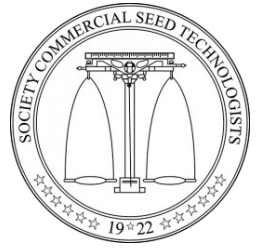




A newsletter for members of AOSA/SCST

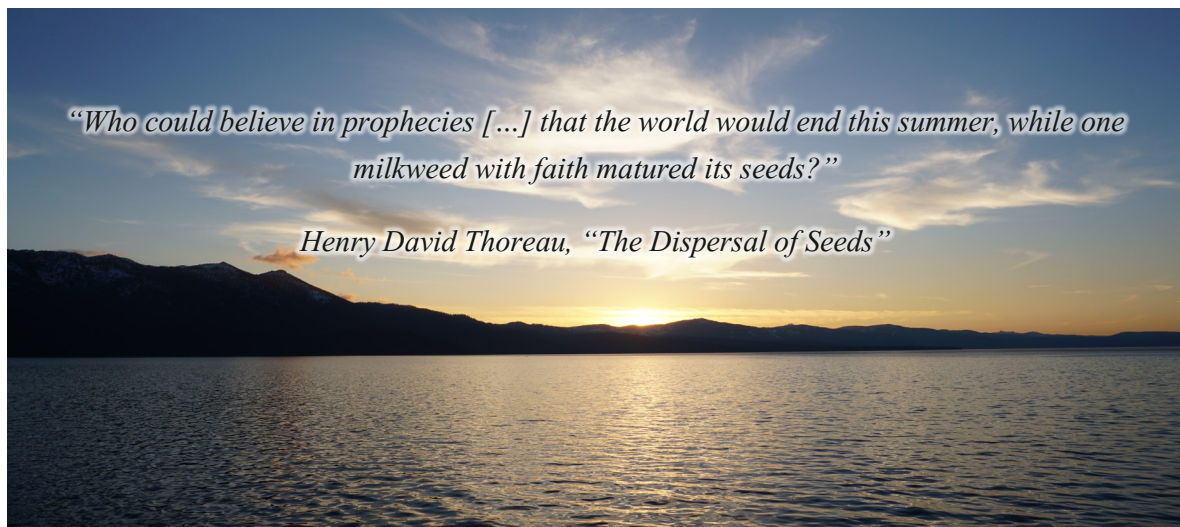


Seed Technologists Newsletter

Volume 88 No. 1

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- Lost Resources—Necrology



“Who could believe in prophecies [...] that the world would end this summer, while one milkweed with faith matured its seeds?”

Henry David Thoreau, “The Dispersal of Seeds”

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AOSA Rules Committee

Randy Crawl, AOSA Chair
Desirae Jones, SCST Chair

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



Letter from the Editor

By Quinn Gillespie, SCST Newsletter editor

Welcome back to the seed analyst's newsletter! First, I would like to thank everyone who has helped to contribute profiles, articles, and photos and generally tolerated the pestering of the editors. And special thanks to Heidi Jo Larson and Brent Reschly for collecting past newsletters, Universal Seed Co. for the time to work on this newsletter, and my co-editor Elizabeth Stewart for doing the bulk of the writing. It's been a strange process to recreate a document that hasn't been distributed in the time that I've been an RST. Doubly strange to be assembling a newsletter in a time when in-person meetings have been canceled. It cuts down a lot on our calendar of events when the future is made up of question marks.

I know that most of us are keenly missing the opportunity to see each other in person, to talk shop and catch up with one another at meetings and workshops. Every photo and post from past Annual Meetings that crops up on my social media feed is a poignant reminder of what we're missing this year. It makes it that much more important for us to stay in touch in other ways, and I like to think that this newsletter



is one way for us to reconnect while we have to keep our distance physically. In 2020 it seems that everything is slightly off kilter, so why not a newsletter returned from the dead?

Naturally this issue is going to differ from past newsletters in significant ways. So much more of our lives has become digital in the seven years since the last time the newsletter was published. Much of the news included in previous issues, such as job postings and referee projects, is now published on the joint website. The previous incarnation of the newsletter was offered as a subscription to the membership and at times topped 50 pages. This edition is considerably shorter and offered for free to the entire membership of the AOSA and SCST, just like the annual meeting proceedings.

Many of us are not living our normal lives for now, some are working split shifts, or altered shifts, or trying to figure out how to work safely and keep our other lab members safe. We're not as able to get together in person to solve problems in seed testing, or to present our ideas to the membership at large. But agriculture has been in motion for going on ten thousand years, and work in seed testing is still moving forward as well. Referees on clovers, hemp, and grasses are still taking place, with samples traveling through the mail to other labs. Rule proposals are still being written, and committees are meeting through conference calls and email lists.

I for one, am looking forward to being able to meet with other analysts in person and I hope that the newly rejuvenated newsletter allows us to stay connected to each other while we each continue the work of seed testing from within our own labs until we can all meet again, full of new ideas and projects and ways to be better as analysts. We are the milkweeds ripening our seeds for the future.



Letter from the President—SCST

By Heidi Jo Larson—SCST President

Wow!! What an interesting time and world we are currently living in. I know we are all wondering what's going to happen next. Most of you are functioning under some type of new "normal". Whether that normal is split shifts, an overabundance of PPE and plexiglass, or some combination of safety features. Due to the new safety features in place it has not allowed us to do much as a Society.

1. We are proud of the membership for their understanding in the unfortunate situation of having to cancel the annual meeting with ASTA. A lot of us are very disappointed but we could not afford to place anyone in any unnecessary harm. We had to err on the side of caution. We encourage committees to still do a conference call or a zoom meeting. Even if you had no major projects going on, get discussions going for the future.

2. We have had to cancel the examinations that have been scheduled up to August. We have discussed about traveling to locations to offer the examination if there were enough candidates. Travel restrictions for most of the Board of Examiners has our hands tied in that area as well. Unfortunately for the foreseeable near future we do not know when we will currently be able to offer the examination again.

3. Unfortunately workshop opportunities have gotten fewer and farther as well. With travel restrictions and the uncertainty the future holds, we don't know when one will be offered again.

4. The Boards have investigated virtual trainings, but we are tentative to host webinars, etc. Currently I know many laboratories have people working from home and some are doing shifts. Some of those shifts are half the lab staff working in the morning and the other half working in the afternoon. Some shifts have people only working certain days of the week. We are unsure what type of technology people have access to when there are not working in the laboratory. Would we be doing the membership a disservice if we offered trainings and webinars when only half the membership may be able to have access to it?

With all the uncertainty that we are all facing, the Board is still currently trying to conduct business to the best of our abilities. Even in these uncertain times, SCST is sitting okay financially. We invested some of the money into a 9-month CD to try to earn some interest off the money. It won't make us rich by any stretch of the imagination, but something is better than nothing. We did not feel comfortable going with a long term CD with these uncertain times. We wanted to be able to access the money quickly if we needed to.

With the graciousness of AOSA and the USDA we have been able to translate the SCST Seed Technologist Training Manual into Spanish. The translation has been completed and we are reaching out to an individual with experience in seed testing to check the translation for accuracy. This will be a very valuable resource for our membership.

We are also continuing to plan for the 2021 meeting in Saskatoon with the CSAAC. We know we also need to be prepared for whatever the new normal may be or a potential resurgence of covid-19. We have a working group along with the AOSA Bylaws and SCST Constitution & Bylaws chairs looking at changes to be able to conduct our meetings virtually if necessary. The way our current C&B reads is that a majority of our business, in particular business meeting, long range planning, and voting on the rules are to be done in person. We need to be able to better adjust to changing times. We have definitely fallen behind on that.

Changing times also mean necessary discussion of changing technologies. Both organizations need to examine the potential for virtual purity and germination analysis. I witnessed some very powerful microscopes that allow you to conduct a purity on a computer screen at very high magnification. There are all kinds of new technologies and changing times out there which can benefit laboratories by reducing subjectivity in analysis.



Letter from the Outgoing President—AOSA

By Mike Stahr—Outgoing AOSA President

By the time you read this I will be a past President of AOSA (second time around!). I was pleased and honored for the opportunity to be a “Principal” (as Jess Peterson calls us) for another four years. It was interesting to interact with the AOSA Executive Board, the Western Skies Executive Director team, SCST principals & Executive Board plus members of both our organizations. Leadership teams of AOSA and SCST also get to interact with other seed organizations, the main ones being ASTA, AASCO, AOSCA, and ISTA. I have the further privilege of continuing to interact with AOSA and SCST leadership and WSS, this time for the second time as a member of the SCST Executive Board.

