on Germination of *Lactuca sativa* L. (cont.)

Lot 3

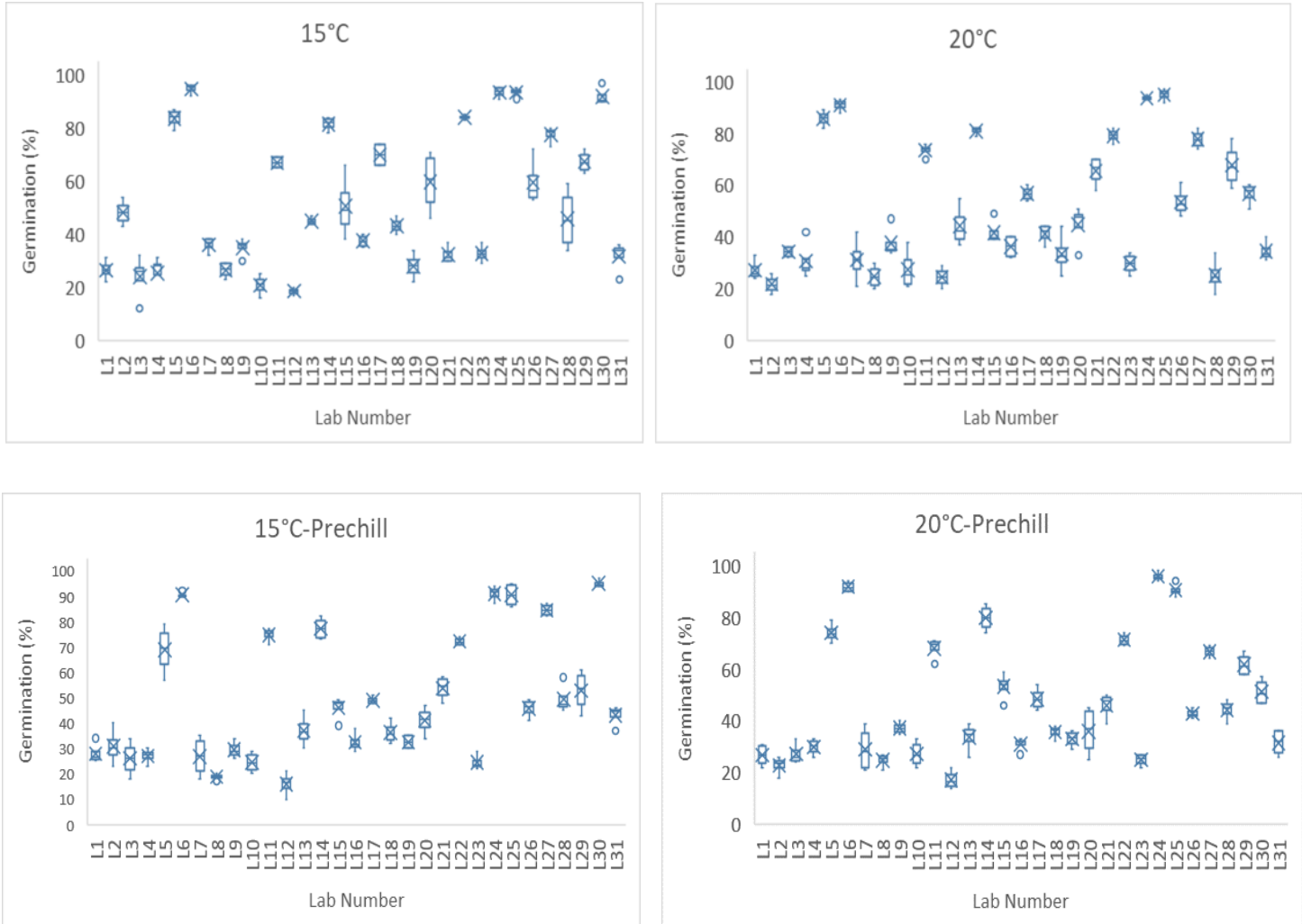


Figure 2B. Test results of germination percentage of Lot 3 from 31 participating laboratories under different germination conditions or treatments in lettuce.



Referee Study on Germination of *Lactuca sativa* L. (cont.)