Heidi did a great job of describing the different world we live in as a result of COVID-19. Canceling the planned joint meeting with ASTA in Indianapolis was a difficult decision to reach. We are well aware of the tremendous amount of work many people put into planning for the Indy meeting plus the missed opportunities to see all those familiar faces (and some new ones!). We are looking into making changes to allow conducting some or most of the annual meeting functions in a year when there isn't an annual meeting. I agree that we need this option, BUT I want to make sure it is only exercised when needed. I would hate to see our annual meetings dwindle in the number of attendees. We can do many things by e-mail and by Zoom, but we also need to meet in person.

Who would have thought in late January when we held a Purity workshop at Iowa State or the first week of February when Iowa State hosted the SCST Genetic Testing Super Workshop that just weeks later our worlds would be radically changed? There aren't nearly enough workshops in an average year and 2020 may not have any. That is very sad along with all the cancelled opportunities for exams to be given. I am a big fan of the AOSA SCST free webinars! They have covered many subjects (Rules, vigor, Canada Rules, exams, etc.). For a while we had several each fall, winter and spring, but even before COVID-19 they seemed to have become much less frequent.

I will close by grabbing onto the last sentence of the previous paragraph – less frequent webinars. These webinars are volunteer efforts and we are organizations of volunteers (except for our WSS Executive Director team). We have our “day jobs” and then we do even more by creating Rule proposals, preparing for & giving webinars, meeting as committees and boards, proctoring exams, conducting study halls and so much more. These are super trying times. Our hectic work lives have been made even more hectic and many of us work from home and others are locked in their labs during the day. PLEASE contribute to advancing seed testing and seed technology anyway you can. Everybody can contribute something and what YOU have to contribute IS NEEDED. A side benefit is that by contributing you can easily earn those continuing education points.

Be safe!



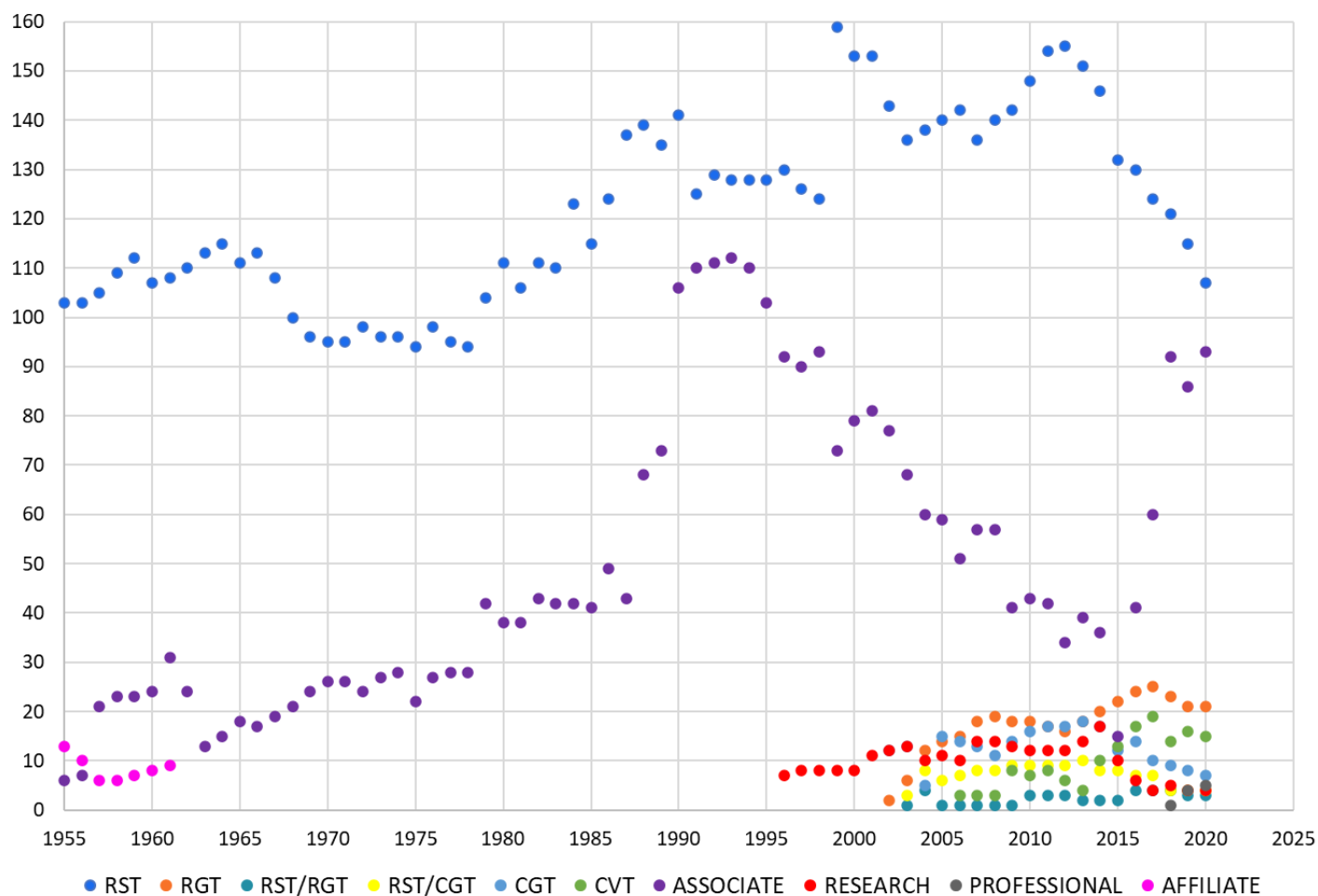
SCST Membership by the Numbers



Current Membership

RSTs	107
RGTs	21
RST/RGTs	3
RST/CGTs	4
CVTs	15
CGTs	7
Professional	5
Research	4
Associate	93

HISTORICAL SCST MEMBERSHIP 1955-CURRENT





SCST Financial Update

Society of Commercial Seed Technologists Balance Sheet As of May 31, 2020

	Total
ASSETS	
Current Assets	
Bank Accounts	
Wells Fargo CD	25,000.00
Wells Fargo Checking*	71,548.20
Total Bank Accounts	\$ 96,548.20
Accounts Receivable	
Accounts Receivable	35,625.00
Total Accounts Receivable	\$ 35,625.00
Other Current Assets	
AM 2021 Prepaid Expenses-Loding	2,500.00
Prepaid Expenses	167.48
Total Other Current Assets	\$ 2,667.48
Total Current Assets	\$ 134,840.68
TOTAL ASSETS	\$ 134,840.68
LIABILITIES AND EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
Accounts Payable	8,997.50
Total Accounts Payable	\$ 8,997.50
Other Current Liabilities	
Accrued Expenses	12,062.50
Wild Species Grant	804.04
Total Other Current Liabilities	\$ 12,866.54
Total Current Liabilities	\$ 21,864.04
Total Liabilities	\$ 21,864.04
Equity	
Unrestricted Net Assets	99,591.23
Net Income	13,385.41
Total Equity	\$ 112,976.64
TOTAL LIABILITIES AND EQUITY	\$ 134,840.68

-These financial statements and financial information have not been subjected to an audit or review or compilation engagement, and no assurance is provided on them.

-Financial statements and financial information is prepared on a modified accrual basis.

-Management has elected to omit substantially all of the disclosures and the statements of stockholder's equity and cash flows required by accounting principles generally accepted in the United States.



AOSA Financial Update

Association of Official Seed Analysts Balance Sheet As of May 31, 2020

	Total
ASSETS	
Current Assets	
Bank Accounts	
10000 Checking	0.00
Wells Fargo Checking 2532	151,619.39
Total 10000 Checking	\$ 151,619.39
Total Bank Accounts	\$ 151,619.39
Accounts Receivable	
12000 Accounts Receivable	29,350.00
Total Accounts Receivable	\$ 29,350.00
Other Current Assets	
Prepaid Expenses	312.48
Total Other Current Assets	\$ 312.48
Total Current Assets	\$ 181,281.87
TOTAL ASSETS	\$ 181,281.87
LIABILITIES AND EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
20100 Accounts Payable	60.00
Total Accounts Payable	\$ 60.00
Total Current Liabilities	\$ 60.00
Total Liabilities	\$ 60.00
Equity	
32000 Unrestricted Net Assets	142,851.74
Net Income	38,370.13
Total Equity	\$ 181,221.87
TOTAL LIABILITIES AND EQUITY	\$ 181,281.87

-These financial statements and financial information have not been subjected to an audit or review or compilation engagement, and no assurance is provided on them.
-Financial statements and financial information is prepared on a modified accrual basis.
-Management has elected to omit substantially all of the disclosures and the statements of stockholder's equity and cash flows required by accounting principles generally accepted in the United States.



Book Review, *The Triumph of Seeds*

Beth Tatum, USDA

The Triumph of Seeds: How Grains, Nuts, Kernels, Pulses, & Pips Conquered the Plant Kingdom and Shaped Human History by Thor Hanson

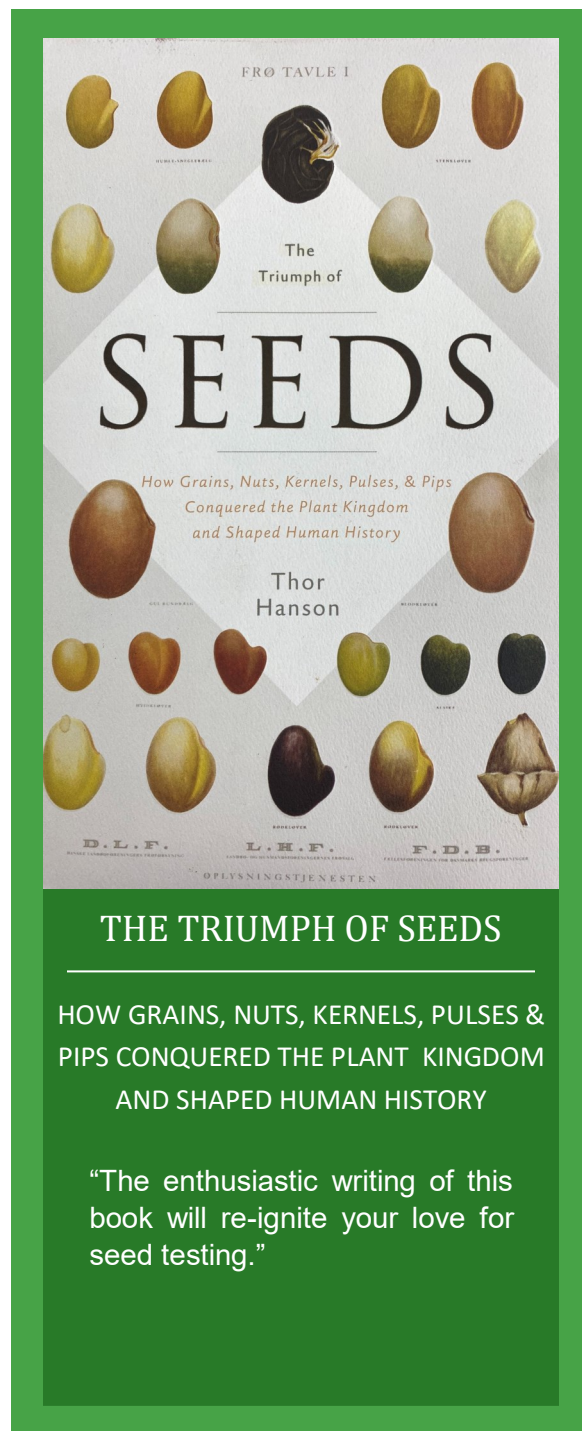
This book is a perennial favorite at the annual meeting silent auction with good reason. The enthusiastic writing of this book will re-ignite your love for seed testing. Even if some of the botany information mentioned is well known by seed analyst, it is a fantastic overview and will give you some ideas for resources, just check out the bibliography.

Hanson starts out by describing his research as a graduate student on the *alejandro* tree, including several amusing stories. Later in life he decided on the topic of this book, and his extensive research took him from the Palouse Prairie in Idaho, to New Mexico to study plant fossils, to recreating Gregor Mendel's study of peas in his own backyard. He visited the National Seed Bank in Colorado, and interviewed members of the Seed Savers Exchange.

The book describes the history of relationships between people and seeds. History lessons such as the story of Masada Fortress and an evolution lesson of the seed, rodent, and predator relationship. It covers Christopher Columbus' search for spices, the travels of the coffee bean, how to commit murder with the castor bean, and how seed dispersal methods influenced the design of battle gear and aircraft.

In the appendix, Hanson includes notes for each chapter with additional interesting facts and a glossary of botanical terms which includes my favorite definition for germination: "The awakening of a seed." But be sure not to use this definition on your Certification Exam, it will probably won't count.

Thor Hanson is also the author of several other ecological books for general audiences, including *Buzz: The Nature and Necessity of Bees* (2018), *Feathers: The Evolution of a Natural Miracle* (2011), and *The Impenetrable Forest: My Gorilla Years in Uganda* (2008).



"In the broadest sense, dormancy refers to that quiet pause, however long, between when a seed matures and when it germinates." Thor Hanson



Genetic Technology Super Workshop

Beth Tatum, USDA & Molly Richeson, AgReliant

The Super Genetic Workshop was held from February 3rd to 6th at Iowa State University. The workshop was hosted by the SCST Genetic committee and the Iowa State University staff. The workshop consisted of several presentations and hands-on training. Topics included molecular and cell biology, mitosis and meiosis, and molecular markers for basic genetic training, then hands-on techniques of ELISA, PCR, and starch gel electrophoresis. The test was offered after the training for analyst who wish to get their RGT. Some of the techniques discussed are described below.

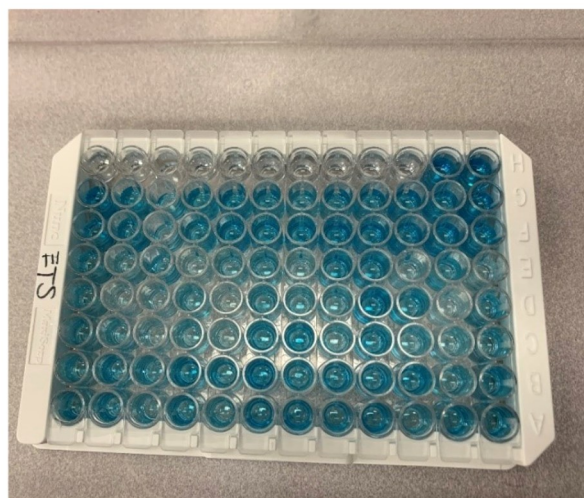


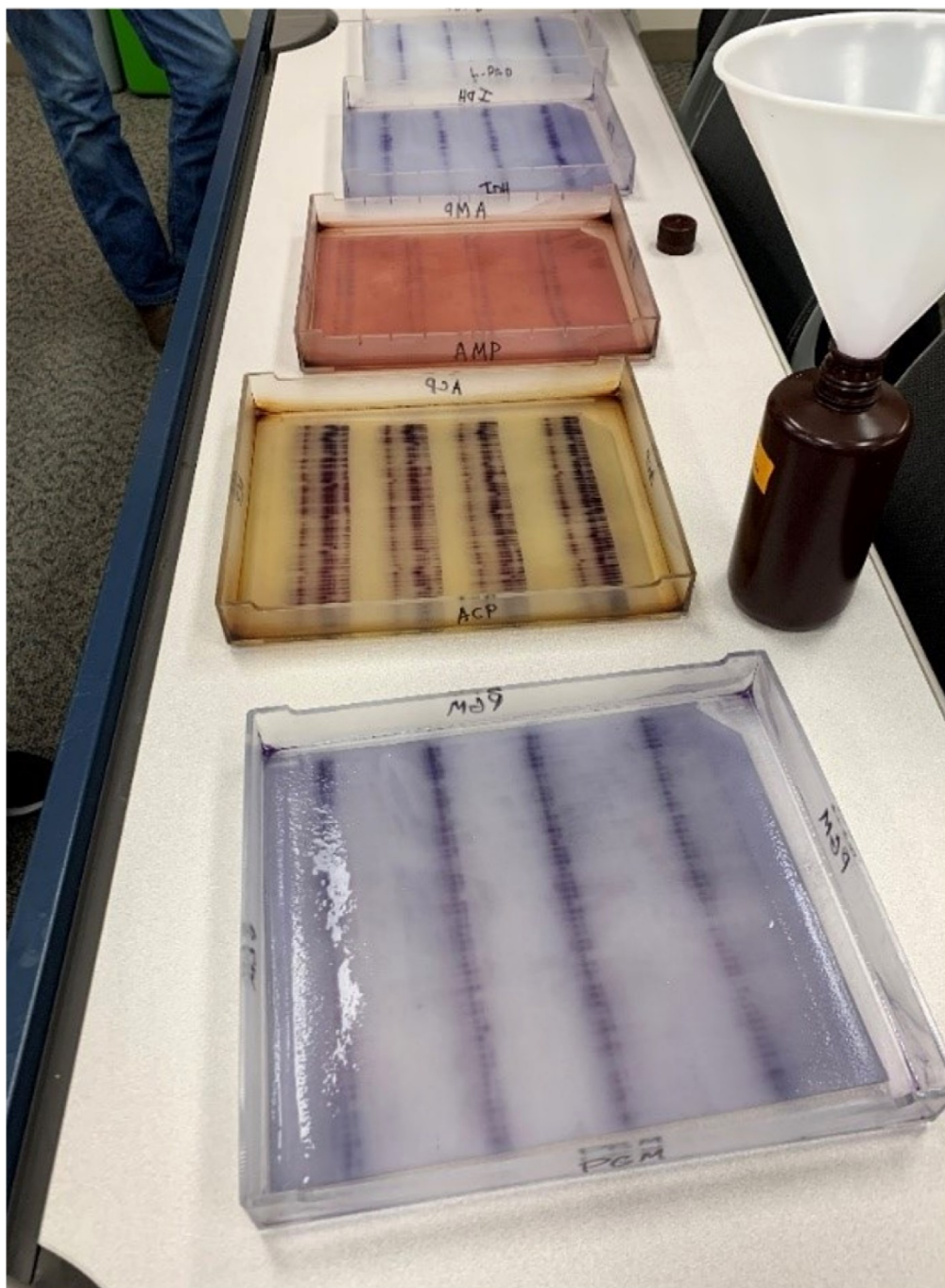
Lateral Flow Strip Test:

The sample extract flows through the sample pad at the bottom to the absorbent pad at the top. The release pad holds antibodies which will bind to the sample extract if the target proteins are present and the pink lines will show up on the indication window.

ELISA microtiter plate:

The plates are prepared with specific antibodies. When the sample extract is applied, it will either bind to antibody and create the blue color or wash away.





Starch Gel Electrophoresis:

The genetics committee brought in a previously stained potato starch gels. Filter paper wicks with the absorbed protein are inserted in the gels. The gels are placed in the electrode tank and are run at a constant power. After electrophoresis is completed the gels are then sliced and placed into different buffers to allow multiple enzyme systems to be assayed (shown in picture). Banding patterns are then evaluated.



How to Write a Rule Proposal

AOSA Rules Committee

During the review process for rule proposals, the AOSA Rules committee decided to compile a list of helpful tips for how to develop rule proposals that meet all the requirements established by the rules committee. Rule proposals that don't meet the requirements may be sent back to the authors for revision, or they may be rejected by the committee.

First, the authors must state the purpose of the rule proposal. Does the rule concern clarification of the rules, or the addition of a new species to the rules? Is there a new procedure or germination method to be added to the rules for testing seeds, or is an old method no longer being used and should be replaced with a method that improves uniformity in testing? Is the new method repeatable between laboratories and analysts?

If proposing a change to a current rule, include the text of the original rule first, and then the edited text, with the edits in red to make them visible. When the rules are reviewed during the Open Rules meeting new changes are made in blue. Color coding also helps to distinguish changes made during Open Rules from the initial proposal written by the authors.

Rule proposals must include a harmonization and impact statement that explains how the new rule proposals harmonizes or does not harmonize with the ISTA Rules, the Canadian M&P, and the Federal Seed Act. Authors should also consider the impact of a new rule proposal on the seed industry, labeling, and state regulations. Rule proposals that are at odds with state and federal seed laws may be rejected. Changes that affect other handbooks and reference materials produced by the AOSA should also be considered and detailed in this section, as they will also need to be updated to reflect the changes to the AOSA Rules.

Once the purpose of the proposal has been established and the impact of the rule change is examined, the authors must gather sufficient data to support a rule proposal. Basic requirements to ensure solid statistical analysis include a minimum of six different labs and six lots of seed tested when proposing a new method for testing, or a change to a previously existing method. The number of labs is vital to ensure that the methods

[For more Information]

Find out more about the AOSA Rules Proposals for 2020 and view the official rule proposal guidelines on the [Rules Committee](https://www.analyzeseeds.com/aosa-rules-2/) page at <https://www.analyzeseeds.com/aosa-rules-2/>

proposed are repeatable across multiple labs. For seed kinds which are not readily available, such as native and reclamation species, it may not be possible to obtain enough seed from six different lots to conduct testing. In this case it may be acceptable to use fewer lots, provided that an adequate number of labs are able to supply data.

To ensure solid experimental design involve other committees in the rules pro-

Harmonization

ISTA Rules

Canada M&P

Federal Seed Act

RUSSEL

Individual State Seed Laws

Impacts

Other AOSA Handbooks
(eg. TZ, Report of Analysis,
Cultivar Purity.)

Seed trade, both national
and international.

State regulatory agencies



cess. The statistics committee is available for advice before starting the study to help in the experimental design and for the analysis of data at the end of a referee process and can also help ensure that any studies conducted will produce usable and meaningful data to support the rule change proposal. Research committees including the purity, germination, tetrazolium, and cultivar purity committees should also be consulted for background information and assistance in analyzing data as well. The ISTA technical committees are another valuable resource and may also be able to provide information regarding previous research or may decide to recommend a similar change to the ISTA rules in order to preserve uniformity across the seed testing organizations. Now more than ever seed testing organizations are trying to ensure that our testing methods are in harmony with one another.

The authors should submit their rule proposals by October 15th. The sooner proposals are sent in before the deadline the more time the Rules Committee has to review them. The Rules Committee may also seek the guidance of the AOSA and SCST Boards, especially when rule proposals may be controversial or concern a change in information to be included on a report of analysis. Time must be allowed for the boards to provide input as well. The authors should also include all relevant contact information. If a rule proposal is pending and contact information changes or an author is removed the Rules Committee should be notified in case there are follow up questions concerning the rule proposal.

These recommendations are provided by the Rules Committee to help ensure that the proposals submitted meet the criteria for voting the first time, and that any changes made to the AOSA Rules for testing seeds reflect solid scientific data.

How to Choose Lots for Referees

- If there are multiple varieties readily available, the lots chosen should reflect multiple varieties.
- Varying quality of seed lots. Seed with very high vigor and high initial germination may do well regardless of methods. Similarly, seed with very low germination may fail to perform regardless of methods. Varying quality lots may also have different average seed sizes as well, which may affect the counts used to determine purity weights.
- Variable years of seed lots, especially when considering seed that may present dormancy issues or when adding new procedures for dormancy breaking.

Prospective Rule Proposals

The two proposals presented on the following pages are two which the Rules Committee discussed at length with the executive boards of both AOSA and SCST. The committee feels that it would be beneficial to both the membership and the authors of the rule proposals to have the complete text available as presented to the Rules Committee for the membership to review. Members are encouraged to read each proposal carefully and to provide the authors with feedback.

Both proposals concern the reports of analysis and how tests which deviate from the rules for testing seeds should be reported. Changes to these portions of the rules may also require a change to the Report of Analysis Handbook. The current statements required by the AOSA Rules are listed in the initial text portion of each Rule proposal.

The current guidance from the executive boards is that the proposals be allowed to move forward for voting by the membership, but may benefit from feedback before they are presented during the Open Rules discussion.



AOSA Rules Proposal 1 : Complete Text

Authors: Lynn Robinson, NE Seed Lab; Kathleen Willey, NM Seed Lab; & Johnny Zook, PA Seed Lab

PURPOSE OF PROPOSAL

To provide additional requisites to the AOSA Rules for Testing Seeds for the required statement indicating deviation from the Rules, and to clarify the appropriate circumstances for deviating from the rules.

PRESENT RULE

Introduction, Page vi, Paragraph 4

When individual samples appear to require special treatment resulting in deviations from the rules, the following statement must be made in the remarks section of the report of analysis: “(*insert name of test*) test was not conducted in accordance with the AOSA Rules for Testing Seeds.” This statement must then be followed by a citation of the AOSA rule and a description/explanation of the deviation. The allowance for deviation should not be construed as an authorization to indiscriminately conduct and report testing not in accordance with these rules.