Lot 3

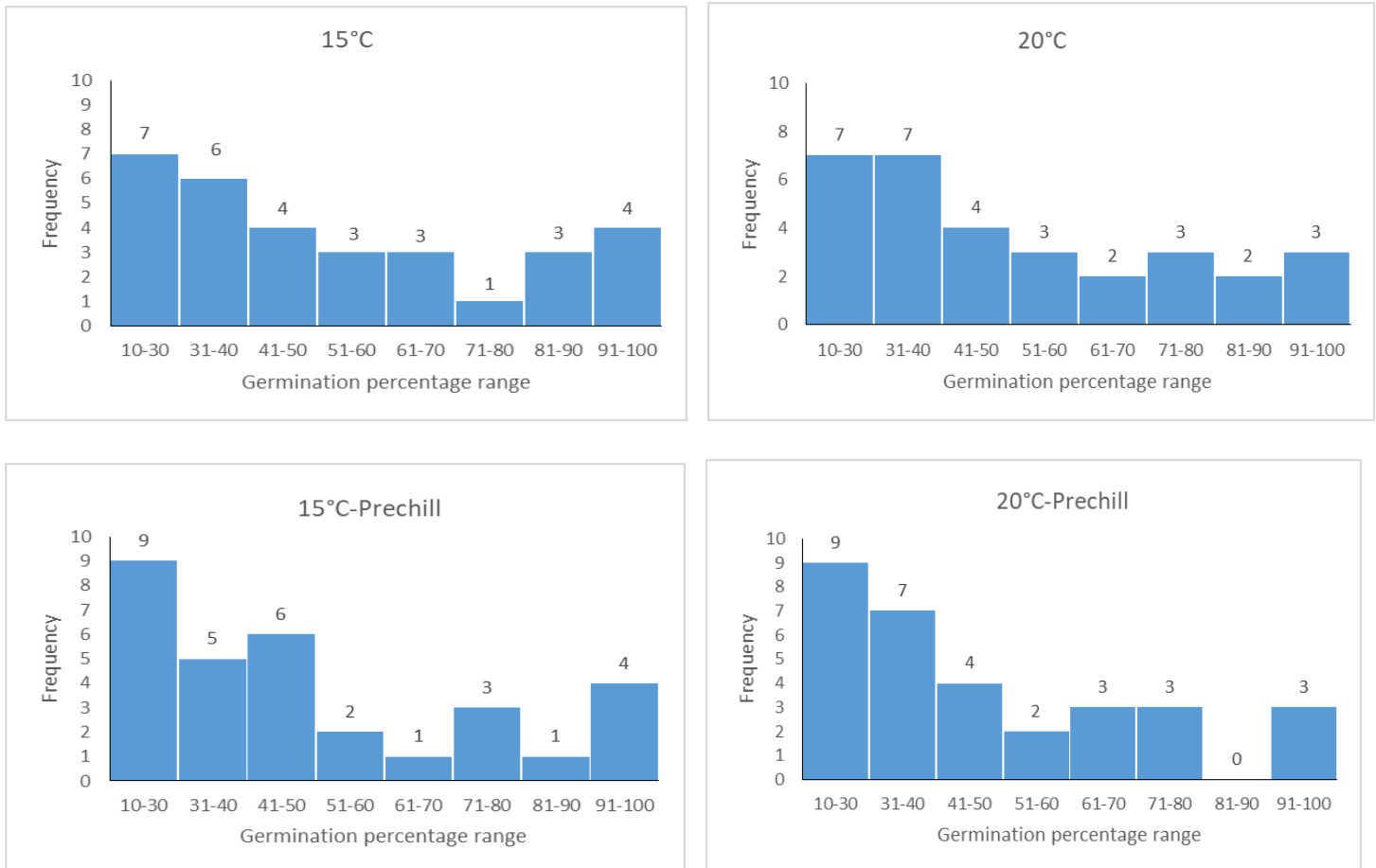


Figure 3. The distribution of the germination results from 31 participating laboratories of lot 3 under different germination conditions or treatments in lettuce.



Book Review: Lab Girl by Hope Jahren

Written by Elizabeth Stewart

In Hope Jahren's book "Lab Girl" she describes her life story with clever parallelism to the life of plants. This book is packed with quotable lines, so this summary was basically already written for me!

Jahren grew up in Minnesota with her Scandinavian family where she often visited her father's classroom laboratory, and planted seeds with her mother on May Day.

"People are like plants: they grow towards the light. I choose science because science gave me what I needed – a home as defined in the most literal sense: a safe place to be."

She attended undergraduate school at the University of Minnesota then moved on to earn her Ph.D. at Berkeley, where she met her life-time lab partner Bill. She was offered a teaching position at Georgia Tech and asked Bill to travel with her as a lab assistant. She describes the hardships included in setting up her research lab while scrambling for grant funding and finding suitable lab equipment.