PROPOSED RULE

When individual samples appear to require special treatment resulting in deviations from the rules, the following statement must be made in the remarks section of the report of analysis: “(*Insert name of test*) test was not conducted in accordance with the AOSA Rules for Testing Seeds. The results might not be eligible for seed labeling; consult the appropriate state and federal seed laws.” This statement must then be followed by a citation of the AOSA rule and a description/explanation of the deviation. The allowance for deviation should not be construed as an authorization to indiscriminately conduct and report testing not in accordance with these rules. Deviation from AOSA Rules for Testing Seeds may only be done when all rule options have been exhausted. Every effort should be made to use the quantities of seed stipulated in the rules and stay within the established testing duration.

HARMONIZATION AND IMPACT STATEMENT:

This proposal is specifically for the reporting of results of seed testing in accordance with the AOSA Rules for Testing Seeds. The seed testing laboratories would need to adjust their reports to accommodate the new wording required for seed testing reporting. The additional stipulations of the proposal should help state seed regulators who are enforcing proper seed testing requirements and encourage seed laboratories to not deviate from the Rules unless necessary. This proposal stems from a discussion held during the AOSA Regulatory meeting at the 2019 AOSA/SCST annual meeting.

SUPPORTING EVIDENCE

Many seed regulatory entities will not accept seed testing results from testing that does not follow the AOSA Rules for Testing Seeds. Customers need to be aware of the possible situation. For example: If a customer is seeking a new germination test to update the “Test Date” for a seed lot with an expired “Test Date,” the customer should be informed if the testing deviated from the rules. If the customer receives a test based on 200 seeds and not the official 400 seeds, as required by the rules, the new germination test will be rejected by those regulatory entities that require testing to be done according to the AOSA Rules for Testing Seeds.

In a similar fashion, many Seed Certifying Agencies will not accept seed testing results that do not follow the AOSA Rules for Testing Seeds. If a customer is trying to meet the minimum germination standard for certification (by claiming Total Viability), and the seed testing laboratory they are using determines the dormant seed percentage as the TZ percentage minus the germination percentage, the Seed testing results will be rejected by those certification entities that require testing to be done according to the AOSA Rules for Testing Seeds.

Submitted by:

Lynn Robinson, NE Seed Lab
Kathleen Willey, NM Seed Lab
Johnny Zook, PA Seed Lab

DATE SUBMITTED:

10/09/2019

Revised 02/21/2020



AOSA Rules Proposal 22: Complete Text

Authors: Lynn Robinson, NE Seed Lab; Kathleen Willey, NM Seed Lab; & Johnny Zook, PA Seed Lab

PURPOSE OF PROPOSAL

To provide additional requisites to the AOSA Rules for Testing Seeds as relating to the statement indicating deviation from the Rules, and to provide guidance in how to respond an improper report of analysis under the purview of the Rules.

PRESENT RULE Section 15, m

m. Any report of analysis containing tests not conducted in accordance with the AOSA Rules, when such rule exists, must contain this statement in the remarks section of the report: *'(Insert name of test) test was not conducted in accordance with the AOSA Rules for Testing Seeds.'* This statement must then be followed by a citation of the AOSA rule and a description/explanation of the deviation.

PROPOSED RULE Section 15, m

m. Any report of analysis containing tests not conducted in accordance with the AOSA Rules, when such rule exists, must contain this statement in the remarks section of the report: *'(Insert name of test) test was not conducted in accordance with the AOSA Rules for Testing Seeds. The result(s) might not be eligible for seed labeling; consult the appropriate state and federal seed laws.'* This statement must then be followed by a citation of the AOSA rule and a description/explanation of the deviation. Failing to include the statement and description/explanation shall constitute a breach of the AOSA Rules for Testing Seeds, and the Report of Analysis should not be considered a valid report.

HARMONIZATION AND IMPACT STATEMENT:

This proposal is specifically for the reporting of results of seed testing in accordance with the AOSA Rules for Testing Seeds. The seed testing laboratories would need to adjust their reports to accommodate the new wording required for seed testing reporting under the purview of the AOSA Rules for Testing Seeds for testing that did not follow the Rules. The additional stipulations of the proposal should help state seed regulators who are enforcing proper seed testing requirements by giving guidance in rejecting invalid reporting, and thus encourage seed laboratories to not deviate from the Rules unless necessary. This proposal stems from a discussion held during AOSA Regulatory meeting at the 2019 AOSA/SCST annual meeting.

SUPPORTING EVIDENCE

Many seed regulatory entities will not accept seed testing results from testing that does not follow the AOSA Rules for Testing Seeds. Customers need to be aware of the possible situation. For example: If a customer is seeking a new germination test to update the "Test Date" for a seed lot with an expired "Test Date," the customer should be informed if the testing deviated from the rules. If the customer receives a test based on 200 seeds and not the official 400 seeds, as required by the rules, the new germination test will be rejected by those regulatory entities that require testing to be done according to the AOSA Rules for Testing Seeds.

In a similar fashion, many Seed Certifying Agencies will not accept seed testing results that do not follow the AOSA Rules for Testing Seeds. If a customer is trying to meet the minimum germination standard for certification (by claiming Total Viability), and the seed testing laboratory they are using determines the dormant seed percentage as the TZ percentage minus the germination percentage, the Seed testing results will be rejected by those certification entities that require testing to be done according to the AOSA Rules for Testing Seeds.

Submitted by,

Lynn Robinson, NE Seed Lab
Kathleen Willey, NM Seed Lab
Johnny Zook, PA Seed Lab

DATE SUBMITTED:

10/09/2019
Revised 02/21/2020



Hemp Seed Testing: Suggestions for Labs

Beth Tatum, USDA

Hemp is one of the oldest of known textile fibers. There is record of it having been cultivated in China for fiber around 27 BC. In the United States more labs are seeing hemp submitted for purity and germination testing. The increase in production and need for consistent testing methods is very evident in all parts of the United States, and hemp has been a topic of discussion at seed meetings nationwide. The AOSA and SCST are conducting research to ensure that labs performing hemp seed testing have the skills necessary to provide consistent results. A referee was conducted by Region 6, Canada, regarding evaluation of hemp seedlings and in 2020 there is an additional referee addressing possible issues of dormancy being conducted by Southwest region 4.

With the enactment of the 2018 Farm Bill, hemp has been removed from Schedule I of the Controlled Substances Act and is no longer a controlled substance. This recent change has led to an increase in hemp production in the United States, both for local use and for export. Labs and exporters should be aware that countries may still have varying statuses regarding the import of hemp seed and may require additional permissions from local governments. It is advised to consult with the import governments departments of agriculture, and potentially with the importing country's department of drug or controlled substance administration to ensure necessary permits are obtained to avoid a rejection of the crop by the importing country.

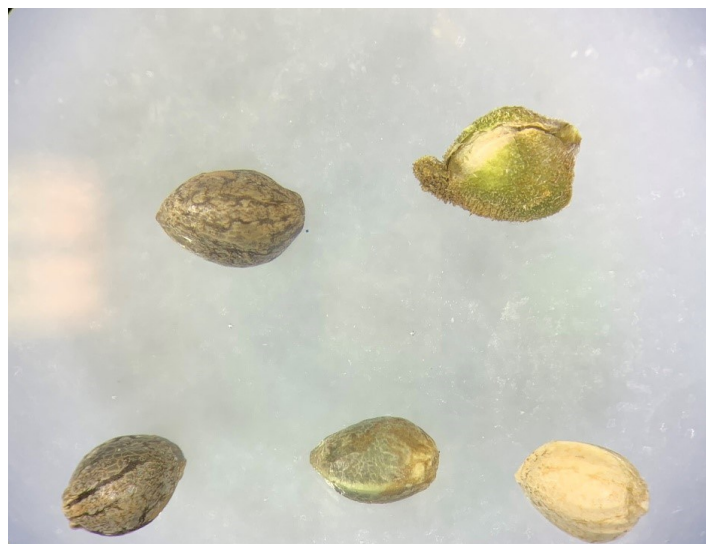
The pure seed unit of industrial hemp is the whole achene larger than one-half the original size. The achenes are round to egg-shaped with veins around the edges. The color ranges from yellow to olive to brown and occasionally mottled with distinct white line venation. See insert regarding possible confusion with hemp nettle and cautions.

A hemp purity exam is 50 grams and 500 grams for the noxious. The pure seed unit includes: "intact achenes whether or not a seed is present." However empty achene units are commonly encountered when conducting purity exams.