They later moved on to John Hopkins University and set up another research lab together. This is where she meets her husband and she became pregnant with her son. Jahren was fighting depression during her pregnancy and was later banned from her own laboratory by the department chair. This led them to move to the University of Hawaii and set up another lab.

Along the way in her career, the two had many setbacks, but turned them into lessons. While studying hackberry trees near Sterling Colorado, none of the trees bore the fruit she needed for her research which led to one of my favorite lines in the book:

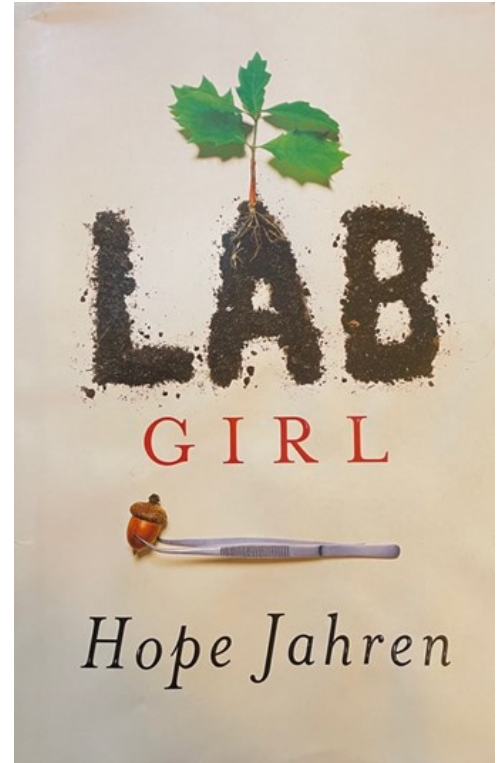
"The whole summer in Colorado was a data-gathering bust, but it taught me the most important thing I know about science: that experiments are not about getting the world to do what you want it to do."

While visiting Ireland, the pair collected hundreds of moss samples to take back with them, but while at airport security they were stopped, and the samples were trashed because they did not have a permit. They later used what they learned from this event to test new lab assistants.

"There are two ways to deal with a major setback: one is to pause, take a deep breath, clear your mind and go home, distract yourself for the evening, and come back fresh the next day to start over. The other is to immediately resubmerge, put your head under and dive to the bottom, work an hour longer than you did last night, and stay in the moment of what went wrong. While the first way is a good path towards adequacy, it is the second way that leads to important discoveries."

This all led her to receive numerous awards and to write over seventy published articles. If you are a 'Lab Girl' (or guy!) and looking for some inspiration, then please read this book!

"When I am pressed, I resort to these two sentences: You shouldn't take this job too seriously. Except for when you should."



Distinguished Member Profiles & Awards



Ernest Allen, USDA—SCST Honorary Member

While working his way through college, Ernest Allen earned his Bachelor of Science and Master of Science in biology from Winthrop University in Rock Hill, SC. Prior to joining the USDA Seed Regulatory and Testing Division, Ernest served several management roles in the service industry where he worked with many diverse groups.

Ernest joined the STRD in 2004 as a lab technician and was promoted to a botanist in 2006. As a botanist, Ernest played an integral role in administering the Federal Seed Act, carrying out seed testing services, and other outreach activities for state government and industry partners. He received his CSA in purity and germination in 2006. As an AOSA member, Ernest served on the AOSA Rules committee.

His accomplishments do not stop there. In 2011, Ernest completed the ISO Lead Auditor training and became a lead auditor for the USDA Accredited Seed Lab program. In 2013, he was promoted to the lab supervisor and deputy director. In 2015, Ernest was promoted to the Director of the USDA AMS Seed Regulatory and Testing Division. As Director, Ernest has focused on increasing the outreach efforts of SRTD and partnering with other organizations. Ernest has assisted in forming the International Seed Morphology Association (ISMA). He has also assisted with AOSA/SCST in creating promotional videos for recruiting seed analysts. Ernest has also partnered with AASCO to create a website for seed sampling education. He is currently the Rules committee chair with ISTA. Most recently Ernest was responsible for close work with all the key stakeholders in amending the regulations of the Federal Seed Act. Ernest is known for his strong belief in the importance of seed testing and regulation. He has been quoted as saying “Seeds play a tremendous part in our everyday lives. Each day, everyone deals with something seeds have impacted.” It is because of this unwavering dedication to the seed industry that SCST is proud and honored to present Ernest Allen with the SCST Honorary Member.