For a germination exam, seed are planted on rolled towels and placed in the 20-30 C chamber. The first count is evaluated at 3 days and the final count 7. There is currently no prechill recommendation in the case of fresh and dormant seed. Hemp is an epigeal dicot, developing two leaf-like photosynthetic cotyledons during the testing period. Normal seedlings grow one long primary root with root hairs. Secondary roots may develop during the testing period. The epicotyl does not generally develop during the



Hemp seed purity
Photo credit: Beth Tatum, USDA



Hemp Seed
Photo credit: Beth Tatum, USDA



Hemp Nettle

Jose Hernandez, hosted by USDA-NRCS PLANTS Database

HEMP VS. HEMPNETTLE

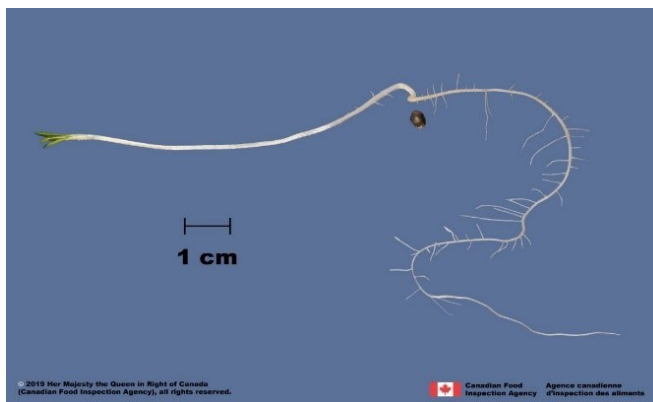
Care should be taken when looking for hempnettle (*Galeopsis* sp.) in hemp (*Cannabis* sp.) samples. Hempnettle is noxious in Alaska, in addition to being considered an Invasive Species per NR40 in the state of Wisconsin. Labs are encouraged to list hempnettle, if found in the bulk exam in the remarks on a report of analysis.

Both seeds may be approximately 2-2.5 mm in width, and 2-3 mm in length, with pale to medium brown mottling and a slightly glossy surface, which may be more pronounced on heavily milled lots. Both species are also slightly ovoid in shape, with a lens shaped cross section. Hempnettle is from the Lamiaceae family and has a pronounced hilum with a roughened texture, and a slightly raised, bubbled texture on the surface of the seed. Hemp seeds are generally very smooth with a webbed or striped appearance to the surface of the seed.

Hemp (*Cannabis sativa*)

Steve Hurst, hosted by USDA-NRCS PLANTS Database

testing period but may be assumed to be intact if the cotyledons are intact. An abnormal hemp seedling could include malformed or watery hypocotyl, necrotic cotyledons, or missing or stubby roots. Cotyledons must be examined if they have not fully emerged from the seed coat by the end of the testing period.



Normal hemp seedling, note intact cotyledons and primary root with secondary roots developing.



Hemp seedling with deep hypocotyl lesion and necrosis present on cotyledon.



Hemp seedling with seed coat removed, revealing necrotic cotyledons.

Hemp seedling photos credit CFIA.



Distinguished Member Profiles—2019

Dr. Riad Baalbaki, CDFA



Riad obtained his bachelor's degree in Agriculture and Master of Science degree in Agronomy at the American University of Beirut, Lebanon, and his Ph.D. in the Crop and Soil Sciences Department at Michigan State University with a major in Seed Physiology. He then conducted postdoctoral research at the Seed Biotechnology Lab at North Carolina State University (a university noted for its eminence in biostatistical research), before joining the faculty of the American University in Beirut, where he served as Assistant and then Associate Professor of Plant Sciences from 1992 to 2005, serving as chair of the Department from 1998 to 2001. He then joined the staff of the Seed Laboratory of the California Department of Food and Agriculture in Sacramento in 2006, where he currently serves as a Senior Seed Botanist specializing in seed and seedling physiology, germination testing, and seed vigor testing.

Riad is an active researcher in seed and seedling related topics and has published a significant body of original research over the last 30 years. He has actively shared his expertise with the seed testing community in myriad ways, including: serving as cochair of the Germination Committee of AOSA/SCST, as a major contributor to the AOSA Handbooks on Seed Vigor testing and Seed Moisture testing, as an author of the widely used textbook, "Seed Testing: Principles and Practices" (S. Elias et al., 2012), as editor of the journal Seed Technology over the last ten years, and organizer and teacher of many national and regional workshops on seed testing and experimental design and statistics, often in collaboration with Sabry Elias. Riad has long been especially generous in providing advice, help, and mentorship to many of us in the seed testing community, sharing his statistical expertise, voluminous photographic library of seedling development, and commonsense approach to solving the diverse problems faced in seed testing.

Jennifer Pernsteiner, MNCIA



Jennifer Pernsteiner graduated from University of Wisconsin – River Falls with a degree in Plant Science (Agronomy Option). Following college, Jennifer married her husband, Steve, and had two children. During her children's younger years, Jennifer was an active 4-H Program Assistant. In August, 2000, she began a career in the seed industry as an administrative assistant at BioDiagnostics Inc. (now Eurofins BioDiagnostics), later moving to a seed analyst and supervisor positions. During her eight years at EBDI, Jennifer received her RST (June 2003), CGT (Herbicide Bioassays in June 2004; ELISA in January 2008), became a Senior Member of CSAAC, CFIA Seed Grader (June 2007), conducted internal ISO audits, and trained several analysts pursuing their RST certification. At Minnesota Crop Improvement Association, Jennifer managed the MnDOT, Sod, and Native programs, served as staff liaison for native seeds, and performed various field inspections for corn, soybeans, sod, natives, and noxious weed free forage and mulch. In August 2016, MNCIA was able to reopen its seed lab after being shut down for eight years, largely due to Jennifer's efforts, in which she managed until retirement in December 2018.

During her career in seed testing, Jennifer was an active member of SCST. She has served on several committees (i.e. Purity, Handbook, etc.), served as Director At Large, SCST liaison for CSAAC, worked on editing of the Seed Technologist Training Manual, co-author of rule proposal reclassifying native species, and presented on soybean hila colors during the Seed Issues Forum.

Jennifer has a thorough background in plants in which she greatly enjoys sharing her knowledge and expertise. In her spare time, she enjoys crafting with her husband, Steve, and being a grandma.



Distinguished Member Profiles—2020

Mike Stahr, ISU



Mike Stahr began his career as a student seed analyst at the Iowa State University seed lab in November of 1979. Mike has worked his way through the ranks and was promoted to the ISU Seed Lab Manager in 2007. Mike and staff have mentored hundreds of student workers and made an impact on the ISU Seed Lab and the industry as a whole. Many of Mike's former students are serving significant roles throughout the agriculture industry.

Mike is not known for sitting behind a desk. He most often can be found working out in the lab alongside his co-workers. Mike is also very actively involved in AOSA and SCST. He has served as President of AOSA along with serving on the Board as a Director at Large. Mike has served on numerous committees as well: genetic technology, rules, cultivar purity, and seed vigor. In 2015, Mike was awarded the AOSA Merit award for his hard work and dedication.

While Mike's passion for seeds has now spanned over 40 years, his love of agriculture is in his DNA. Mike's parents both grew up on farms and moved to Iowa when Mike was a young child. The family started farming in 1969, near Ogden, where Mike's grandparents

soon joined them. "We had our own *Living History Farm* as we harvested corn by hand and put loose hay in the hayloft," Mike said. "I married a farmer's daughter and have been privileged to assist my in-laws in farming for more than 40 years. Julie and I live on the farm just south of Boone that has been in her family since around 1845."

Sue Alvarez, Ransom Seed Lab



Sue Alvarez graduated from the University of California Davis with a master's degree in Horticulture. Prior to becoming an RST, Sue was very active in seed testing. She began her career as a seed analyst with Ransom Seed Lab in 1985. From there she worked as a seed analyst and an assistant seed physiologist with Petoseed Company in California. She was responsible for all aspects of research for hybrid vegetables, coordinating trials, along with seed testing.

In 1994, while employed with Ransom Seed Lab, Sue obtained her RST. Sue has been very active in all aspects of seed testing with Ransom. Not only does she assist with the day to day seed testing duties, but she is responsible for training new analysts as well. Sue is very active in referee testing and research into new methods of seed testing. Sue has been very active in the committees and work of SCST. Sue has served as co-chair of the rules committee, editor for the *Journal of Seed Technology*, and has been a member of numerous other committees. Sue has also served the organization on the Board of Directors.