CSA Bios– Germination

As submitted by members, compiled by Scottie Pouliot

New CSAs are encouraged to submit bios and photos at any time. Bios received between issues will be published in the next issue. Please submit bios to the editors or to any newsletter staff.

Andrea Taylor



I grew up as a country kid from the Ozark Highlands. Spent a lot of time outside and was always curious about nature and biology. I worked in retail management for 15 years before deciding to make a career change and go back to school. I received a bachelor's degree in Biology from Columbia College in 2013. While attending school I joined the Master Naturalists and helped with local prairie restoration. Walking in fields to harvest native seed is a great way for me to unwind and reconnect with nature.

Since 2016, I have worked as a seed analyst for the Missouri Department of Agriculture State Seed Control Laboratory. Before my current position I had the experience of working as a tour guide, substitute teacher, naturalist, backcountry steward, and IT support technician. Oddly all helping me towards my career. I find my work as an analyst satisfying and well suited for my easy going and independent disposition.

Will Zastrow



Will is a botanist from Cedar Rapids, Iowa. He attended Iowa State University after high school to peruse a degree in Biology with a Botany concentration and began working at the ISU Seed Science Center starting in 2018, at the end of his freshman year. In his three years as a student employee, he worked in several different departments in the seed science building as they became seasonally busy, giving him a well-rounded experience in seed testing. He graduated in 2021 with both his diploma and his germination certificate and took a permanent position at the ISU Seed Science Center, where he now works as a junior seed analyst in the germination lab. He writes science fiction in his free time.



CSA Bios– Purity

Scottie Pouliot



I work at the Indiana State Seed Lab. I started working as a seed analyst four years ago after working for the USDA on a soybean project. I got my bachelor's degree from Purdue University in Entomology in 2015. I am currently working on my master's degree at Purdue in soil microbiology. I received my certification in germination in 2019 and my purity certification in 2021. My favorite seed is *Sida spinosa*.

Outside of work I am a glass artist. I make stained glass and I am a glassblower. At home, I pursue a variety of other interests such as cross stitching, reading, cosplaying, video games, and baking. My favorite thing to do is spoil my cats. I achieve all of this by drinking a lot of coffee and the support of my husband.



CVT Bios

As submitted by members, compiled by Quinn Gillespie, RST

New RSTs, CVTs, CPTs, RGTs, and CGTs are encouraged to submit bios and photos at any time. Bios received between issues will be published in the next issue. Please submit bios to the editors or to any newsletter staff. Not all new members may be represented here, if you have received your RST, RGT, CVT, CGT, or CPT please reach out to be included in the next issue.

Marshal Reidlinger

I grew up outside of Columbia MO and always had an interest in biology from a young age. I attended the university of Missouri for a time before joining Missouri Crop Improvement Association and started working towards my RST and have been working here for close to 4 years now.

Kelly Grief



I graduated from Iowa State University with a double major in Seed Science and Agriculture and Society, and a passion to help end food insecurity. I have been working at Corteva Agriscience in a seed quality lab for 3 years, and enjoy working for a company that is dedicated to solving food insecurity issues. This year I received my CVT, and am working towards my RST certification.



Lost Resources

Necrology Report

The loss of anyone from the seed testing industry, even if they are many years retired, always represents the loss of a valuable resource. Let us celebrate and reflect on these lost resources and honor the work they have done and the contributions they have made to seed technology. Memorials are presented here as submitted by the Necrology Committee.

Lawrence Odell Copeland

March 1, 1936—December 31, 2021

A visitation for Lawrence will be held Saturday, January 8, 2022 from 10:00 AM to 12:00 PM at Gorsline Runciman Funeral Homes, 1730 East Grand River Ave, East Lansing, MI 48823. A funeral service will occur Saturday, January 8, 2022 at 12:00 PM, 1730 East Grand River Ave, East Lansing, MI 48823. A committal service will occur Saturday, January 8, 2022 at Leek Cemetery, Sandhill Road at Dobie Road, Mason, MI 48854.

Fond memories and expressions of sympathy may be shared at www.greastlansing.com for the Copeland family.



From Dr. Sabry Elias:

It is with a saddened heart to inform you that Dr. Larry Copeland passed away on December 31st, 2021. He has been an active member in the AOSA for a long time, and chaired many committees. He contributed significantly to the seed science and technology and the seed testing areas for many years. His many outstanding publications such as Principles of Seed Science and Technology book, Seed Testing: Principles and Practices, Seed Science and Technology Laboratory Manual, and Seed Purity and Taxonomy book, and the many papers and extension publications are live testimony to his long and bright career as one of the best seed scientist in our generation.