Janine Maruschak, CFIA



Janine grew up in Saskatchewan on a farm and was surrounded by agriculture, nature and plants, and has always had a great appreciation for that. Janine studied at the University of Saskatchewan and celebrated 30 years of service with the federal government this year. Janine has been the Head of the Seed Science and Technology Section at the Canadian Food Inspection Agency's (CFIA) Saskatoon laboratory since 1999 and currently manages a team of 29 seed testing colleagues.

Janine has been a participant at the AOSA meetings since 2000, has served on the Rules Committee, the Referee Committee and has been an Executive Board member since 2006 and Secretary Treasurer since 2011. Janine continues to be actively involved in AOSA, having hosted the AOSA meeting in Saskatoon in 2005 and plans to host another meeting in 2021.

Janine is also an internal and external auditor overseeing the CFIA's accredited seed laboratory program and is actively involved in the Canadian seed sector serving on the CSAAC board,

has attended OECD, ISTA meetings and has a great deal of experience in seed certification and grain testing systems. Janine sees it as a privilege to be able to work with many staff of different expertise, who come from different backgrounds with different experience and have skill sets to do the work that SSTS does on behalf of Canadians and the seed sector.



COVID-19 Agricultural and Food Industry Safety Webinar

Summary by Quinn Gillespie, SCST

On May 29, 2020 ASTA sponsored a presentation by Dr. David Acheson of The Acheson Group. Dr. Acheson has more than 30 years of experience in food safety, epidemiology, and food-borne pathogens and founded The Acheson Group as global food safety consulting group in 2013.

Dr. Acheson provided a brief overview of SARS Covid 19 regarding the virus lifespan and spread. The current CDC understanding of the virus is that it is still primarily person to person contact, from symptomatic or asymptomatic people spreading respiratory droplets or aerosols.

The current knowledge of Covid-19 symptoms is still expanding. At the moment the primary symptoms that an infection may be Covid-19 has expanded beyond shortness of breath and fever. A number of other secondary symptoms have also been identified. Dr. Acheson was very clear in his belief that the vaccine is still some years away and that at this time the best treatment if hospitalization is not warranted is to rest and remain hydrated. While treatments are in development, and some show promising results, an official treatment for the virus has not yet been designated.

For essential industries, Dr. Acheson included a list of best practices intended to limit the potential for person to person spread and recommended that companies establish a plan to isolate individuals who become sick. (See p. 14) With regards to visitors to essential industries, Dr. Acheson recommended limiting visitors to only the most essential and conducting wellness checks on anyone from outside the company arriving on site.

In the event that an employee or someone on staff does become ill, Dr. Acheson also laid out clear guidelines for when an employee may safely return to work, based on the current understanding of the virus.

The team at The Acheson Group provides daily updates on current CDC and WHO research and understanding of the SARS-Covid-19 virus. Daily updates and free printable materials in multiple languages for workplaces are available at <https://www.achesongroup.com/covid-19>.

COVID-19 TRANSMISSION FACTS

- Most people will experience symptoms within five days if they are going to at all.
- By fourteen days everyone who is going to show symptoms at all will have shown symptoms.
- Primary spread is from person to person contact via aerosols.
- Symptomatic people may be able to spread the virus up to ten days after the onset of symptoms
- There is currently no evidence of transmission via food or packaging.
- Surface transmission rates are low. SARS-Covid-19 does not reproduce on surfaces but may live on surfaces for up to four days.

SARS-COVID-19 Symptoms

Primary symptoms

- Fever
- Cough
- Shortness of breath
- Chills
- Anosmia (loss of smell and/or taste)
- Diarrhea



Secondary symptoms

- Headache
- Muscle pain
- Tiredness or fatigue
- Sore throat
- Oxygen levels below 90%



Workplace Recommendations from TAG

Best Practices for Essential Industries

- Communicate the importance of handwashing and practicing good hygiene including covering coughs and sneezes with a disposable tissue and throwing it away immediately.
- Encourage the use of face coverings whenever people are working together. TAG defines working together as within 6 feet for more than 10 minutes.
- Communicate the importance of social distancing with signs, floor markings, or physical barriers. Free printouts are available from [The Acheson Group](#), the [World Health Organization](#), and the [Center for Disease Control](#).
- Conduct wellness checks for employees, asking if people are experiencing any symptoms or fever, or take temperature before beginning a shift or returning from lunch. Temperature checks may not be reliable if someone is taking fever-reducing medication.
- Isolating employees into shifts or groups to reduce spread and cross-contamination of shared surfaces.
- Regular cleaning of common touch points including bathrooms, locker rooms, break rooms, and food preparation areas.

What to do if someone becomes sick?

- Individuals who are ill or symptomatic should be isolated and sent home.
- Individuals they have been working closely with (within 6 feet for more than 10-15 minutes) should also be isolated.
- Isolate the area they were in contact with for 24 hours, if possible, then clean thoroughly with an EPA approved disinfectant.
- Stay in contact with the individual and remember that all individuals may have very different reactions to the stresses of the current pandemic.
- Communicate clearly with other employees while maintaining worker medical confidentiality.



When is it safe to return to work following a diagnosis or suspected case of Covid-19?

- Ten days after symptom onset with no fever present for at least 72 hours without the use of fever reducing medication such as ibuprofen, aspirin, or acetaminophen.
- Distinct reduction in symptoms including shortness of breath, fatigue, and/or cough.
- If tests are available, two negative test results at least 24 hours apart. Keep in mind that tests may not be available in all areas.
- If someone is asymptomatic and tests positive, it is safe for them to return to work 10 days after the date of the most recent test result.
- Always follow medical advice regarding safe return to work.



Constitution and Bylaws Change Procedures

Quinn Gillespie, SCST Constitution and Bylaws Chair; Kathleen Willey, AOSA Bylaws Committee

General Procedure for Changes to the SCST Constitution and Bylaws Changes

1. Proposed changes to the SCST constitution and bylaws must come from the board or from the general membership. The constitution and bylaws chair does not make changes independently.
2. Proposed changes from the membership are submitted to the Executive Board for review and discussion.
3. If proposed changes are approved by the Board to move forward, the Constitution and Bylaws chair will draft proposed amended text to be presented to the general membership for review. Typically this presentation takes place during the Long Range planning meeting.
4. Proposed amendments are discussed by the members present, and at this time any additions or edits may be made to the proposed amendments.
5. The Executive Director sends out the proposed amendments as agreed upon during Long Range planning, to the entire membership. Generally this is a digital version of the presentation given during Long Range planning. The presentation is also made available on the analyzeseeds.com website.
6. A ballot is drafted to be sent out to all members eligible for voting. Members have 30 days to review proposed amendments before voting is tallied. Each proposed amendment is voted on individually.
7. Only amendments which have been voted on and passed by a 2/3 majority are added to the constitution and bylaws.
8. Passing amendments are made to the constitution and bylaws and the updated version is sent to the Executive Board for review and final approval before distribution to the membership and upload to the website.

For more information, current versions of the AOSA Bylaws and SCST Constitution and Bylaws, and change forms visit the AOSA Bylaws Committee and SCST Constitution and Bylaws pages at analyzeseeds.com.

General Procedure for Changes to the AOSA Bylaws

1. Compile data from a referee, survey or harmonization group to offer proof for the need to change or add a bylaw.
2. Used the attached form to state what bylaw is to be changed or added.
3. Add compiled data to prove need for change
4. Sign and date completed Bylaws change form and email to AOSA Charter and Bylaws chair.
5. Changes approved by the Charter and Bylaws Committee for action by the membership must be published or sent to the official laboratories within 30 days of the annual meeting.
6. Changes approved for action by the membership must be presented to the membership at the annual meeting, during the business meeting.
7. Within sixty days after the annual meeting ballots are sent out by mail or electronically to the membership.
8. Forty percent of official laboratories must participate in the voting, and proposed changes must pass by 2/3 of the vote to be adopted into the Charter and Bylaws.



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.

Willemina Catherine (Kimm) Van Egmond

As published in the Grand Rapids Press

Willemina Catherine (Kimm) Van Egmond (96) of Jenison, Michigan went to be with her Lord and Savior on April 12, 2020 at the Brookcrest Rehab & Life Center in Grandville, Michigan.

She was born on March 31, 1924 to Nick and Alice Kimm on their farm near Manhattan, Montana. Willemina was raised on their family farm and attended Manhattan Christian Elementary School and graduated from Manhattan Public High School in 1943. She later graduated from the Bozeman Business School. She married Peter Van Egmond in 1946 with whom she would have 4 children: Rollan (1948), John (1950), Marie (1954) and Patricia (1957). Peter passed away in December 1956 at the age of 37 from complications related to childhood rheumatic fever.

Willemina was employed by Montana State University and worked for 33 years in the Plant Sciences & Pathology Department as a laboratory seed analyst. She tested the purity of seed samples for farmers, seed growers, and other state agencies. In retirement she did volunteer work at the Law and Justice Center, Love, Inc., and the Chamber of Commerce in Bozeman.

Willemina was a long-time member of the Bethel Christian Reformed Church in Churchill, Montana and its Evening Fellowship Ladies Group. Her special joy in life was participating in Bible Study Fellowship for 19 years. Through this study, she acquired a wealth of Bible knowledge which enriched her spiritually. She also loved to knit, crochet, read and do petit-point stitching.

In 2009, Willemina moved from Bozeman, Montana to the independent living community at Waterford Place in Jenison, Michigan. While in Michigan she became a member of Ridgewood Christian Reformed Church and attended regularly until her death. She loved playing card and board games as well as constructing puzzles with her fellow Waterford Place community residents.

Willemina is preceded in death by her parents, her husband Peter, her sister Winona Vander Molen and her brother Clarence Kimm. She is survived by her sisters Audrey Flikkema (Manhattan, Montana) and Ethel Bestebreuer (Sunnyside, Washington) along with numerous nieces and nephews. She is also survived by her 4 children: Rollan (Marijo) Van Egmond, Grand Rapids, Michigan, John (Janna) Van Egmond, Tucson, Arizona, Marie (Jeris) Vermeer, Maurice, Iowa, and Patricia Van Egmond, Tucson, Arizona along with her 12 grandchildren and 16 great grandchildren.

Celebration of Life services will be held at both the Bethel Christian Reformed Church in Churchill, Montana and at the Ridgewood Christian Reformed Church in Jenison, Michigan at a later date when the current COVID-19 restrictions are lifted. Memorials may be sent to the Bible League International in Crete, Illinois or the Bethel Christian Reformed Church in Manhattan Montana. Willemina enjoyed God's presence and direction in her life and knew that her eternal hope was in her Lord and Savior, Jesus Christ.

We will miss her earthly presence but rejoice in her liberation to heaven where she is now glorifying her heavenly Father forever. I love you, LORD, my strength. The LORD is my rock, my fortress and my deliverer; my God is my rock, in whom I take refuge, my shield and the horn of my salvation, my stronghold. (Psalm 18:1-2 NIV)



Lost Resources

Necrology Report

Dr. Arnold Larsen

Dr. Larsen was well known in the AOSA and SCST during his career. He was a longtime AOSA member, president (1979), a Meritorious Service award recipient (1982) and Honorary member. He served on numerous committees, pioneered blowing point research and invented the thermogradient plate. He wrote a Study Guide to the Seeds of Colorado and served for many years as an advisor and content developer for the Seed Analysis Program at the Larimer County Voc-Tech and later for the Colorado State University's Seed Testing distance education program. A small correction from the obituary: the name of the seed lab he directed was the Colorado Seed Laboratory (1970 - 1993). He worked hard to pass along his research skills and seed analysis skills to employees and graduate students. His input at annual meetings was always well regarded. He will be greatly missed.

Jolan Mari

Today we honor the life of Jolan Mari and celebrate her inspirational contributions to Ball and the seed industry. Jolan sadly passed away this week after a long battle with cancer and our hearts are heavy with the loss. Those who knew and worked with Jolan through the years can attest to her amazing dedication to raising and maintaining standards in the world of seed, and how she did it all with a positive, friendly attitude. Her marvelous work ethic and accomplishments over her 40-year career with Ball is certainly a story worth sharing.

Jolan joined Ball Horticultural Company in 1977 only three months after arriving in the United States with her husband Joseph from a rural town in Croatia (then Yugoslavia). Remarkably she did not speak English when she immigrated to West Chicago, where she began work as a custodian. However she took advantage of the Ball language facility to learn. Over the years she has made the most of many opportunities, including learning more about seed biology and growing with the company. She advanced to the Seed Testing Lab in 1987 where she worked until her recent retirement.

Jolan was mentored by Francis Kwong (another legend in seed!) and it was he and Ben Lacson, former head of seed production for PanAmerican Seed, who encouraged her to further her career in seed testing.

"One day she asked me what else she could do in the company," recalls Ben. "At that time, we were sending most of our tests externally as we did not have a certified resident seed technologist (RST). I told Jolan, 'You can study to become an RST.' She took up the challenge that Francis and I gave her, and, for a period of three years, she studied very hard while continuing to work full time and According to Ben, our seed tests are now officially recognized as legitimate because Jolan put her stamp on them. As an RST, she provides support to PanAmerican Seed Production locations and around the globe through the Association of Official Seed Analysts (AOSA) and Society of Commercial Seed Technologies (SCST). And just as Francis was an inspirational mentor, Jolan was always willing to help and pass on her extensive knowledge of seed testing to others.

"She trained many colleagues and mill leads at our farms and was instrumental in getting Linda Vista up and running," says Anne Leventry. "She also helped with new crops and protocols, where she often set the standard by developing brand-new testing techniques."

Jose Moya, head of seed testing in Costa Rica, remembers the time in the 1990s when he travelled to West Chicago to work in the PanAmerican Seed Lab. That's where he first met Jolan. She worked very hard teach-



Lost Resources

Necrology Report

ing him and the new LV team. She spent time explaining seedling and seed structure of crops, which was valuable knowledge that definitely built a strong foundation at the farm.

"She was never a selfish person. Whenever we needed help Jolan always immediately looked for any way to help us. That's why we at Linda Vista love her," Jose says. "I remember a phrase she always said in our conversations: 'Keep your head up, be passionate, and pay attention to the details. That will help you do a good job.' I will miss you, my friend."

"Jolan is the authoritative word on seed quality for PanAmerican Seed and one of the most dedicated and principled people I have ever had the pleasure to work with," says Linda Mackechnie, our seed production research manager. "Her ability to maintain the highest standards is one of the reasons we are the best in the industry."

Throughout her career, Jolan was revered for seeing obstacles as challenges and failures as setbacks rather than defeats. Her research efforts on behalf of our company and the seed industry were key to making new product ideas into realities. "She saw the wonder in all of it," says Ball research scientist Ruth Sellman. "Jolan had a great passion for the natural world. She would often remark about the amazing diversity of plants and seeds and marveled in the multiplicity of just ONE kind of seed or plant species." Ruth also admired Jolan's courage and how in her eyes nothing was impossible. You simply put your nose to the grindstone and got it done. No cutting corners, no excuses or stonewalling. Get it done and do it right. "She was steadfast in her work ethic and everyone who knew her depended on this. And those who didn't know her well swiftly learned it about her."

"Jolan was my supervisor for more than 17 years," says Anna McDowell, a Ball retiree who worked side-by-side with Jolan completing countless significant projects. "Her knowledge and expertise in seed testing, germination and the horticultural industry as a whole were unsurpassed. I cherish the years we worked together and her friendship. She will be dearly missed."

Jolan lived in West Chicago with her husband of 45 years. He has recently passed as well. They raised three children, Jackie, Joseph Jr., and Elizabeth, and had two grandchildren, Erick and Morgan. In her own words during her 40-year Ball Service Awards, Jolan shared how she enjoyed her work in seed immensely even though she had been in the same department for decades.

"Each season brings new challenges and excitement," she wrote in her 2017 booklet entry. She was proud of her accomplishments (rightly!) and felt great satisfaction at contributing to the flower seed industry.

Dear Jolan was not ready to retire and leave us so soon. She felt there was much more she wanted to accomplish. But we can all agree – *and celebrate!* – that what she did accomplish was significant and appreciate such devotion to our company. We offer our condolences to her family and all who know and love her. Thank you, Jolan.

How to contribute a memorial for a lost resource:

Contacts:

Matt Levy, SCST Historian & Necrology Committee chair at buckicoach@hotmail.com

Kathleen Willey, AOSA Historian & Necrology Committee chair at kwilley@nmda.nmsu.edu

Or the Executive Director at: scst@seedtechnology.net or aosa@aosaseed.com