I could not find better description of Dr. Copeland's accomplishments than what his long-term friend and co-author in many books and publications Dr. Miller McDonald, professor Emeritus of Seed Biology, Ohio State University, wrote when he participated in nominating him for the Oregon State University Distinguished Service Award in 2008, he wrote (*Thank you Miller*):

It is my pleasure to enthusiastically and whole heartedly endorse your nomination of Dr. Lawrence O. Copeland for the Oregon State University Distinguished Service Award. I have known and worked closely with Larry on research/teaching/extension projects for over 30 years and I can think of no one more deserving



of this award. During this period, Dr. Copeland has compiled an extraordinary academic record of world stature. Let me detail some of his significant accomplishments through his service and their impact on society.

Dr. Copeland began his academic and service career at Oregon State University (OSU) where he completed his B.S., M.S. and Ph.D. programs. It was at OSU, where he first understood the importance of seed as the essential reproductive unit in crop production because of his relationship with the acclaimed OSU Seed Certification and Technology programs. From there, Larry accepted a position as faculty member at Michigan State University with 100% extension emphasis in seed technology and additional responsibilities in teaching seed related courses. I will address his accomplishments since that period.

In spite of having a 100% extension appointment with primary responsibility to serve the seed industry in the state, Dr. Copeland immediately launched an ambitious research program culminating in research publications focusing primarily on seed production and seed quality evaluation. These works led to enhanced and improved seed production of crops local to Michigan. He identified superior seed quality tests related to important crops for the state. This work was so highly regarded and scientifically presented that he was asked and subsequently served as Editor of the esteemed research journal "Journal of Seed Technology" for approximately 6 years, the premier seed research journal in the United States. His research activities also resulted in the training of high quality graduate students, particularly from international countries. Many of those students today are placed in either academic institutions, departments of agriculture or the seed industry, testimony to the high quality of mentoring provided by Dr. Copeland.

It is my opinion, however, that Dr. Copeland's greatest legacy and international impact in seed biology has been his authorship of central textbooks in seed biology. In 1976, he wrote the "Principles of Seed Science and Technology." This was the first general textbook in seed technology that captured every aspect of the discipline and yet was still written at a level for undergraduate students. The popularity of the book was immediate and it is today considered THE textbook in introductory seed biology. The book is currently in its fourth edition and has been used worldwide with translations in Chinese and Korean with significant portions appearing in Indian books as well. Dr. Copeland asked me to be a coauthor on this book in 1984 and I found him to be an outstanding writer and creator of new materials. As a result, he and I coauthored other textbooks including "Seed Science and Technology Laboratory Manual" to support the "Principles" book and "Seed Production: Principles and Practices". More recently (2008), Dr. Copeland, in conjunction with Doris Baxter, published the text "Seed Purity and Taxonomy" that is novel in its use of comprehensive scanned seed images. This book will be required reading and a must reference for all seed technologists worldwide. It goes without saying that these publications have had significant impact on the education of seed technologists, students and the seed industry worldwide. They are considered as central references in any seed library.



In addition to these central references, Dr. Copeland is a critical scientist with outstanding writing skills. His talents are highly valued and in demand globally with numerous sponsored activities in other countries. He has provided important service to leading seed testing organizations such as the Association of Official Seed Analysts (Merit Award, given to only one person annually), Society of Commercial Seed Technologists (Honorary Member, given to only one person annually), International Seed Testing Association (member, Statistics Committee), Crop Science Society of America (Fellow), and Agronomy Society of America (Fellow). The latter two are only awarded to 0.005% of the membership and are highly competitive. With a 100% extension appointment, Dr. Copeland has also received several Outstanding Extension Specialist awards at MSU. These awards are based on significant career accomplishments, are highly competitive and further document the excellence and overall importance of his significant contributions to agriculture.

In conclusion, Dr. Copeland has established a sustained, outstanding, innovative career of research excellence, graduate student mentoring, authorship of central texts in seed biology, and distinguished service to the seed industry and related organizations that is without peer. His service is recognized and valued worldwide and had critical impacts to understanding and enhancing the production of quality seeds. His texts remain required reading in courses on the subject. These laudatory accomplishments have led to better agriculture and high quality seed production that are highly deserving of the prestigious OSU Distinguished Service Award.

Sincerest Condolences
Dr. Sabry Elias, CSA-G

Coralie Joyce Wilson

June 12, 1930 - December 17, 2021

Coralie Wilson, 91, of Albany, passed away Friday, at Quail Run. Coralie was born in Webster, South Dakota, to Walter and Irma (Krause) Machmiller. Upon graduation from the University of South Dakota in 1951, she went to work for the Northrup King Company in Minnesota. Two years later in 1953 she moved to Albany to be the seed technologist and laboratory manager for Northrup King, in Tangent.

She married George T. Wilson on December 9, 1955. He preceded her in death on January 30, 1985. They had one son, David G. Wilson, who also preceded her in death on March 23, 1992.

Her career with Northrup King was 40 years with retirement in 1992. She was a retired member and past president of the Society of Commercial Seed Technologists. Coralie enjoyed reading mysteries, gardening, British comedy TV shows, was a member of Camera Club and the Albany Friends of the Library. She also enjoyed traveling to the coast. At Coralie's request there will be no service. Online condolences may be posted at www.fisherfuneralhome.com





Joseph Stephen Burris
April 18, 1942—January 1, 2022

Joseph Stephen Burris, 79, of Ames, passed away peacefully at home on January 1, 2022. A celebration of his life will be held 2:00 pm Friday, Jan 14, at the First United Methodist Church, 516 Kellogg Ave., Ames, IA, with visitation following in the church multipurpose room.

Joseph was born April 18, 1942, to Charles R. and Catherine (Pravica) Burris in Cleveland, OH. Joe grew up in Lyndhurst, OH, graduating from Brush High School in 1960. He earned a B.S. from Iowa State University in 1964 and Ph.D. in agronomy/biochemistry from Virginia Polytechnic Institute in 1968. He joined the Botany Dept. at ISU as a seed physiologist in 1968. During his 31 year career at ISU, he advised and mentored over 40 graduate students, many of whom became life-long friends and colleagues in the seed industry. Joe counted among his professional accomplishments collaboration with the architect in design and construction of the original Seed Science Center on the ISU campus, significant contribution to the design and success of modern seed drying technology, and scientific understanding of seed quality. Joe was very active in professional societies. Upon retirement, he worked as a consultant to the seed and vegetable industry in many

parts of the world.

In 1963 Joe married Judith Burkley and together they had four children, Jeffrey (1966), John (1968), Jennifer (1969), and Jason (1973). He enthusiastically supported his children and then grandchildren at track, cross country meets, baseball, basketball and softball games, theatre performances, piano and dance recitals. He strategically planned family vacations, mapping out road trips across the country. Joe could fix or build anything he was challenged to do. And by his actions, Joe taught his children and grandchildren to be curious, self-reliant and engaged.

In 1999, Joe married Joan Peterson. They loved traveling, both to explore new places and to visit family and friends. He was an accomplished wood worker and enjoyed making custom furniture for his home and his children's homes. In later years, he learned and enjoyed wood turning, and loved giving his bowls to family and friends.

We will miss many things about Joe, including his wry sense of humor, his love for the underdog, his ability to be present when he was with you, and how he loved his family and friends.

Joe was preceded in death by his parents, sister, Barbara Joye, brother, Charles, all of Ohio. Those surviving are his sister in law, Hilda Burris, wife, Joan, children, Jeff (Natalie) of Cedar Falls, IA, John (Verushka) of Niwot, CO, Jennifer (Gregg Garn) of Norman, OK, and Jason of Green Bay, WI, grandchildren Nathan and Joel Burris, Morgan and Kevin Burris, and Kathryn, Dylan and Allyson Garn. Also step children Erich (Allison) of Mahomet, IL, Audra (Jonathan Hall) of Morgantown, WV, Giles (Jelena Saric, significant other) of Chicago, IL, and Julia Slocum of Ames, IA, and step grandchildren Pearce and Presley Slocum and Simone and Oscar Hall.

In lieu of flowers, memorials in Joe's name may be directed to the Iowa Arboretum, 1875 Peach Ave, Madrid, IA, 50156, or Mary Greeley Hospice Home Care and Israel Family Hospice House, 400 S. Dakota Ave., Ames, IA, 50014.

Funeral arrangements are under the direction of Grandon Funeral and Cremation Care, Ames, IA. The family wishes to extend grateful thanks to the Mary Greeley Hospice Home Care nurses and staff for their wonderful support and care.

Online condolences may be sent to www.grandonfuneralandcremationcare.com



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